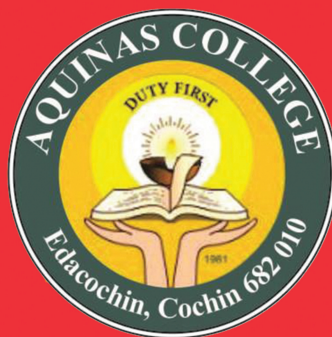


AQUINAS JOURNAL OF MULTIDISCIPLINARY RESEARCH

Volume III April 2017 ISSN 2395-7751



AQUINAS COLLEGE
EDACOCHIN, COCHIN - 682010
KERALA, INDIA

AQUINAS JOURNAL OF MULTIDISCIPLINARY RESEARCH

Peer Reviewed Research Journal



Aquinas College

Edacochin, Cochin-682010

Kerala, India

www.aquinascollege.co.in

Email: aquinascollegemail@gmail.com

Advisory Board

Rev. Fr. Johnson Chirammel

Dr. Babu Joseph

Dr. V. P. N. Nampoori

Dr. Thomaskutty Mathew

Dr. V. S. Antony

Manager,

Aquinas-Avila-Siena Colleges

Former Vice Chancellor,

CUSAT, Kochi

Emeritus Professor, ISP, CUSAT

Reader, STAS, MG University,

Regional Centre, Edappally

Academic Director,

Aquinas-Avila-Siena Colleges

Editorial Board

Chief Editor

Prof. Dayisi M. F.

Principal, Aquinas College

Editor

Joseph John

Associate Professor and Head,

Department of Physics,

Aquinas College

Associate Editors

Tania John

Assistant Professor and Head,

Department of English

Sivaraj K. S.

Assistant Professor,

Department of Physics

Mary Jemima Sebastian

Assistant Professor,

Department of English

Berry Holaday M. G.

Assistant Professor,

Department of Economics

Athira Prakash

Assistant Professor,

Department of Physics

DECLARATION

I, Prof. Dayisi M. F., Principal, Aquinas College, Edacochin, hereby declare that I am the printer and publisher of the journal entitled **Aquinas Journal of Multidisciplinary Research** to be printed and published at Edacochin and particulars in respect to the said journal given hereunder are true to the best of my knowledge and belief.

- | | |
|-------------------------------------------------|------------------------------------------------------------------------------------------------------------|
| 1. Title of the Journal | Aquinas Journal of
Multidisciplinary Research |
| 2. Registration Number | ISSN 2395-7751 |
| 3. Language | English |
| 4. Periodicity | Yearly |
| 5. Retail selling price of the Journal per copy | Rs. 300/- |
| 6. Publishers Name | Prof. Dayisi M. F. |
| Nationality | Indian |
| Address | Principal, Aquinas College,
Edacochin, Cochin-682010, India |
| 7. Place of Publication | Aquinas College, Edacochin,
Cochin-682010, India |
| 8. Printers Name | Prof. Dayisi M. F. |
| Nationality | Indian |
| Address | Principal, Aquinas College,
Edacochin, Cochin- 682010, India |
| 9. Name of Printing Press | Little Flower Press, Perumpadappu,
Cochin-682006, India |
| 10. Editor's Name | Joseph John |
| Nationality | Indian |
| Address | Associate Professor and Head,
Dept. of Physics,
Aquinas College, Edacochin,
Cochin- 682010, India |
| 11. Owner's Name | Rev. Fr. Johnson Chirammel |
| Nationality | Indian |
| Address | Manager,
Aquinas-Avila-Siena Colleges,
Edacochin, Cochin-682010, India |

ISSN 2395-7751

All Rights Reserved

© Aquinas College, Edacochin, Cochin- 682010, India

EDITORIAL

We are extremely happy to present the third issue of the Aquinas Journal of Multidisciplinary Research. The Journal serves the academicians by encouraging analysis, discourse, and providing the most effective and permanent way of passing on information to a large audience as well as progressively developing expertise in their interested area. We hope this third issue will be more acceptable to our well-wishers who search for new sources of information.

The present issue of Aquinas Journal of Multidisciplinary Research will lend a new perspective and dimension, which will help to illumine hitherto unexplored areas of the subjects and make it a profound study. Moreover it will provide a forum for the interdisciplinary study of contemporary issues which will help to encourage a closer interaction between the various branches of knowledge. Our mission is to examine diverse aspects of the rapid changes taking place in the field of research and to present them with sagacity, truth and vision. The Journal provides an outlet for innovative research, which advances understanding of the core areas of study in all its varied aspects. It provides a platform for the researchers and academicians to share their knowledge. We wish to stimulate your discussions and innovations through this Journal. As an academic publication, the Journal is open to all researchers of diverse fields of discipline.

We extend a warm thank you to all the contributors who have generously shared their expertise with us. We would also take this opportunity to thank the editorial board for their peer review work. Wish you all a happy and informative reading.

Editors:

Prof. Dayisi M. F., Principal

Joseph John, Associate Professor and Head

CONTENTS

Science

1. **Optical Studies on Micro- Viscosity Variation of Styryl 7 Dye on Different Solvents** 1
Sony Udayan, Mathew Sebastian, V. P. N. Nampoori and Sheenu Thomas
2. **Investigation on the Conduction and Polarization Mechanisms of Chromium Doped Multiferroic Yttrium Manganite** 7
Sivaraj K. S. and Anantharaman M. R.
3. **Thermodynamics of Schwarzschild Blackhole and its Modifications in the Dark Energy Field** 14
Greeshma Mohan, Chrislima Kavu and Dr. Tharanath R.
4. **Preparation and Absorption Studies of Graphene Oxide and Reduced Graphene Oxide** 26
Amala Jaison, Meril Sunny and Kala M. S.
5. **Photocatalytic Degradation of Textile Dye Using Chemically Synthesized Silver Nanoparticles** 32
Mary Shalmia M. T., Sreekutty Prathapan and Radhu Subha

Humanities

6. **The Dark River, Black Exclusion and Poverty: An Ecofeminist Reading of Breana Clarke's *River, Cross My Heart*** 38
Dr. Soney Bhageeradhan
7. **Revival of Sovereignty through Forests: Extrication of Feminine Characters in Select Bollywood Tawaif Films** 48
Sabitha S. Babu
8. **'The Neo-white man's burden': Journey from Colonialism to Post Colonialism in the movie *Lord Livingstone 7000 Kandi*** 59
Tessa Fani Jose, Athira Babu
9. **The Simple Symbol: Tracing the Tremendous Shift in the Digital Space from Phoneography to Hashtivi** 62
Lakshmi Anil

10.	<i>K-Drama: A Lodestar to the Indian Telenovelas</i> Annu Mary Cyriac	66
11.	<i>Virgo Intacta: Of the Mind</i> Swathi O. A.	73
12.	Truncated Portrait of Nature: Unveiling the Era of Ecological Awakening in Malayalam Literature Liz Mary Antony	78
13.	‘Matsyagandhi’ as a Text of the Marginalized Sheena Kaimal N., Shalvi P. P.	84
14.	Influence of Different Intensity Aerobic Speed among Education Students Simmi I. S.	90

Sports

15.	Current and Emerging Topics in Sports Video Processing Shaji Jose	96
16.	Relationship of Anxiety and Aggression with the Penalty Kick Performance in College Level Women Football Players Saran K. S.	108
17.	Comparative Study on Achievement Motivation and Unforced Error among State Level Badminton Players Nithin Nazarudeen	114
18.	Comparison of the Service Efficiency between State Level and District Level Volleyball Players Rahul R. Nair	120
19.	Effect of Core Workout on Abdominal Strength and Flexibility among College Students Mithin Anand	126

Optical Studies on Micro - Viscosity Variation of Styryl 7 Dye on Different Solvents

Sony Udayan¹, Mathew Sebastian¹, V. P. N. Nampoori¹ and Sheenu Thomas¹

¹International School of Photonics, Cochin University of Science and Technology,
Cochin, India

ABSTRACT

We have observed micro viscosity variation using Styryl 7 dye through fluorescence lifetime techniques in different solvents. Fluorescence lifetime of Styryl 7 on different solvents is found to be increase with the viscosity of the samples. Lifetime studies confirm that Styryl 7 dye is a good fluorescent probe for detecting the micro viscosity of the samples.

INTRODUCTION

Fluorescent probes are generally used in biomedical studies for the detection of bio molecules and used in fluorescent imaging of biological matters. Among the wide varieties of fluorescent probes styryl dyes are commonly used [1]. These dyes are effectively applied as delicate probes for fluorescent staining of proteins [2]. Among different derivatives of styryl dyes few dyes are molecular rotors such as Styryl 7, Styryl 8, Styryl 9M, Thioflavin T. On exciting a molecular rotor, for example styryl 7, the benzothiazole and dimethylaminophenyl group around the C=C bond will form a non-radiative twisted intramolecular charge transfer state. The most remarkable feature of molecular rotors is the dependency of the twisted state formation rate on the local environment, mainly the micro viscosity of the solvent. In the case of molecular rotor, the steric hindrance for the formation of twisted state is observed in viscous solvent. It has been reported that restriction to the formation of this twisted state will increases the fluorescence intensity of the dye [3]. In a biological system, viscosity plays an important role. The change in viscosity of cell membrane is the variation of various physical processes in the cell, mainly due to various diseases [4]. Some examples are, increased viscosity of red blood cells and blood platelets observed in patients with

diabetes, an increased viscosity of erythrocytes seen in patients with liver disorder due to alcoholism, and decreased viscosity of leukocytes seen in patients with Alzheimer's diseases [5-7].

EXPERIMENTAL

Styryl 7 dye (S7) was used as supplied by Sigma-Aldrich. All the solvents were spectral grade and were used without further purifications. S7 dye of 0.02mM concentration was prepared on ethanol, methanol, butanol, isopropyl alcohol and water. Absorption and fluorescence spectrum of the samples were recorded by using UV-VIS NIR Spectrophotometer (Jasco V-570) and Varian Cary Eclipse fluorimeter. Lifetime studies were carried out by DeltaproTM fluorescence lifetime system.

RESULT AND DISCUSSION

Figure 1 shows the absorption spectrum of S7 on different solvents. The absorption is due to the charge transfer between the donor amino groups to the charged thiazole groups. Absorption peak for different solvent differs thoroughly as a function of solvent polarity. With an increase in polarity of the solvent the absorption peak has a blue shift, indicating a smaller dipole moment in the excited state [8]. FWHM of the absorption spectrum increases with increase in solvent polarity.

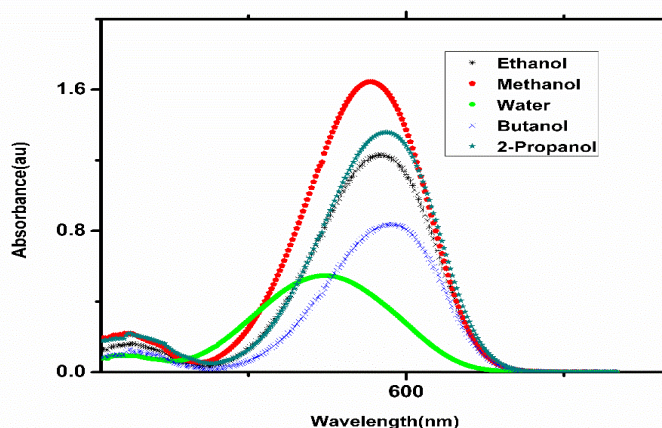


Fig 1: Absorption spectrum of S7 on different solvents

Figure 2 shows the fluorescence spectrum of S7 on different solvents. Fluorescence spectrum is found to be narrower than the absorption spectrum. Fluorescence intensity increases with increase in viscosity of the solvents. Exception occurs only for water. Fluorescence spectrum is less sensitive to the polarity of the solvent. Table 1 shows the absorption and fluorescence maxima of S7 on different solvents.

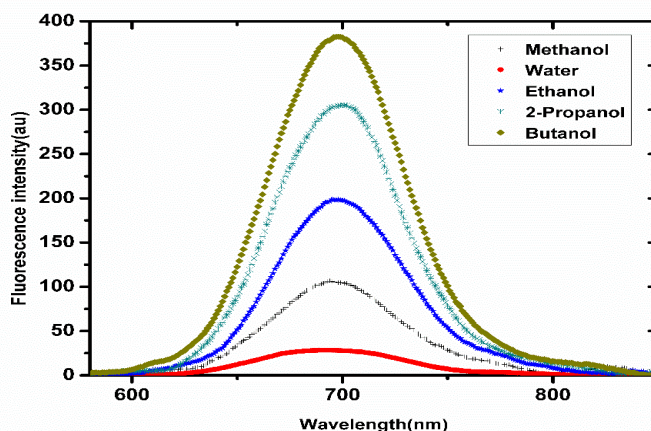


Fig 2: Fluorescence spectrum of S7 on different solvents excited with 532nm

Sl. No.	Solvent	Solvent Polarity	Absorbance		Fluorescence	
			$\lambda_{\text{max}}(\text{nm})$	FWHM(nm)	$\lambda_{\text{max}}(\text{nm})$	FWHM(nm)
1	Butanol	0.46	579	121	698	74
2	Isopropyl alcohol	0.51	575	123	697	70
3	Ethanol	0.54	570	128	699	69
4	Methanol	0.60	562	129	697	65
5	Water	1.09	522	166	694	84

Table1: Absorption and Fluorescence maxima of S7 on different solvents

Fluorescence lifetime measurements of S7 in different solvents were done by using Time correlated single photon counting techniques (TCSPC). The samples were excited with short light pulses of duration 1.4 ns and wavelength 367nm from an LED light source. The decay of the fluorescence intensity is given by the relation $F(t) = \alpha_0 e^{-t/\tau}$ and for multiple fluorescence decay; the fluorescence intensity is given by the relation $F(t) = \sum_i \alpha_i e^{-t/\tau_i}$. Fluorescence lifetime is calculated using least square curve fitting algorithm. Mono exponential curve fit indicates a single fluorescence life time with a fit parameter χ^2 close to unity. Multi exponential decay occurs if the fit parameter χ^2 deviates from unity [9]. Fluorescence lifetime of S7 varies proportionally with micro viscosity of the solvent. The increase in lifetime is due to the deactivation of the radiation less path due to rigidification of the molecule [10]. Table 2 shows the lifetime of S7 on different solvent.

Sl. No.	Solvent	Viscosity (mPa.s)	Lifetime (nsec)
1	Methanol	0.543	0.14
2	Water	0.89	0.16
3	Ethanol	0.983	0.18
4	Isopropyl alcohol	2.1	0.24
5	Butanol	2.3	0.33

Table 2: Lifetime of S7 on different Solvents

From the above experiments the optical properties of S7 is highly dependent on the viscosity and polarity of the solvent, this property of the dye make it to be used as a fluorescent probe for sensing micro viscosity change in biological samples.

CONCLUSION

We have shown that the optical properties of Styryl 7 dye is found to be dependent on the polarity and viscosity of the local environment. Absorption maxima of dye on different solvents shifted to blue side with increase in solvent polarity. Fluorescence intensity of the dye on different solvents increases with increase in solvent viscosity. Fluorescence lifetime varies in accordance with the micro viscosity of the solvent. Since styryl dyes show great affinity with biomolecules, any change in viscosity of the biomolecule due to the interaction of some proteins can be detected by Styryl 7 dye.

ACKNOWLEDGEMENT

The authors are thankful to the Kerala State Council for Science Technology and Environment (KSCSTE) Govt. of Kerala and the University Grants Commission (UGC), Govt. of India for the Financial support.

REFERENCES

1. R. Tropcheva, N. Lesev, S. Danova, S. Stoitsova and S. Kaloyanova, *"Novel cyanine dyes and homodimeric styryl dyes as fluorescent probes for assessment of lactic acid bacteria cell viability"*, Journal of Photochemistry and Photobiology B: Biology, 2015, vol. 143; pp. 120-129.
2. R. P. Haugland, *"Handbook of fluorescent probes and research products. Eugene, OR: Molecular Probes"*, 2002.
3. V. Babenko and W. Dzwolak, *"Thioflavin T forms a non-fluorescent complex with α -helical poly-L-glutamic acid"*, Chemical Communications, 2011, vol. 47; pp. 10686-10688.
4. S. Singer, *"Membrane fluidity and cellular functions"*, Control Mechanisms in Development Anonymous Springer, 1975, pp. 181-192.
5. W. Osterode, C. Holler and F. Ulberth, *"Nutritional antioxidants, red cell membrane fluidity and blood viscosity in type 1 (insulin dependent) diabetes mellitus"*, Diabetic Med., 1996, vol. 13; pp. 1044-1050.

6. K. Shiraishi, S. Matsuzaki, H. Ishida and H. Nakazawa, *"Impaired erythrocyte deformability and membrane fluidity in alcoholic liver disease: participation in disturbed hepatic microcirculation"*, Alcohol and Alcoholism, 1993, vol. 28; pp. 59-64.
7. G. S. Zubenko, U. Kopp, T. Seto and L. L. Firestone, *"Platelet membrane fluidity individuals at risk for Alzheimer's disease: a comparison of results from fluorescence spectroscopy and electron spin resonance spectroscopy"*, Psychopharmacology (Berl.), 1999, vol. 145; pp. 175-180.
8. T. Lian, Y. Kholodenko and R. M. Hochstrasser, *"Infrared Probe of the Solvent Response to Ultrafast Solvation Processes"*, J. Phys. Chem., 1995, vol. 99; pp. 2546-2551.
9. M. Y. Berezin and S. Achilefu, *"Fluorescence lifetime measurements and biological imaging"*, Chem. Rev., 2010, vol. 110; pp. 2641-2684.
10. C. Tredwell and C. Keary, *"Picosecond time resolved fluorescence lifetimes of the polymethine and related dyes"*, Chem. Phys., 1979, vol. 43; pp. 307-316.

Investigation on the Conduction and Polarization Mechanisms of Chromium Doped Multiferroic Yttrium Manganite

Sivaraj K. S.^{1, #} and Anantharaman M. R.¹

¹*Department of Physics, Cochin University of Science and Technology, Cochin 682022, India*

[#] *Department of Physics, Aquinas College, Edakochi, Kerala, 682010, India*

**Corresponding author E-mail: sivaekm@gmail.com*

ABSTRACT

Y_{1-x}Cr_xMnO₃ samples with varying compositions were synthesized using soft chemistry procedures. The conduction mechanisms of the pure and doped samples were studied by carrying out dielectric measurements and its variation with respect to change in ambient temperature was investigated. Doping percentage of Cr clearly affects the electrical ordering and the change in polarization was clearly observed in the Ferroelectric measurements.

Keywords: *multiferroics, hexagonal, dielectric, ferroelectric, conductivity, polarization.*

INTRODUCTION

Multiferroic materials are a new class of materials which are extensively researched due to their novel multifunctional properties. These materials are those in which two or all three of the properties: ferroelectricity, ferromagnetism and ferroelasticity occur in the same phase. In particular the focus is on the Multiferroic magnetoelectrics-materials that are simultaneously ferromagnetic and ferroelectric with or without ferroelasticity. The most promising candidate for multiferroic materials are the Rare Earth Manganites (RMnO₃) family. RMnO₃ crystallize in two structural phases, depending on the ionic size of the rare- earth elements. It crystallizes as orthorhombic manganites for rare-earth elements with a relatively large ionic radius (R=La to Dy), and they also form a hexagonal

structure for RMnO_3 with rare-earth element of a relatively small ionic radius ($\text{R}=\text{Ho}$ to Lu , Y , and Sc) with the space group of $\text{P6}_3\text{cm}$ at room temperature. Recently, the hexagonal manganites have attracted much attention because of the coexistence of ferroelectricity and antiferromagnetic (AFM) order [1, 2, 3].

YMnO_3 is one of the most intensively studied hexagonal manganites. It is observed that YMnO_3 is ferroelectric with a space group $\text{P6}_3\text{cm}$, and it revealed an A-type antiferromagnetic ordering, below 70 K. As a material in which ferroelectricity and antiferromagnetism coexist, YMnO_3 is undoubtedly of current interest with respect to the coupling between ferroelectricity and magnetism and their possible control by the application of magnetic and/or electric fields. YMnO_3 consists of MnO_5 trigonal bipyramids where each manganese ion is surrounded by three in-plane and two apical oxygen ions. The ferroelectric polarization has been proposed to originate from the tilting of MnO_5 trigonal bipyramids and the buckling of Y layers [4, 5]. Rao et al. reported the electrical transport properties of YMnO_3 ceramics up to 1000°C . YMnO_3 was found to be a p-type semiconductor and its high conductivity arises from an appreciable concentration of Mn^{4+} ions, which introduces a large amount of charge carriers and facilitates the movement of the charge carriers by a hopping mechanism [6].

The coexistence of magnetism and ferroelectricity is rare, particularly in materials lacking lone pairs, and recent reports of coupling between the magnetic and ferroelectricity is rare, particularly in materials lacking lone pairs and recent reports of coupling between the magnetic and ferroelectric ordering in YMnO_3 provide compelling motivation for understanding the origin of its ferroelectric behavior.

MATERIALS AND METHODS

Stoichiometric amounts of Y_2O_3 , MnCO_3 and Cr_2O_3 were mixed in a 1M solution of citric acid and ethylene glycol. The solution was heated at about 100°C until a gel state is formed. The dried powder was grinded for an hour and heated at 1100°C for 12 hours. The black powder obtained was further grinded for an hour and made into pellets of 12mm diameter. The pellets were further sintered at 1100°C for 6 hours. The structural phase formation is confirmed using Rigaku D-Max X-Ray Diffractometer. Dielectric measurements were performed to get an

insight into the conduction mechanism using a homemade dielectric cell and an LCR meter HP 4285A automated using virtual automation package LabVIEW. The ferroelectric studies were conducted using Radiant Precision LC Ferroelectric Loop Tracer.

RESULTS AND DISCUSSIONS

Structural Characterization

The phase formation is confirmed from the X-Ray Diffraction pattern obtained using Rigaku D-Max Cu K α X-Ray Diffractometer. The graphs obtained were compared using the ICDD file. The hexagonal perovskite structure is clearly visible from the peaks and the CrMnO₃ peaks become prominent with the inclusion of Cr composition.

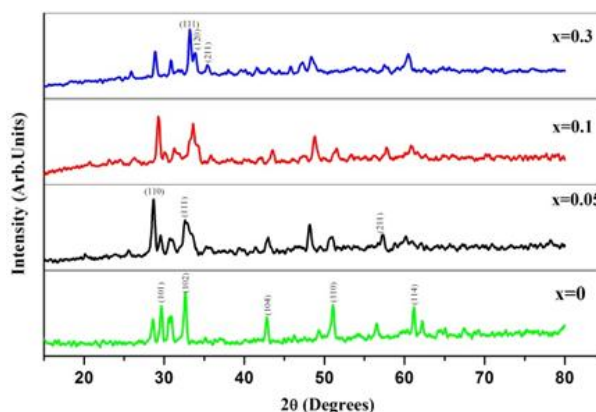


Fig 1: XRD of $Y_{1-x}Cr_xMnO_3$ ($x = 0, 0.05, 0.1, 0.3$)

Scanning Electron Microscopy images show a clear change in the grain size and grain boundaries. The figure shows the SEM micrographs of pure YMnO₃ and 30% Cr doped YMnO₃.

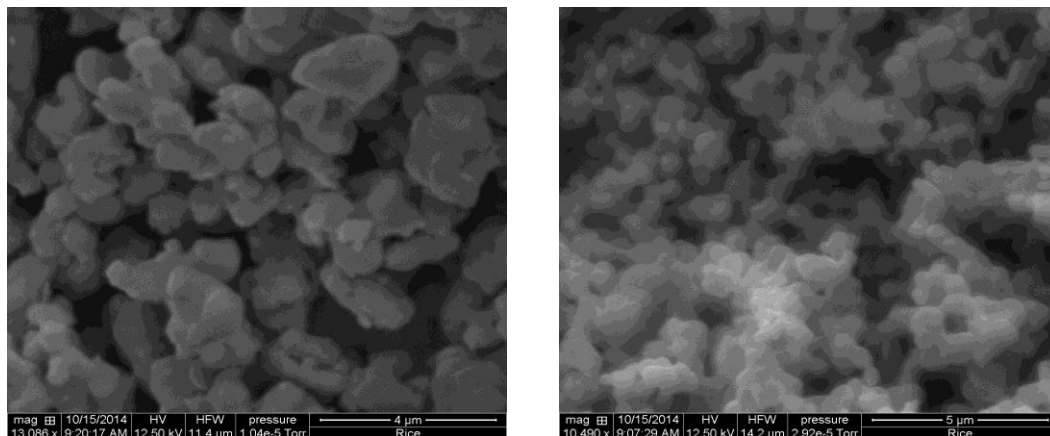
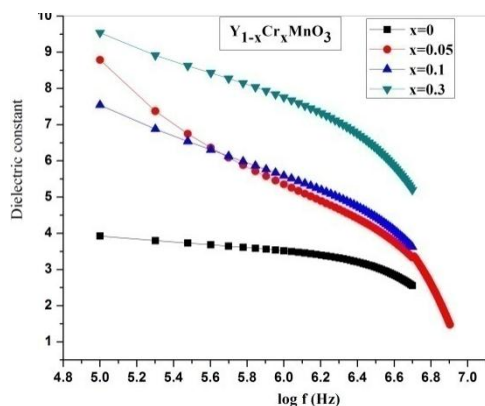


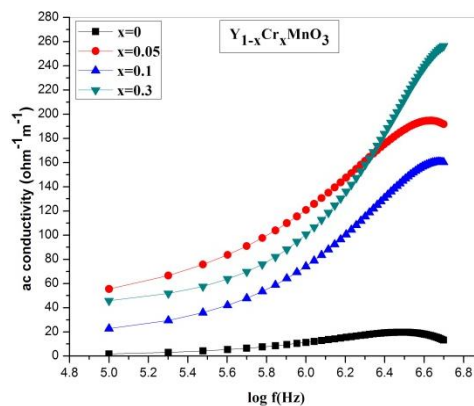
Fig 2: SEM images of (a) YMnO_3 and (b) $\text{Y}_{0.7}\text{Cr}_{0.3}\text{MnO}_3$

Dielectric Studies

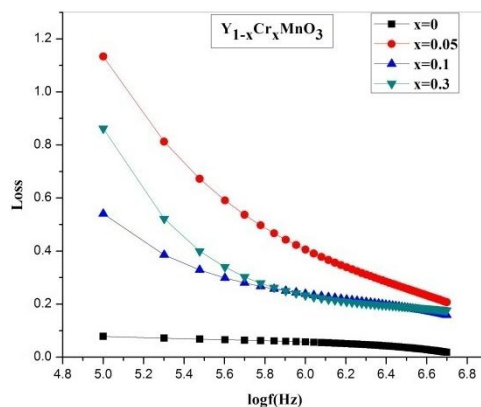
Studies on the conduction mechanism of YMnO_3 have revealed it to be a very poor p-type semiconductor. The dielectric studies carried out using a homemade dielectric cell coupled with LCR meter provided information on the effect of doping with divalent cations.



(a)



(b)



(c)

Fig 3: Variation of (a) dielectric constant, (b) ac conductivity and (c) loss with log f for $Y_{1-x}Cr_xMnO_3$ ($x=0, 0.05, 0.1$ and 0.3)

The dielectric constant remains constant at lower frequency while as the frequency increase it starts decreasing in accordance with the Maxwell-Wagner theory. The polarization finds it difficult to cope with the increasing frequency and it lags behind leading to fall in the dielectric constant values. It can be seen from figure 3 that as the Cr doping increase the dielectric constant value and conductivity of the samples also increases. The conduction mechanism is due to hopping charges in $YMnO_3$ which is mediated by grain and grain boundaries [6]. The grains form a conducting layer mainly dominant at high frequency giving low dielectric constant while the grain boundaries are poorly conducting mainly dominant at low frequency and having high dielectric permittivity values [7, 8]. The loss of the samples also increases with the increase in Cr doping.

Ferroelectric Studies

$YMnO_3$ is a room temperature ferroelectric with the transition temperature at around 900K. The ferroelectric hysteresis was recorded using PE loop tracer for the Cr doped samples.

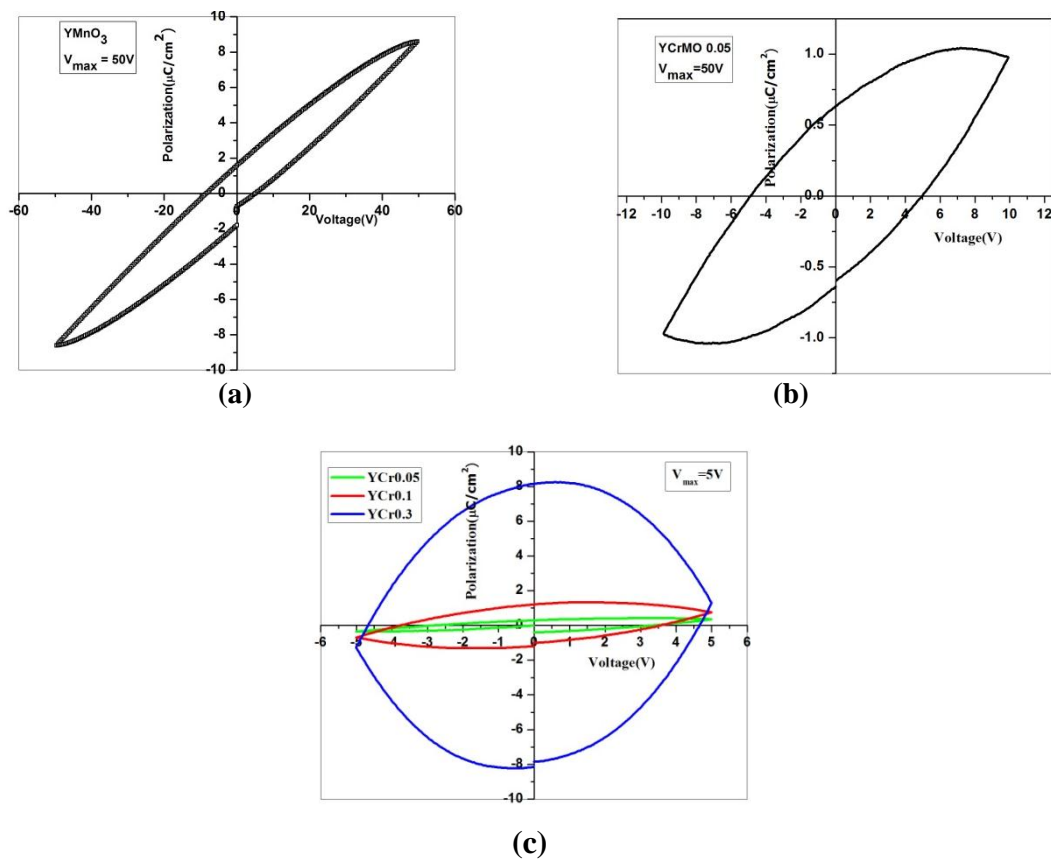


Fig 4: PE hysteresis of (a) YMnO₃, (b) 5% Cr doped YMnO₃ at 300K and (c) Y_{1-x}Cr_xMnO₃ (x=0.05, 0.1 and 0.3) at 5V

The PE hysteresis of YMnO₃ clearly shows the ferroelectric hysteresis loop while the Cr doped sample shows a loop with increased area indicating a resistive nature along with the ferroelectricity. This indicates that the inclusion of Cr suppresses the ferroelectric ordering of YMnO₃ [8]. The area of the loop signifies the energy loss which correspondingly increases with the Cr doping. This result is in agreement with increase in loss obtained in the dielectric measurements.

ACKNOWLEDGEMENTS

SKS and MRA acknowledge DAE-BRNS for the funding provided in the form of project (No: 2011/34/7/BRNS/0596).

REFERENCES

1. Nicola A. Hill, *Why Are There so Few Magnetic Ferroelectrics?*, J. Phys. Chem. B, 2000, Vol. 104; No. 2; 66-95.
2. J. M. D. Coey, M. Viret, *Mixed-valence manganites*, Advances in Physics, 1999, Vol. 48; No. 2; 167-293.
3. D. I. Khomskii, *Multiferroics: Different ways to combine magnetism and ferroelectricity*, Journal of Magnetism and Magnetic Materials, 2006, 306; 1–8.
4. Monika Tomczyk, Paula Maria Vilarinho, Agostinho Moreira, and Abílio Almeida, *High temperature dielectric properties of YMnO₃ ceramics*, Journal of Applied Physics, 2011, 110; 64-116.
5. Koops C. G. *On the dispersion of resistivity and dielectric constant of some semiconductors at audio frequencies*, Phys Rev, 1951, 83; 1; 121.
6. Andrew K. Jonscher, *Dielectric relaxation in solids*, J. Phys. D:Appl. Phys, 1999, 32; 57-70.
7. R. Richert, H. Wagner, *The dielectric modulus: relaxation versus retardation*, 168 / Solid State Ionics, 1998, 105; 167 – 173.
8. M. Chandra Sekhar, N. Venkata Prasad, *Dielectric, impedance, magnetic and magnetoelectric measurements on YMnO₃*, Ferroelectrics, 2006, 345; 45–57.
9. Yan Zhen Wei and S. Sridhar, *J. A new graphical representation for dielectric data*, Chem. Phys., 15 August 1993, Vol. 99; No. 4.
10. S. Sagar, S. Saravanan, S. Suresh Kumar, S. Venkatachalam and M. R. Anantharaman, *Evidence for the existence of multiple equilibrium states in cobalt phthalocyanine tetramer: a study by dielectric spectroscopy*, J. Phys. D: Appl. Phys., 2006, 39; 1678–1683.
11. S. Saravanan, C. Joseph Mathai, M. R. Anantharaman, S. Venkatachalam, P. V. Prabhakaran, *Dielectric and Conductivity Studies on Cobalt Phthalocyanine Tetramers*, Journal of Applied Polymer Science, 2004, Vol. 91; 2529–2535.

Thermodynamics of Schwarzschild Blackhole and its Modifications in the Dark Energy Field

Greeshma Mohan, Chrislima Kavv and Dr. Tharanath R.

Aquinas College, Edakochi

ABSTRACT

We study the thermodynamic behavior of Schwarzschild black hole and the same immersed in the dark energy field. We deduce the thermodynamic properties of these two cases and compare the results with each other. We investigate the mass, temperature and heat capacity as functions of entropy in each cases. We compare the stability of Schwarzschild black hole in both cases.

INTRODUCTION

A black hole is an extremely massive concentration of matter, created when the largest stars collapse into its gravitational singularity at the end of their lives. Nothing, not even light can escape from its gravitational pull. The Schwarzschild black hole is the simplest black hole, in which the core does not rotate. This type of black hole only has a singularity and an event horizon. The black holes can be described only by their mass, charge and angular momentum, which is depicted as ‘no hair’ theorem. Understanding black holes is very complex, it needs many aspects; one such is the quantization of gravity, it is extremely difficult and string theory offers some hope (1,2,3,4). The researches in black hole theory in general relativity leads to the fundamental relationship between thermodynamics, gravitation and quantum theory and brought to light the black hole thermodynamics. Since the seminal work of Hawking and Bekenstein (8), we have understood that black holes behave as thermodynamic objects, with characteristic temperatures and entropies. The thermodynamic properties of black holes are well understood by different methods, from which we obtain the temperature and entropy as,

$$kT_{\text{Hawking}} = \frac{\hbar k}{2\pi}$$

$$S_{BH} = \frac{A_{horizon}}{4\hbar G}$$

where, $A_{horizon}$ is the horizon area and k is the surface gravity. In one key aspect, though, black hole entropy is atypical. For an ordinary nongravitational system, entropy is extensive, scaling as volume. Black hole entropy, on the contrary, is “holographic,” scaling as area and these quantities are inherently quantum mechanical as it depends on both Planck’s constant \hbar and Newton’s constant G and these quantum mechanical studies found out that black holes behaves as black bodies and emit particles called ‘Hawking Radiation’, hence black holes can be subjected to laws of thermodynamics. The thermodynamical behavior of black holes gives rise to the physical insights into the nature of quantum phenomena occurring in strong gravitational fields. This leads to the four laws of black hole mechanics which has remarkable mathematical resemblance to the ordinary laws of black hole mechanics.

The zeroth law states that a simple, non-rotating black hole has uniform gravity at its event horizon, i.e. such a black hole is at thermal equilibrium. The first law relates the mass, angular momentum and charge of a black hole to its entropy. The entropy of a black hole is then related to the surface area of its event horizon.

$$dM = \frac{1}{8\pi} k dA + \Omega dJ + \Phi de$$

where $1/8\pi k \equiv \frac{\partial M}{\partial A}$, etc. which is really just an expression of mass-energy conservation and corresponds to the first law. If A plays the role of entropy then it is obvious from the above equation that K plays the role of temperature ($k dA \sim T dS$). The interesting thing is that K can be shown to be constant across the event horizon surface. The quantity K is known as the surface gravity of the black hole, whose significance lies in the fact that it determines the e-folding time which controls the rate at which the collapsing star shifts and approaches equilibrium. The remaining terms simply describe the work done (energy extracted) corresponding to change in angular momentum dJ and change in electric charge de . Ω is the magnitude of angular velocity and Φ the electric potential at the event horizon. The second law states that the area of the event horizon of a black hole never decreases and hence the entropy of a black hole system. One consequence is that when two black holes merge, the surface area of the merged event horizon must be greater than the surface areas of the original black holes.

The ordinary second law fails when any matter is dropped into a black hole. This is because matter loses its entropy as it falls in, giving a decrease in entropy. This is solved by replacing ordinary law by the generalized second law of thermodynamics:

$$S_{\text{total}} = S_{\text{bh}} + S_{\text{matter}}; \Delta S_{\text{total}} \geq 0$$

This always holds good. The third law states that it is impossible to reduce surface gravity to zero in finite number of steps by any procedure. This also implies that "extreme" black holes (those with a maximum possible rotation or charge) would have minimum entropy. This means that it would never be possible to form an extreme black hole. For example, it would never be possible to spin a black hole so fast that it would break apart. The advantage of black hole thermodynamics is that it provides a way to get a handle on the complex interactions it can have and provides hope to the understanding of quantum gravity. Thermodynamic black holes have not only mass, charge and angular momentum, but also temperature and entropy (5,6,7).

We use semi classical gravity throughout this paper in which the gravitational field is treated as classical and particles are treated as quanta.

THERMODYNAMICS OF SCHWARZSCHILD BLACK HOLE

Black hole thermodynamics is one of the interesting subjects in modern cosmology and is the area of study that seeks to reconcile the laws of thermodynamics with the existence of black hole event horizons which is widely studied in the literature. The seminal connections between black holes and thermodynamics were initially made by Hawking and Bekenstein (8). Black holes behave as thermodynamic objects which emit radiation from the event horizon by using the quantum field theory in curved space-time, named as Hawking radiation, with a characteristic temperature proportional to their surface gravity at the event horizon and they have entropy equal to one quarter of the area of the event horizon in Planck units. As we know, the main laws of thermodynamics have close analogies in the physics of black holes. For example, the second law of thermodynamics is analogous to the second law of black hole dynamics (area law) which implies that the surface of a black hole cannot decrease. The Hawking temperature, entropy and mass of the black holes satisfy the first law of

thermodynamics (7, 8). By using the thermodynamic laws of the black holes, we can derive the thermodynamic properties of the Schwarzschild black hole. If the black hole is regarded as a thermal system, it is then natural to apply the laws of thermodynamics; however, a crucial difference from the other thermal systems is that it is a gravitational object whose entropy is identified with the area of the black hole (In this section we are using $c = G = \hbar = 1$). The metric of Schwarzschild black hole is given by,

$$ds^2 = -f(r)dt^2 + \frac{1}{f(r)}dr^2 + r^2(d\theta^2 + \sin^2\theta d\phi^2) \quad (1)$$

where,

$$f(r) = 1 - \frac{2M}{r} \quad (2)$$

Here M is the black hole mass.

We obtain the relation between mass of a black hole and its horizon radius directly from the above equation as,

$$M = \frac{r}{2} \quad (3)$$

and we know that entropy can be written as,

$$S = \frac{A}{4} = \frac{4\pi r^2}{4} = \pi r^2 \quad (4)$$

so that r can be written in terms of S as,

$$r = \sqrt{\frac{S}{\pi}} \quad (5)$$

Then (3) becomes,

$$M = \frac{1}{2} \sqrt{\frac{S}{\pi}} \quad (6)$$

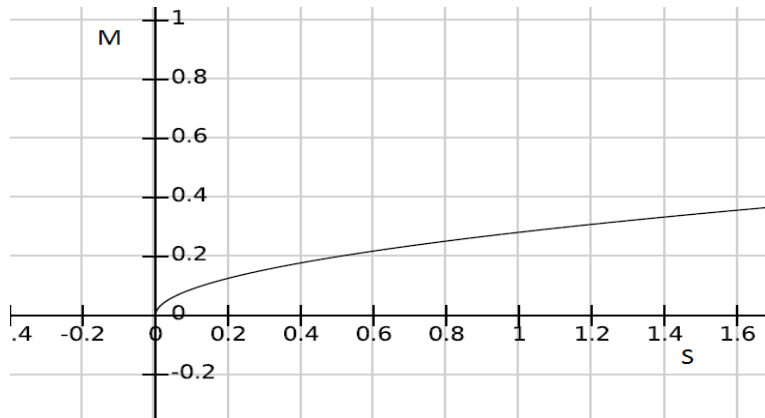


Fig 1: Variation of mass with entropy

In Fig (1) we have plotted the variation of mass of black hole with respect to entropy. Mass increases as the entropy increases, and it is evident that the horizon area also increases. Since we have an area law of entropy, the increase in area will cause the increase in entropy. Now we can deduce the thermo dynamical quantities from the above expression of mass in terms of entropy.

$$T = \left(\frac{\partial M}{\partial S} \right) \quad (7)$$

And

$$C = T \left(\frac{\partial S}{\partial T} \right) \quad (8)$$

From the above equations the black hole temperature can be obtained as,

$$T = \frac{1}{4\sqrt{\pi S}} \quad (9)$$

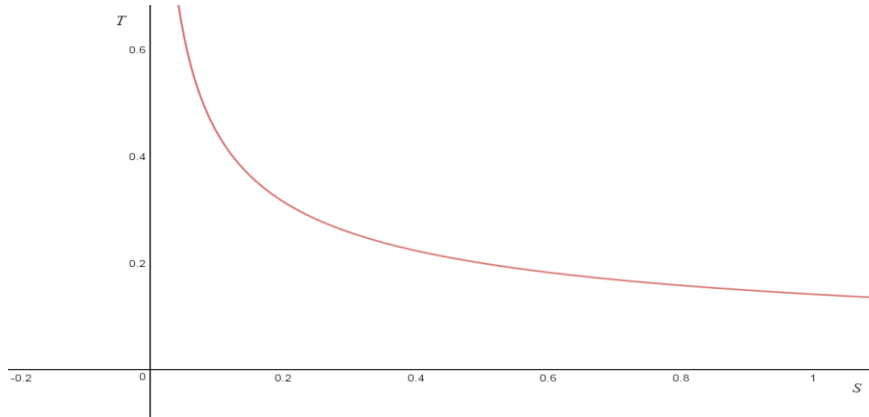


Fig 2: Variation of temperature with entropy

Fig (2) represents the T-S diagram. It is observed that temperature is decreasing with entropy. Now we are looking for the heat capacity (C) of the black hole; we get the heat capacity in terms of entropy,

$$C = T \left(\frac{\partial S}{\partial T} \right) = -2S \quad (10)$$

A Schwarzschild black hole has a temperature $\frac{h}{8\pi m}$. As an isolated black hole evaporates, it radiates energy, its mass decreases, and its temperature consequently increases. This clarifies negative heat capacity for Schwarzschild black hole. In Fig (3) we have plotted the variation of heat capacity.

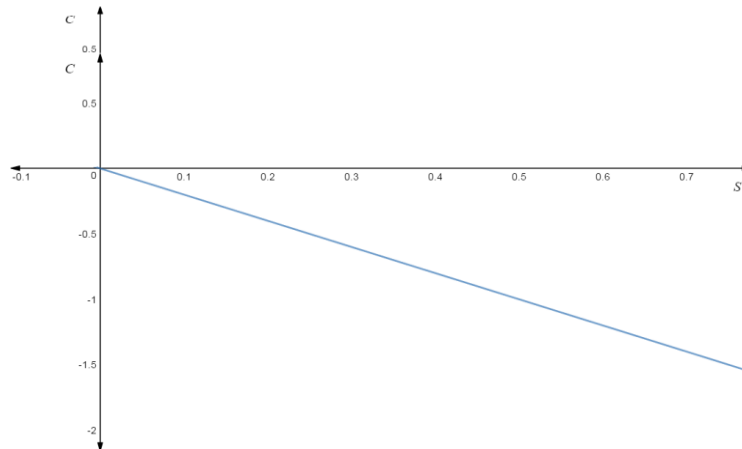


Fig 3: Variation of heat capacity with entropy

Here we can infer that heat capacity is negative, such a thermodynamical system is unstable. Thus Schwarzschild black hole is observed as thermodynamically unstable.

Thus we studied thermodynamics of the Schwarzschild black hole by observing the behavior of temperature, mass and heat capacity with respect to entropy.

THERMODYNAMICS OF SCHWARZSCHILD BLACK HOLE WITH DARK ENERGY FIELD

The expansion of the Universe is a long-established fact and there are significant astronomical evidences that the universe is expanding at an accelerating rate. The current cosmological observation predicts the existence of some form of energy which permeates all of space with a large negative pressure, called dark energy which constitutes about 70 percent of the energy density of the universe. Dark energy is a complete mystery and the evidence for it is indirect and understanding the origin of this negative pressure is one of the biggest efforts in

cosmology today. Dark energy field is defined as an ordinary scalar field coupled to gravity (9, 10). It is characterized by a parameter ϵ , the ratio of the pressure to energy density of the dark energy, which is given by a kinetic term and a potential term (12) as,

$$\epsilon \equiv \frac{p}{\rho} = \frac{\frac{1}{2}\dot{Q}^2 - V(Q)}{\frac{1}{2}\dot{Q}^2 + V(Q)} \quad (11)$$

The value of ϵ falls in the range $-1 \leq \epsilon \leq \frac{-1}{3}$. Black holes surrounded by dark energy are believed to play the crucial role in cosmology and it is interesting to know how the dark energy affects the thermodynamics of the black holes. The quasi normal modes of different black holes surrounded by dark energy have been studied earlier. We now investigate the effect of dark energy on the area spectrum of a Schwarzschild black hole. The metric of Schwarzschild black hole surrounded by dark energy field (12) is given by,

$$ds^2 = -f(r)dt^2 + \frac{1}{f(r)}dr^2 + r^2(d\theta^2 + \sin^2\theta d\phi^2)$$

where,

$$f(r) = 1 - \frac{2M}{r} - \frac{a}{r^{3\epsilon+1}}$$

Here M is the black hole mass and a is the normalization factor, which is positive depending on the energy density of dark energy field (In this section we are using $c = G = \hbar = 1$). Following Kiselev (11) the energy density can be written as,

$$\rho_\epsilon = -\frac{a}{2} \frac{3\epsilon}{r^{3(1+\epsilon)}} \quad (12)$$

We can establish the relation between mass of a black hole and its horizon radius directly from the above equation as,

$$M = \frac{r}{2} - \frac{a}{2r^{3\epsilon}} \quad (13)$$

and we know that entropy can be written as

$$S = \frac{A}{4} = \frac{4\pi r^2}{4} = \pi r^2 \quad (14)$$

so that r can be written in terms of S as

$$r = \sqrt{\frac{S}{\pi}} \quad (15)$$

Let us rewrite (3) as

$$M = \frac{1}{2} \left[\sqrt{\frac{S}{\pi}} - a \left(\frac{\pi}{S} \right)^{\frac{3\epsilon}{2}} \right] \quad (16)$$

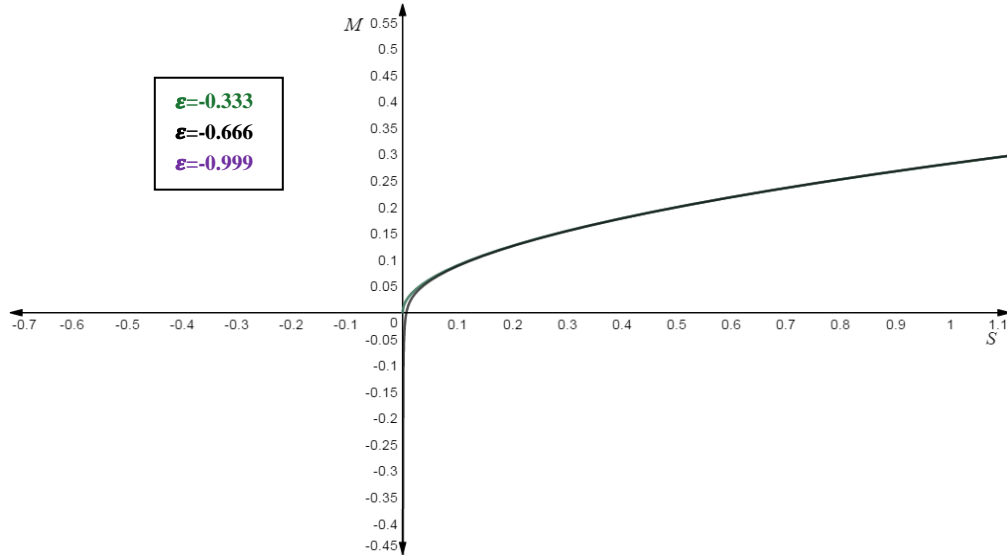


Fig 4: Variation of mass with entropy for different values of ϵ , keeping $a=0.001$

In Fig (4) we have plotted the variation of mass of black hole with respect to entropy. Similar with the first case, mass increases as the entropy increases, and it is evident that the horizon area also increases. Since we have an area law of entropy, the increase in area will cause the increase in entropy.

The density of dark energy ρ_ϵ , can be written as

$$\rho_\epsilon = -\frac{3a\epsilon}{2} \left(\frac{\pi}{S} \right)^{\frac{3\epsilon+3}{2}} \quad (17)$$

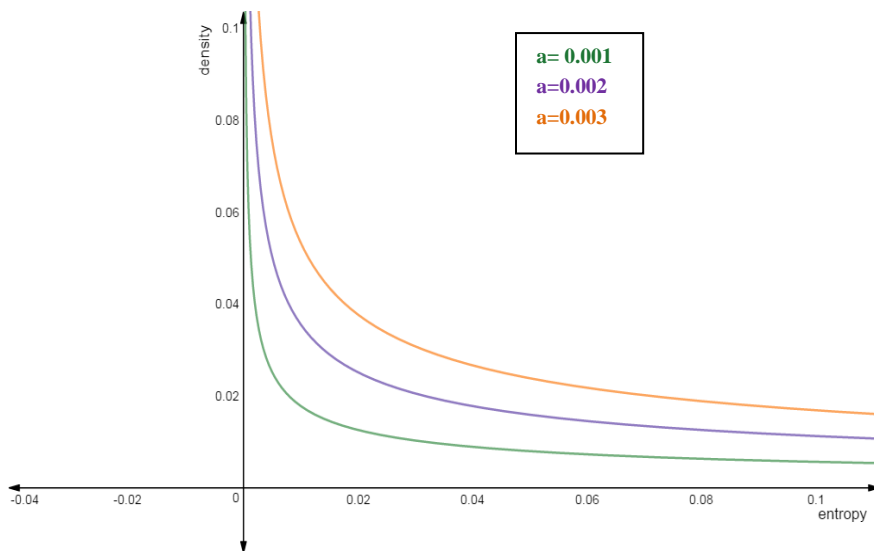


Fig 5: Variation of density of dark energy with entropy for different values of a , keeping $\epsilon = -\frac{2}{3}$

The variation of the density parameter with the entropy is plotted for different values of ‘ a ’ in Fig (5). It shows that density factor decreases as entropy increases. Its variation is almost same for all values of the dark energy parameter.

Now we can deduce the thermo dynamical quantities from the above expression of mass in terms of entropy.

$$T = \left(\frac{\partial M}{\partial S} \right) \quad (18)$$

and

$$C = T \left(\frac{\partial S}{\partial T} \right) \quad (19)$$

From the above equations the black hole temperature can be obtained as,

$$T = \frac{1}{4\sqrt{\pi S}} + \frac{3a\epsilon\pi^{\frac{3\epsilon}{2}}}{2S^{1+\frac{3\epsilon}{2}}} \quad (20)$$

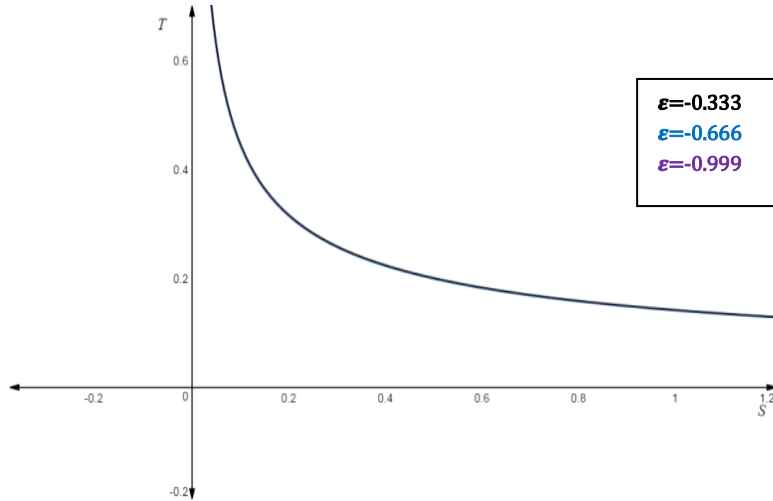


Fig 6: Variation of temperature with entropy for different values of ϵ , keeping $a=0.001$

Fig (6) represents the T-S diagram. Now we are looking for the heat capacity, C of the black hole; we get the heat capacity in terms of entropy and dark energy parameter as,

$$C = T \frac{\partial S}{\partial T} = - \frac{16S^{3\epsilon+5} + 96a\epsilon\pi^{\frac{3\epsilon+1}{2}} S^{\frac{3\epsilon+9}{2}}}{8S^{3\epsilon+4} + 144a\epsilon^2\pi^{\frac{3\epsilon+1}{2}} S^{3\epsilon+2} + 96a\epsilon\pi^{\frac{3\epsilon+1}{2}} S^{\frac{3\epsilon+7}{2}}} \quad (21)$$

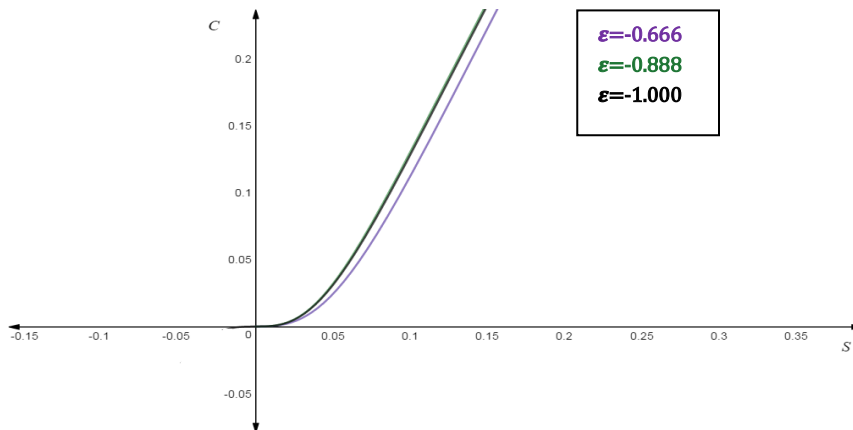


Fig 7: Variation of heat capacity with entropy for different values of ϵ , keeping $a=0.001$

In Fig (7) we have plotted the variation of heat capacity for a fixed value of 'a' and for different values of 'e'. From the graph we can infer that heat capacity is positive and increasing with entropy. Thus we can observe that the presence of dark energy makes the Schwarzschild black hole thermodynamically stable.

CONCLUSION

We have investigated the thermodynamical behavior of the Schwarzschild black hole and derived the expression for mass, temperature and heat capacity of the Schwarzschild black hole in terms of entropy. And in the mass-entropy graph, the idea of area law is justified. Temperature is found to be decreasing with entropy. Heat capacity of the black hole is observed to be negative, which states that the Schwarzschild black hole is thermodynamically unstable. Then we have investigated the effect of dark energy on the thermodynamic characteristics of Schwarzschild black hole. We have derived the expressions for mass, dark energy density, temperature and heat capacity of the black hole surrounded by dark energy in terms of its entropy. The idea of area law is found to be justified as well. Here also, the temperature is found to be decreasing. We have plotted the variation of dark energy density parameter with respect to entropy and found that density decreases with entropy. Here heat capacity of the black hole is found to be positive, which indicates black hole is thermodynamically stable. Comparing both cases it is found that the effect of dark energy is to make the Schwarzschild black hole thermodynamically stable. Thus if a Schwarzschild black hole exists in universe it must be surrounded by dark energy.

ACKNOWLEDGEMENTS

We are grateful to Dr. Tharanath R. for his constant support and guidance throughout this project. We also thank to our parents, teachers and friends for helpful discussions.

REFERENCES

1. *Introduction to the theory of black holes*, Gerard 't Hooft, Utrecht University, 2009.

2. *A Note on Black Hole Temperature and Entropy*, P. R. Silva, arXiv:gr-qc/0605051.
3. http://www.scholarpedia.org/article/Black_hole_entropy.
4. <http://www.gravityfromthegroundup.org/pdf/hawkingradiation.pdf>.
5. *Black Hole Thermodynamics and Statistical Mechanics*; Steven Carlip. arXiv:0807.4520v1 [gr-qc], 28 Jul 2008.
6. *The Four Laws of Black Hole Mechanics*, J. M. Bardeen*, Department of Physics, Yale University, New Haven, Connecticut, USA; B. Carter and S. W. Hawking; Institute of Astronomy, University of Cambridge, England. Commun. math. Phys., 1973, 31, 161-170.
7. *Thermodynamics of black holes*, P. C. W. Davies. Rep. Prog. Phys., 1978, Vol. 41.
8. S. W. Hawking, Commun. Math. Phys. 1975, 43, 199; J. D. Bekenstein, Phys. Rev. D, 1973, 7; J. M. Bardeen, B. Carter, S. W. Hawking, Commun. Math. Phys., 1973, 31, 161.
9. *Thermodynamics of the Schwarzschild and the Reissner–Nordström black holes with quintessence*; K. Ghaderi, B. Malakolkalami , Science Direct Nuclear Physics B 2016, 10-18.
10. *Thermodynamics and spectroscopy of schwarzschild black hole surrounded by quintessence*, R. Tharanath, V. C. Kuriakose, arXiv:1301.2571v1 [gr-qc], 11 Jan 2013.
11. kiselev v v class. Quantum. Grav, 2003, 20, 1187.
12. R. R. Caldwell et al., phys. Rev. Lett., 1998, 80, 1582.
13. Israel, Werner, "*Event Horizons in Static Vacuum Space-Times*". Phys. Rev. 1967, 164 (5), 1776–1779.

Preparation and Absorption Studies of Graphene Oxide and Reduced Graphene Oxide

Amala Jaison¹, Meril Sunny² and Kala M. S.³

Department of Physics, St Teresa's College, Ernakulam

*E-mail: ¹amalajaison@gmail.com, ²merilsunny2013@gmail.com,
³kalasajeev@hotmail.com*

ABSTRACT

Two-dimensional carbon material, graphene has fine potential applications as electron transfer agent and super capacitor material due to its excellent electronic and optical properties. However, the challenge is to synthesize graphene in a bulk quantity. In order to synthesis graphene, graphene oxide was prepared from natural graphite flakes by modified Hummer's method through liquid oxidization. By reducing graphene oxide we will get few layers of graphene. We have prepared graphene oxide (GO) as the first step. The prepared graphene oxide were characterized by X-ray diffraction (XRD), FTIR, Raman spectroscopy and UV-visible analysis. Then graphene oxide was reduced by hydrazine hydrate and its UV visible absorption spectrum was compared with that of GO.

INTRODUCTION

Graphene is a 2-dimensional material which was first separated from graphite by mechanical stripping method in 2004[6]. As an allotrope of element carbon, it is a planar sheet of carbon atoms arranged into hexagon. The "thinnest" known material graphene can be used for biosensors, transparent electrodes, hydrogen storage, composites, and high energy super capacitors for its high optical and electron transparency and excellent mechanical properties.

There are many ways to synthesize graphene such as exfoliation and cleavage, chemical vapor deposition (CVD), thermal decomposition, and electrochemical reduction. Among these preparation methods, solution-based reduction of graphite oxide (GO) is attractive for its easy operation in recent

years. It includes three typical steps in this method. They are graphite oxidation, GO aqueous dispersion, and GO reduction. The methods invented by Brodie, Staudenmaier, and Hummers [1] are widely used for graphite oxidation. Hummer's method is preferred because it is more efficient and less hazardous. Recent literature reported that the electrical conductivity of GO can be significantly increased through removal of the oxygen functional groups by chemical or heat reduction [10, 11–13]. Among the chemical reduction, hydrazine has been extensively reported as an efficient reducing agent for GO [11] making use of grapheme based materials for highly conducting nanocomposites, transparent electrodes and photovoltaic device applications.

EXPERIMENTAL METHOD

Hummer's method is a chemical process that can be used to generate graphite oxide through the oxidation of graphite using concentrated acids in the presence of strong oxidants. Exfoliation of Graphite oxide gives highly stabilized few layer Graphene oxides. Hummer's method was developed in 1958 as a faster and more efficient method of producing graphite oxide. Before the method was developed, the production of graphite oxide was slow and hazardous to make because of the use of concentrated sulfuric and nitric acid. William S Hummer's and Richard E Offeman created their method and simplified it to just graphite, concentrated sulfuric acid, sodium nitrate and potassium permanganate. They did not have to use temperature above 98°C and avoided most of the explosive risk of the Staudenmaier's Hofmann method [9].

Preparation of Graphene Oxide

2 gm of Graphite flakes and 2 gm of Sodium Nitrate (NaNO_3) were mixed in 95 ml Sulfuric acid (H_2SO_4) and it was then stirred for 30 minutes at normal temperature. Keeping the solution in ice bath, 6gm of Potassium Permanganate was added step by step within one hour and was stirred for 30 minutes. After that 160 ml distilled water was added slowly so as to maintain the temperature below 100°C. This solution was stirred continuously for 2 hours at room temperature. Then 400ml distilled water was added and stirred for 20 minutes followed by the addition of 10ml of H_2O_2 . Finally 200ml of 5M HCl was added

into the solution. The solution was kept to settle down and the supernatant water was changed periodically to reduce the pH to neutral level.

When the pH of the solution becomes neutral, the solution was centrifuged and the residues from the solution were collected. The mixture was dried at 40°C to obtain Graphene oxide powder.

Reduction of GO with Hydrazine Hydrate

Dried graphite oxide (400 mg) prepared by a modified Hummer's method was suspended in distilled water (400 ml) with strong stirring and ultrasonication at least for 1h. Reduction was carried out by hydrazine hydrate (the weight ratio of hydrazine hydrate/GO=1) by stirring at 95°C for 3 hrs. Upon completion, the rGO powder was immoderately isolated via filtration, and washed with distilled water then dried at 60°C for 24 h to remove residual solvent.

Characterization of Graphene Oxide

The structure of the material was determined by XRD by Bruker AXS D8 Advance. The Fourier transformed infrared (FTIR) spectrum was measured with a Nicolet 6700FT-IR Spectrometer in the range of 400–4000 cm^{-1} . Characterizations were also done by Raman spectroscopy with a 532 nm laser beam where scattered monochromatic beam from sample is used for analysis. The UV-VIS absorption spectrum was carried out in the range of 200–800 nm by Thermo Scientific Evolution 201 UV- visible spectrophotometer.

RESULTS AND DISCUSSION

XRD analysis was used to determine the average crystalline properties of the GO sheet. Results are shown in Figure 1. The GO sheet prepared showed a very strong peak at $2\theta = 10.7^\circ$, corresponding to the d-spacing of 8.2\AA that is consistent with interlayer space of GO sheets due to the existence of oxygen rich group. The results of XRD proved the successful synthesis of GO sheet.

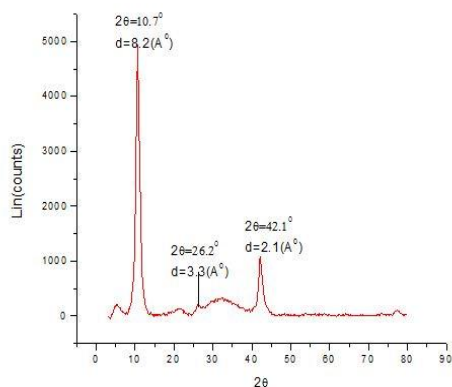


Fig 1: XRD pattern

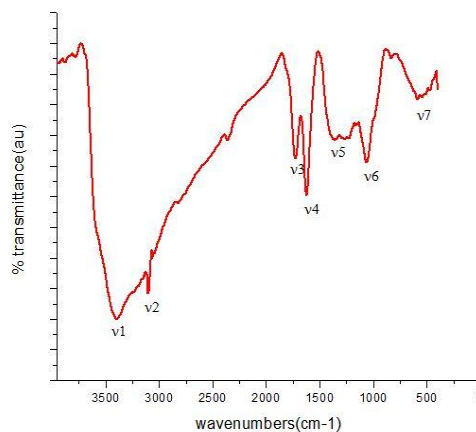


Fig 2: FTIR spectrum

FTIR spectra analysis was performed to investigate the structure and functional groups of the materials, as shown in Figure 2. The GO sheet showed apparent adsorption bands for the carboxyl C=O ($\nu_3=1727\text{ cm}^{-1}$), aromatic C=C ($\nu_4=1623\text{ cm}^{-1}$), epoxy C–O ($\nu_5=1220\text{ cm}^{-1}$), alkoxy C–O ($\nu_6=1061\text{ cm}^{-1}$), and hydroxyl –OH ($\nu_1=3391\text{ cm}^{-1}$) groups. The presentation of oxygen-containing functional groups, such as C=O and C–O, further confirmed that the graphite indeed was oxidized into GO and was consistent with the reported values. The results of FT-IR analysis is further demonstrated the successful synthesis of GO.

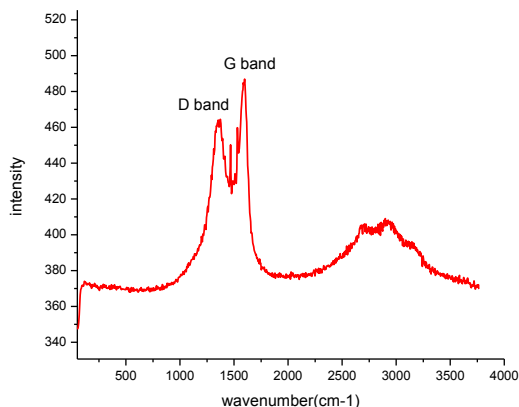


Fig 3: Raman spectrum

In the Raman spectra of graphene oxide, the G peak is the result of in plane optical vibrations and has a value of 1600 cm^{-1} . The D peak is located at 1370 cm^{-1} and is due to first order resonance. This peak is absent in defect free graphene related materials. But the presence of D peak represents the formation of a defective one.

Absorption Study of Graphene Oxide and Reduced Graphene Oxide

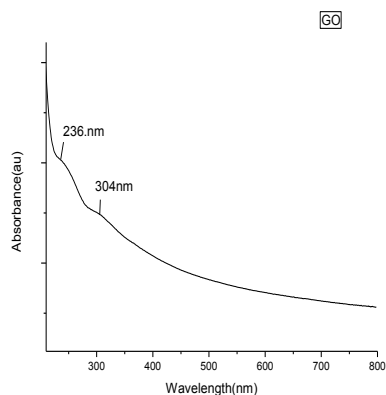


Fig 4: UV spectrum of GO

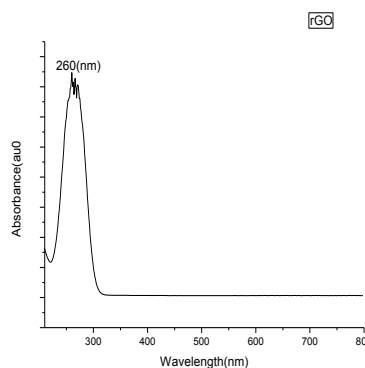


Fig 5: UV spectrum of rGO

UV-VIS spectra of aqueous GO dispersions are presented in Fig. 4. Two kinds of characteristic features were observed in these spectra to identify GO. First corresponds to a π - π^* plasmon peak which appears at 236 nm, the next is a shoulder at ~ 304 nm, corresponding to an n - π^* plasmon peak. The UV-VIS spectra of GO exhibits two absorption peaks, whereas absorption peak for rGO (Fig.5) has a single peak which is red shifted to 260 nm. This phenomenon of red shift of π - π^* peak and the absence of n - π^* peak are used as a monitoring tool for the reduction of GO.

CONCLUSIONS

The Graphene oxide successfully synthesized by the convenient modified Hummer's method and its characterizations were done by Raman spectrum, XRD spectrum, FT-IR analysis and the UV-visible absorption spectrum. Reduction

process of Graphene oxide was done by hydrazine hydrate and the UV –visible absorption study confirmed the formation of rGO.

REFERENCES

1. Balaprasad, Farah, *Water soluble graphene synthesis*, Chemical Science Transactions, 2012, 10; 500-507.
2. Geim A. K. and Kim P., *Carbon Wonderland*, Scientific American, 2008, 4; 298.
3. Ban F. Y., Majid S. R., Huang N. M., Lim H. N., *Graphene Oxide and Its Electrochemical Performance*, Int J Electrochem Sci, 2012, 7; 4345-4351.
4. Daniela C., Dmitry V., Jacob M., Alexander S., Zhengzong S., *et al. Improved Synthesis of Graphene Oxide*, ACS Nano, 2010, 4; 4806-4814.
5. Daniel R., Sungjin P., Christopher W., Rodney S., *The chemistry of graphene oxide*, Chem Soc Rev, 2010, 39; 228-240.
6. Geim A. K., Novoselov K. S., *The rise of grapheme*, Nature materials, 2007, 6; 183- 191.
7. <http://arxiv.org/ftp/arxiv/papers/1212/1212.6413.pdf>
8. P. R. Wallace, "*The band theory of graphite*", Physical Review, 1947, vol. 71; no. 9; pp. 622–634.
9. Hummers, William S., Offeman, Richard E., "*Preparation of Graphitic Oxide*", Journal of the American Chemical Society, March 20 1958, 80 (6); 1339.
10. Park S. J. and Ruoff R. S., Nat. Nanotechnol, 2009, 4; 217–24.
11. Stankovich S., Dikin D. A., Dommett G. H. B., Kohlhaas K. M., Zimney E. J., Stach E. A., Piner R. D., Nguyen S. T. and Ruoff R. S., Nature, 2006, 442; 282–286
12. Watcharotone S., et al Nano Lett., 2007, 7; 1888–1892.
13. Ramanathan T., et al Nat. Nanotechnol., 2008, 3; 327–331.

Photocatalytic Degradation of Textile Dye Using Chemically Synthesized Silver Nanoparticles

Mary Shalmia M. T., Sreekutty Prathapan and Radhu Subha

Department of Physics, St. Teresa's College, Ernakulam

ABSTRACT

A simple and inexpensive, single step synthesis of silver nanoparticles was achieved using sodium citrate both as a reducing and capping agent. Silver nanoparticles were synthesized by injecting sodium citrate solution into the solution of silver nitrate at high temperature. The synthetic process was carried out in aqueous solution, making the method versatile and ecofriendly. The synthesized silver nanoparticles were characterized by UV-visible absorption spectroscopy and transmission electron microscope (TEM). Results showed that the average size of spherical silver nanoparticles was about 30 nm. We also investigate the photocatalytic activity of these Ag nanoparticles by irradiating the aqueous solutions of dyes containing silver nanoparticles with solar light. We suggest that surface plasmon resonance (SPR) effect and interband transition of silver NPs can activate organic molecules for oxidation under ultraviolet and visible light irradiation.

INTRODUCTION

Nanotechnology provides the ability to design nanoscale materials which have unique properties which depends on their size and shape. Metallic nanoparticles exhibit unusual optical, thermal, chemical and physical properties that are due to a combination of the large proportion of high-energy surface atoms compared to the bulk solid and to the nanometer-scale mean free path of an electron in a metal (10-100 nm for many metals at room temperature). Silver is an especially attractive metal to examine on the nanoscale, due to its extremely high electrical conductivity in the bulk, and its unusual optical properties that depend on nanoparticle size and shape [1].

Photocatalysts show great potential as drivers of chemical reactions when illuminated by light at ambient temperatures. The superiority of photocatalytic degradation by nanoparticles in wastewater treatment is due to its advantages over the conventional methods, such as quick oxidation, no formation of polycyclic products and oxidation of pollutants. It is an effective and rapid technique in the removal of pollutants from waste water. In the recent years, numerous metal oxides including TiO_2 , ZnO and other oxides have attracted growing attentions for photodegradation of organic dyes; TiO_2 is of particular interests due to its low cost and high stability. Nonetheless, TiO_2 has a relatively large energy band-gap and only absorbs UV region, while the UV lights only contribute to less than 10% of total solar radiations; the visible lights, on the other hand, contribute to 50% of the solar radiations. It's a crucial drawback in photo-catalysts of TiO_2 based application. So, in the recent years have been many research efforts devoted to improve the photocatalytic activity by incorporating of metal particles (silver, gold and iron), to broaden the absorption of solar radiations to reactivate the TiO_2 -based photo-catalysts by treating with heat. A key step in improving the photocatalysis process is the development of new catalysts that allow us to use both the UV and visible energy in the sunlight to drive chemical reactions. It is well known that silver nanoparticles (Ag-NPs) strongly absorb visible light due to the so-called surface plasmon resonance (SPR) effect. Ag-NPs also exhibit considerable ultraviolet (UV) light absorption, causing the transition of 5d electrons to the 6sp band (interband transition). Due to the higher photon energy, it is logical to expect that UV light is also able to drive chemical reactions on Ag-NPs [2]. In this study we investigated the photocatalytic performance of Ag-NPs synthesized by chemical method. Here we verify that Ag-NPs at room temperature can be used to drive chemical reactions under light illumination throughout the solar spectrum and in the process gain some understanding of the photocatalysis mechanism which is different from that for conventional semiconductor photocatalysts.

EXPERIMENTAL METHODS AND RESULTS

Synthesis

1Mm Solution of silver nitrate AgNO_3 was prepared by dissolving 0.0169g of silver nitrate in 100 ml of distilled water and boiled in ambient atmosphere and 10Mm tri sodium citrate solution is prepared by dissolving

0.294g of trisodium citrate into 100 ml of distilled water. Silver nitrate solution was kept in hot plate at 90⁰C for 5 minutes and then add 2.5 ml of trisodium citrate drop by drop. Once the reduction process begins colour change appears and the solution turn into pale yellow. After the changes in colour, solution was kept in magnetic stirrer for 15minutes [3].

Characterization: Optical properties of the synthesized Ag nanoparticles were characterized using UV-Visible spectrophotometer. Figure 1 shows the UV-Visible absorption spectra which show a peak near 436 nm, attributed to the surface plasmon resonance band. Morphology and size of the synthesized nanoparticles were determined using Transmission Electron Microscopy (TEM). Figure 2 shows the TEM images, which indicates that the particles are nearly spherical with sizes ranging from 10 nm to 40 nm.

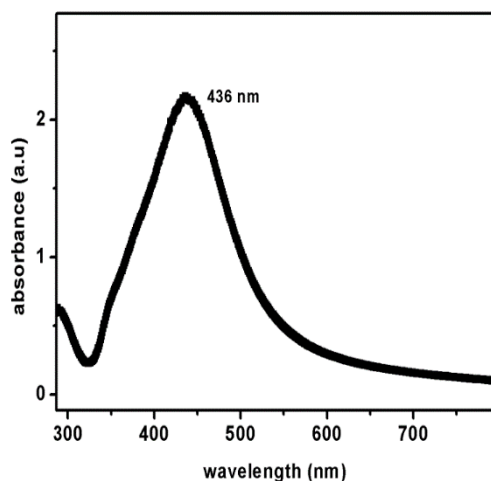


Fig 1: UV-Visible absorption spectrum of chemically synthesized silver NPs, showing plasmonic absorption band around 436

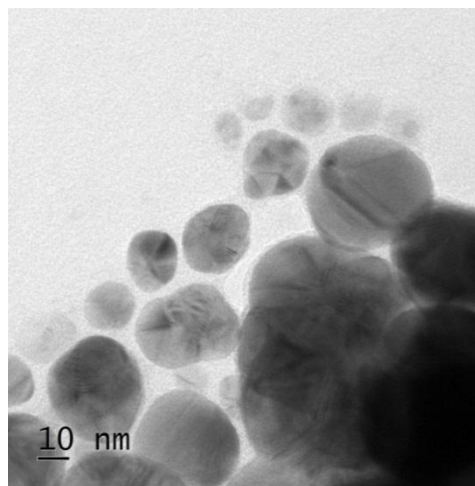


Fig 2: TEM images of synthesized Ag NPs showing a size range of 10 – 30 nm

Photocatalytic studies

The synthesized nanoparticles were used for photocatalytic studies. 10^{-4} M aqueous solution of Textile dye (blue color emission wavelength of 586 nm) was prepared. To 40 ml of dye solution, 5 ml and 10 ml of silver nanoparticle solution were added and magnetic stirred for one hour. Three samples - dye, dye with 5ml silver NP and dye with 10ml silver NP each was kept at dark and similarly three voids of each was kept under sunlight and was further studied. Absorption spectra was taken for the samples kept in dark and the samples after irradiating with sunlight for 2 hours, to understand the photocatalytic degradation of dye.



Fig 3: Comparison of dye and dye with silver solution kept in dark and after irradiating with sunlight for 2 hours

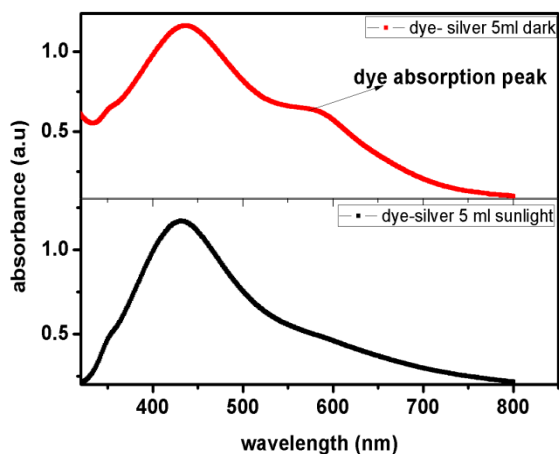
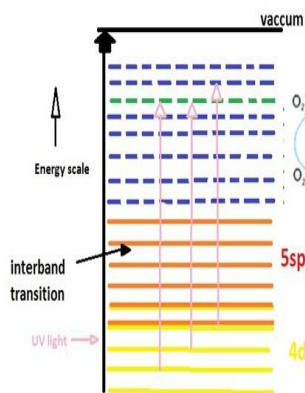
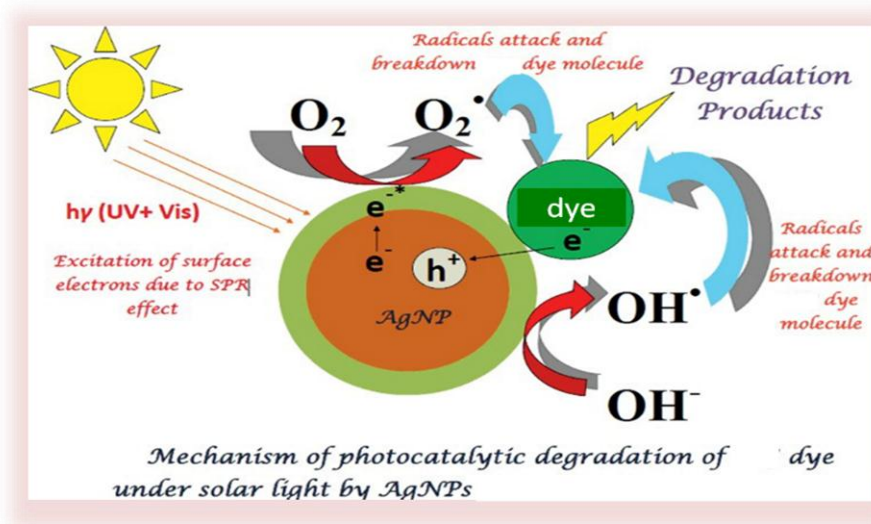


Fig 4: UV-Visible absorption spectra of dye solution mixed with silver NPs kept in dark and sunlight (2 hours)



Scheme 1: Excitation of silver NP on irradiation with UV light in solar spectrum

AgNPs has the property to photo catalytically degrade the organic molecules by absorption of visible as well as uv light of solar spectrum. On irradiation with sunlight, the visible wavelength in the blue region excites the SPR band. Similarly the uv light of solar spectrum excites the electrons in the 4s orbital to the 5sp orbitals (Scheme 1). The holes produced in 5s orbitals have a greater affinity for electrons and will capture the electrons from the excited dye molecules (on illumination with sunlight, dye molecules will also get excited along with silver nanoparticles). In addition, the photo-generated electrons react with oxygen molecules to form oxygen radicals and also produce hydroxyl ions, favoring the degradation of dye molecules [4].



CONCLUSION

In this study, we prepared silver nanoparticles by chemical synthesis method and the synthesized nanoparticles were found to have a size range of 10 – 40 nm with the plasmonic absorption band around 436 nm. We also investigated the photocatalytic degradation of dye with the synthesized Ag nanoparticles under irradiation with sunlight. We observed decoloration of dye solution after irradiating for two hours with sunlight, indicating that silver nanoparticles exhibit very good photo catalytic activity against molecule of dye and thus can be used in waste water treatment.

REFERENCES

1. Salamat Ali, Syeda Amber Yousaf, *Why nanoscience and nanotechnology? What is there for us?*, Journal of faculty of engineering and technology, 2008, 15; 11-20.
2. Huaiyong Zhu, *a Xi Chen, a Zhanfeng Zheng, a Xuebin Ke, a Esa Jaatinen, a Jincai Zhao, b Cheng Guo, c Tengfeng Xied and Dejun Wangd, *Mechanism of supported gold nanoparticles as photocatalysts under ultraviolet and visible light irradiation*, Chemical Communication, 2009, 48; 7524.
3. Balu S., S.Chittaranjan Bhakat, Dr. Sanjay Harke, *Synthesis of silver nanoparticles by chemical reduction and their antimicrobial activity*, International Journal of Engineering Research & Technology (IJERT), 2012, 1; 2278-0181.
4. Wenbo Hou and Stephen B. Cronin, *A review of surface plasmon resonance- Enhanced photocatalysis*, Advanced Functional Materials, 2012, 23; 1612-1619.

The Dark River, Black Exclusion and Poverty: An Ecofeminist Reading of Breena Clarke's *River, Cross My Heart*

Dr. Soney Bhageeradhan

Assistant Professor, Department of English, Cochin College

Born in Washington D.C. and graduated (B.F.A.) at the historically black Howard University, Breena Clarke is the author of three novels, *River, Cross My Heart* (1999), *Stand the Storm* (2008), and *Angels Make Their Hope Here* (2014). Her debut novel generated an immense amount of discussion as it was the October 1999 Oprah Book Club selection. It was also the recipient of the New Atlantic Independent Bookseller's association award for fiction for the year 1999 in addition to receiving the Alex Award given by the Young Adult Library Services Association. The novel set in 1925 Georgetown, is unburdened by an eventful plot, the magic of its narration being generated by the series of well researched and evocative vignettes woven around the death by drowning of the six year old Clara Bynum and the process of grief that the Bynum family goes through.

River, Cross My Heart renders the situation of Black people in 1920s U.S.A. with a vividness that accompanies painstaking research and is amply supported by felicitous expression and the powers of the imagination of a gifted writer. Clarke had endured the loss of her only child and has a personal understanding of the process of grief. She states that the most difficult part was writing the death scenes in her novels. The six year old Clara Bynum goes out with her twelve year old sister Johnnie Mae and her friends to the Potomac River to bathe. This was something which was forbidden as the Potomac River was not a place a swimmer could trust. The narrator says that the river was "as duplicitous as a two dollar whore" (5). It looks inviting but can provide a very choppy experience to people on boats. The narrator recounts the legends that surround this geographic feature.

Legends abound that the Potomac River is a widow maker, a child taker and a woman-swallower. According to the most famous tale,

the river has already swallowed three sisters – three catholic nuns. Yet it did not swallow them only drowned them and belched them back up in the form of three small rock islands. They lie halfway between one shore and the other, each with a wimple made of seabirds' wings. (5).

The unpredictable aspect of this river, the fact that it cannot be subjected to human control gives it its formidable legends, and perhaps invites the denigrating comparison with a category of woman whom culture had learned to ostracize and demean since the beginning of organized human societies. The treacherous aspect of nature is compared to the woman who is excluded from society because of her activities which it cannot entirely control. Clarke in an interview addresses her reference to the Potomac as a two dollar whore. She says that the Potomac looks calm on the surface, but it has got a lot of undercurrent. It would be calm and sweet at certain spots, roiling in others. "So it's a river, I think, that has a lot of character. And that's one of the reasons that I felt it, too, was a character in the novel. That it had an identity" (*"River, Cross My Heart"* by Breena Clarke). The streak of independence in Johnnie Mae is emphasized and that is what her father Willie takes strong exception to. The intractable character trait in Johnnie Mae is reflected in the river which is a metaphor of the new black woman who is emerging with the times. Johnnie Mae's brave plunging into the river is used to highlight the bold and adventurous strain that Clarke seems to value in her protagonists:

One of the things I wanted to do with Johnnie Mae, the protagonist, was to show that she was adventurous. That . . . She had a lot of moxie. . . I believe that in order to survive this life, and to do well in life, you've got to have moxie. And unfortunately, Clara Bynum, her younger sister, didn't have as much moxie.. . she was young, it's true, and the accident that happened to her was purely that, an accident. But she didn't have as much boldness and moxie as Johnnie Mae. The comment that I'm making is that it's harder for someone to survive if they don't have that — that intestinal fortitude. (*"River, Cross My Heart"* by Breena Clarke).

The Three Sisters is a landmark and is usually uttered before a catalogue of grief. The group of children vacillates to this place as an unconscious response

to the lack of excitement with their usual swimming spot, the Higgins Hole, a spot in the C&O canal where coloured children gathered in the summer and clambered over debris to swim. The water was not exactly brackish, but it was far from clear and there was a regular flush of decaying organic matter floating in it. Higgins Hole had lost its charms ever since a public swimming pool was opened exclusively for white people in Volta Place, right across the street where their aunt Ina lived.

The swimming pool is contrasted with the Potomac River in what seems to be metaphorical of the nature-culture divide. The coloured people (as African Americans were called then) excluded from culture were excluded from the pool as well and this exclusion conjured up an obsessive longing for the pool. “Nobody trusts the Potomac River. It’s not benign like the aqua-glass swimming pool for white children up on Volta place.. . Just walking along the river bank can be dangerous if you’ve got a worry spot or a grief stone or an anger or resentment that you cannot name” (6). The Potomac derives its formidable legends by metaphorical linkage with the enigmatic, uncontrollable woman whose motives are undecipherable. Later on in the novel the black medical student and swimming instructor Charles Hughes ruminates that a river swimmer understands fear because “a river is not a captive. It moves and changes. It can fool you and take you down in a minute if you are not always paying it mind” (198). The analogy with the unknowable, deceitful woman though not iterated is carried through.

Clarke mentions in an interview prior to her appearance on the Oprah Winfrey Show, that the novel grew out of a short story. She had made her mother prepare some oral history tapes and her mother was putting a very optimistic gloss on her childhood in Georgetown. Clarke notes that this changed radically, as though from day to night when she talked about the swimming pool at Volta Place which was reserved for whites alone. Clarke says that she found her story there. Her mother had lived through momentous events in the nation’s history like the depression of the 1930s or World war II, but it was this incident of segregation which lodged in her mind even after fifty or sixty years. Clarke surmises that it was the injustice of it which rankled so deeply (“*River, Cross My Heart* by Breena Clarke”). Her mother had been a good swimmer much like Johnnie Mae was in the novel, and the sense of profligacy with which she views the white girls

who sat by the side of the pool only to dangle their legs in it and be teased by a red haired boy, could be the same emotion that her mother felt.

The gradations of colour can pretty much decide a black woman's life. Miss Ann-Martha, the single coloured woman of independent means and uncertain morals has a word of advice on this topic to Johnnie Mae. "A yella girl can rule the mens if she is smart, especially colored mens. A brown gal got to work a bit harder. A blue- black gal is got no chance" (15). Johnnie Mae's friends have cognomens after comestibles, but the thrust is on the colour of these edibles. "gingerbread Mable, caramel Lula, black-coffee Hannah, Sarey the banana, and Tiny, the tall slim girl colored the same as the skin of an eggplant . . ." (21). The primacy of skin tone ruled the black woman's world.

Barbara Christian in an essay "Images of Black Women in Afro American Literature: From Stereotype to Character" indicates that in literature, the mulatta or the woman with an influx of white blood was seen as desirable and elevated because of her whitening. But that was not the case in folk songs or work songs. These songs depict the clash of the dark woman and the "yaller" woman, but the yaller woman is not always portrayed as more desirable. She quotes two songs to prove this point.

De mulatto gal got yaller skin, yaller skin,
De mulatto gal got yaller skin, yaller skin,
.....
Den she got a devilish grin, daddy.
De chocolate girl got greasy hair, greasy hair,
De chocolate girl got greasy hair, greasy hair,
.....
She is the gal can cuss and rare daddy. (qtd.in Christian 6-7)

Another song which shows that white blood need not necessarily add "to the value of a woman" (Christian 7) is quoted below:

Some say give me a high yaller,
I say, give me a teasing brown,
For it takes a teasin brown
To satisfy my soul.
For some folks say

A yaller is low down,
But teasin brown
Is what I's crazy about. (qtd. in Christian 7)

When asked in an interview what people criticize her for, she mentions that people have expressed their annoyance in the lack of a religious narrative in her fiction. Religious worship is introduced for its social function only. This is most evident in the depiction of Reverend Jenkins of the Mount Zion United Methodist Church. He is represented as a comical though astute person. The element of humour in the novel curiously comes out most insistently in the funeral of Carla where Jenkins presides. His flatulence and intestinal trauma contributes to the humour in these scenes. Humour is also brought in by Miz Elva Bemis, president of the Ladies for Olives burial society. She brings in money, solace and sagacious advice wrapped in kindness for the Bynum family. Pushing a peppermint ball into a guilt laden Johnnie Mae's mouth she admonishes, "Don't forget the little sweetness of life" (45), but the tremulous manner in which her words of solace rouse up a religious litany verges on the comical. Religion one of the structural pillars of culture is excluded from the weave and weft of the novel. It is a surface pattern which is prominently visible but ultimately unimportant.

The warping of the white man's religion with superstition and an eschatology unsanctioned by Christianity is brought out with comical effect in the novel. The enumeration of superstitions is generally focused on the *domus* or the domestic sphere. It relates to not using or even peeling a double sided onion because it would bring discord into the family, the house should not be swept in circles; the dirt should be swept out through the door. If salt was spilled some of it had to be quickly thrown off over the shoulder to ward off bad luck. While waiting for their son Calvin to be born Willie spends his time wracking his brains over who would be re- incarnated as his new child. He was confident that Clara was his sister Merle "come again" he decides that if it was a girl it would be either his mama or "big mama" come again. If it was a boy it would be his father. His wisdom on this topic was, "With these coming children we never relinquish the past. We keep seeing somebody gone in each new one" (204). This cyclical eschatology does not coincide with the accepted Christian one and has more in common with communities which live close to nature.

The presence of dead people is part of the design of the novel. Aunt Ina talks to her dead husband Carson on a daily basis. The dead Clara peoples Johnnie Mae's dreams as well as important points in her life. When she is parceled to be sent off to her grandfather in Carolina for breaking rules and bathing in the swimming pool at Volta place by night, she sees Clara standing on the doorway of the station forcing her to run out of it and ending an en pass with her parents because neither of them want her to go away and they do not have a clue as to how to undo the situation. Her winning the swimming competition at the end of the novel is linked to her seeing Carla in the water. The swimming pool, the symbol of culture in the novel changes into the intractable Potomac in which she sees her sister and it is in chasing and tagging her sister and the rocks in the Potomac that she finally outdoes the competition and wins.

Considerable narrative space is allotted to the activities of women, especially in the domestic field. The empire that women have arrogated to themselves is the kitchen. Clarke narrates an instance when Alice, Johnnie Mae's mother needs to work for her white employers on Thanksgiving Day. When she and Johnnie Mae get back, her cousin and closest friend Ina has got the dinner going. In spite of the fact that Alice would not have been able to manage work and the dinner at home what overcomes her is a feeling of resentment at another woman having taken over what should have been her exclusive dominion. Catching sight of Alice, Ina hands her an apron, signifying the transfer of power which is rightly her own. Black women were denied access to art during the days of slavery. Their creativity had to find an outlet in crafts like quilting, gardening or skills like cooking. So cooking is not a household chore from a black woman's historical perspective, it is an outlet to let her creativity unspool.

Through the thoughts of Johnnie Mae perched on the commode the writer lets the reader have a preview of the lives of black women at that point in the history of their nation.

Obliged to rise up out of bed before husband and daughters to straighten up the neat but rickety little frame house; obliged to stay up long past dark to knit socks, sweaters and scarves; obliged to think up excuses for the landlord and grocer when accounts were past due; obliged to wear a whalebone corset under a fussy dress on Sunday and sit there all day fanning and singing; obliged to

make the biggest and sweetest three layer chocolate cake ever known for the church bake sale and for anybody's and everybody's birthday. And obliged to clean from top to bottom and over again the house of the woman she worked for. "Doesn't she ever do something she wants to do?"(11).

The yearly church picnic which is a recreational and social get together only brings on added work for the already overworked women. Women who cooked five or six days a week stay up late cooking enormous portions and then get up early to fry the chicken. The baking would have been done the previous day. Changing raw materials to food and clothing is one of the gender dictated roles that women are expected to fulfill. The coloured women spend tremendous amounts of time cooking and receiving compliments for their biscuits, cakes and cookies. There seems to be an over-abundance of food in the lives of these impoverished, but honest working people. The cornucopia of food in the novel invites comparison to the food situation which was prevalent in India roughly at comparable times. The Bengal Famine of 1943 wiped out approximately three million people due to starvation and associated diseases. The dead were constituted majorly not from the poorest strata but from the artisan class because people having to spend more on food refrained from spending on cobblers, carpenters and their like. Pictures of dead bodies of skeletal children curled up by the side of dogs on pavements are representative of the Bengal famine which happened eighteen years after the time period of this novel. The stories of the Malayalam stalwart M.T. Vasudevan Nair who was born in 1933 abound with children belonging to upper caste families and situated in the middle economic rung fantasizing about a meal of rice and coconut oil because rice water broth is what they customarily had for lunch. The striations of poverty and deprivation are complex and difficult to understand or constructively categorize.

America might have been able to provide food for its poor but was not able to provide equitable citizenship status for people of all ethnic origins. Racial segregation in pools, restaurants, schools and churches are dealt with in Clarke's book. When Clara's bruised and muddy body is dredged out of the river, the white sergeant does not waste compassion on Willie. He is curtly asked to peek under the tarpaulin and identify the child. In Carolina where the Bynum family came from, coloured people could not go to the hospital. Ina in an angry outburst

remembers how the doctor for coloured people did not help much in delivering babies. Ina believes she lost her child because of his negligence. She also blames her subsequent inability to have children on him. The play ground and Volta Place swimming pool are exclusively for white children. Clarke in an author's note mentions that the Epiphany Catholic Church was established in 1923 by black Catholics who no longer wanted to attend the segregated Holy Trinity Church. The psychological effects of these pervasive exclusions are cumulative and can result in excluded categories of people internalizing their subordinate positions.

The effect of menstrual taboos on women has been analyzed similarly. Even in matrilineal pacific cultures, the most sacred object of the community cannot be touched by a woman for fear that her touch would ritually pollute it. Among the long list of superstitions that Johnnie Mae has to remember there is one regarding menstrual taboo. A woman on her "monthlies" must not touch a pitcher of milk or she would curdle it. Johnnie Mae comments that the list of things a menstruating woman was forbidden from doing was so long and arcane that she suspected that it was made up to keep a woman from doing anything at all.

Menstrual taboos could have their origins in patrifocal culture's fear of the regenerative powers of woman which align her with the creative and cyclical energies of nature that they try to tame and subordinate for their profit and convenience. But patriarchy and patrifocal cultures are fearful that these energies are ultimately intractable and way beyond the realm of their powers to subjugate. Willie in the novel is a representative of that culture. He vehemently opposes Johnnie Mae's passion for swimming and her plans to represent Washington in the championships. His inventory of complaints surrounds the appropriateness of a girl indulging in professional swimming:

Her hair's always wet or nappy. It's a good grade of hair and it's going to be ruined from all that swimming in the pool. She smells funny. She is acting womanish and hardheaded but behaving like a child too. She's not carrying herself like a growing up young lady. But still and all she's there at that pool in a swimming suit instead of in her clothes. (207).

Independence, a quality highly valued in white males is not something which is desirable in an African American adolescent. Willie has great concerns

for “that damnable streak of independence” (204) which Johnnie Mae demonstrated even as a child. Taking a switch to her bottom or the back of her legs had been useless because she was hard-headed and headstrong.

Clarke plays around with the stereotypes of women found in African American writing in her novel. The Mammy figure is the way southern writers chose to see the African American woman. She was the ideal and a contrast to the ideal white woman. She was nurturing attendant to the children and family; black, religious and constantly putting others need before hers. She was there because southern men could not fight duels for white women who cooked, cleaned and took care of children. The ideal white woman would not debase herself by engaging with these activities which would associate her with the physicality of being female. But the functions of mammy are “magnificently physical” (Christian 2). It was of crucial importance that the mammy had large breasts and big arms. Alice is a close up of the industrious mother who carried out all these functions. But she does not physically fall into the category of the mammy. Her physical appearance would place her in the category of women that white society would categorize as dignified.

Other stereotypes are that of the concubine and the conjure woman. Miss Ann Martha Pendel of the uncertain morals fits the category of the concubine, but physically she does not have the accepted traits of a concubine. Her breasts flopped carelessly under her shift and there was slackness in her lips when she spoke from the corner of her mouth. The conjure woman is portrayed in the character of Miss Ella Bromsen. But Miss Ella of the brooms and potions is an apparition of kindness and is not feared by the women in her community. They readily accept her potions and administrations and seem to accord it a certain amount of respect.

The exclusion from the pool is an injustice that Johnnie Mae cannot brook and the pool holds forth an allure even after the coloured people get their own pool called the Francis pool together with the swimming instructor Charles Hughes. Johnnie Mae is irate over the amorphous “they” who keep them out of the pool. She would like to know the identity of the “they.” Was it President Coolidge? Were all white people in on the plot? Willie is all for acquiescence, but Alice understands Johnnie Mae’s rage. “We pay our rent the same as the others around here. Still they say our children cannot play in the play ground” (24).

Johnnie Mae is set on crossing this barrier set up by white society. The Volta Place swimming pool has become a symbol of their circumscribed lives and she is bent on freeing herself from these restrictions. She and her friend Pearl go out by night to swim in the pool. They are caught by a patrolling policeman Toby Davis who calls them niggers, but they manage to get away unidentified. Sergeant Michael Cronin who considered himself sympathetic to the coloured (but which does not stop him from referring to the anonymous girls as “little niggers”) does not pursue the matter but asks Reverend Jenkins to see to it that the situation does not repeat itself. Jenkins is able to identify the girls from the general description and has a talk with her parents even though he felt that having places like the exclusive pool was shameful and wrong.

The symbolic bastion of racial prejudice had been breached by the “moxie” of the young black girl. She had come a second in the qualifying competition to represent Washington in swimming. The relieved judges decide to cancel the diving competition for fear that Johnnie Mae the black girl would beat the white competition much to the chagrin of Charlie Hughes, her instructor. Diving had been Johnnie Mae’s specialty and she was sure to have defeated the white girl. The novel ends with Johnnie Mae starting on her “monthlies” and winning the competition chasing the ghosts that haunted her childhood and recreating the natural element that best symbolized her spirit, the Potomac River which the author affirms is a character in the novel.

REFERENCES

1. “Breena Clarke.” Homepage. breenaclarke.com. n.d., Web. 29 May 2016.
2. “Breena Clarke’s Page.” *She Writes*. Shewrites.com. n.d. Web. 29 May 2016.
3. Christian, Barbara. *Black feminist Criticism: Perspectives on Black Women Writers*. New York: Teacher’s College P, 1997. Print.

Revival of Sovereignty through Forests: Extrication of Feminine Characters in Select Bollywood Tawaif Films

Sabitha S. Babu

*Assistant Professor of English, Maharaja's College (Govt. Autonomous),
Ernakulam*

Email: sabithasbabu@gmail.com

ABSTRACT

Visual narratives catalyze and modify the adverse situations of the society in favour of a paradigm shift regarding nature. The problems engulf the biosphere need to be addressed urgently. If it happens through the medium of visuals, the outcome would be far-reaching. An all-embracing and all inclusive eco-centric approach is required to have a wide sweep of the present anthropocentric worldview. Literature is concerned with the expansive and comprehensive outlook towards the conservation of nature. Visual representations aim at the prolonged extension of the idea of the defense of the nature. Speaking precisely, the films leave no room for complaint in the portrayal of the prodigiousness of the forests. The immensity of the wilderness never loses footing by the hands of film makers.

The Bollywood films, too, would never be an exception in the depiction of wild life. The romanticization of nature is the cardinal element in them. The Bollywood tawaif films figure forest as a place of safety and recluse. It is a replica of their emancipation and liberation. The paper aims to throw light on the empowering aspect of the forests as depicted in the Tawaif films. The task at hand is to analyze the acquittal of feminine characters through the medium of forests in select Bollywood Tawaif films like Devdas and Umrao Jaan by using Eco feministic abstractions.

Keywords: *Tawaif, ecocentrism, feminism, identity.*

Forests are the cradles of civilization. Life springs from their recesses. Primitive people lived in harmony with them. The whole world was like a web of life where living and non-living beings lived in a network of interdependencies. But today the circumstances are changed a lot. Ironically the need of the hour is to teach people the importance of the preservation of nature and forests. Our conventional and stereotypical perceptions prevent us from having a new and scientific understanding of the world. The old anthropocentric paradigm should be changed to new eco-centric model to give birth to a sustainable society. The sustainable society is that which would appraise the words of Chief Seattle, the Native American, when he says in his speech "The End of Living and the Beginning of Survival," "We are part of the earth and it is part of us. . .land is sacred to us. . .the earth does not belong to man; man belongs to the earth" (105-106).

Bollywood films picture forests with their beauty and romance. The idyllic picturization of forests always enhances the glamour of Hindi films. Forests, like the various assets of nature stand out as powerful symbols and images in the films. They represent the emotional turbulence of the characters on the screen. The binary emotions like emancipation or captivity, happiness or sadness, richness or poverty, innocence or crookedness etc. get delineated through the portrayal of forests in many a number of Bollywood films. The emotional turmoil, benevolence, agreeability, geniality, warmth, aloofness, hostility of the characters gets revealed through the portrayal of the forest and its recesses.

Bollywood is particularly a box office - oriented Hindi language film industry rooted in Bombay. The incorporation of motion pictures into Indian life is the motto of this highly expensive film industry. Hindi film industry is always dominating the Indian film world in terms of its revenue and reception. The popular Hindi cinema is widely accepted as a hybrid art form which blends neatly the theatrical and cinematic elements. The reception of Bollywood films by Indians is mainly due to their nature as being cultural transporters, as revealed in the words of Ajay Gehlawat in the book *Reframing Bollywood*: "...the widespread viewing of Bollywood in Indian villages functions instead as a form of visual literacy" (xxii). But on the other side, Bollywood film is always criticized as an imitation of its western counterpart;

not having any innovative ideas. Only the entertainment purpose is highlighted here as uttered by Vidya Balan, a cine artist in the film *The Dirty Picture*: “entertainment, entertainment, and entertainment” (2011). Bollywood films often get interpreted as a means of escape or removal from reality for simple-minded audiences.

Yet, a close reading of Indian films would really open up windows of new world of interpretations; the world which gives importance to ethics, environment, and ecology. A paradigm shift is required to make changes in the society and such changes are essential in keeping and maintaining the vitality of the environment. The new ideology of the ecological aspects can easily be disseminated through the films in Indian society. Because in India film holds an important position and populace find pleasure in personal identification with the film characters. Indians’ love for films gets revealed in the words of Tamaswini Ganti in *Bollywood: A Guidebook to Popular Hindi Cinema*: “Cinema has played an important role in state discourses about development, nationhood, and modernity in post-independence India” (47).

The discursive cinematic practice is supercilious as it sexualizes the women while formulating a strict moral code for them. Women internalize the moral code and gradually become the stockholders of morality. The institution of monogamy betrays the occasional uprisings of eruptions from the part of female film makers. Women are trapped within the institution called marriage and become ‘legalized prostitutes.’ (Walker, 1) Ironically these women characters enjoy a moral and cultural dominance over all other types of female representations in films. In India women have minimal roles to perform in the society and in the family. The positioning of women into certain roles is evident from the following words of Bharati Ray from her editorial book *Women of India: Colonial and Post-Colonial Periods*:

Women’s bodies have been the site of major polemics on gender. While they have been, historically, loaded with signification, three notions obstinately persist in the context of India. First, women’s bodies are for procreation, second, women’s bodies are for men’s enjoyment, and thus sexual agency on the part of women threatens the social order, and third women’s bodies are

the repositories of men's honour, linked to the honour/shame of the community and the nation. (xxxix)

To an extent the independent, self-esteeming, proud, feminist woman is nullified by the film makers. One of such kinds of neglected lots is a 'tawaif', who, in fact regarded as an indispensable figure in the history of India. The word 'tawaif' is rich with emotional connotations. The term 'tawaif' is the plural form of the Arabic word 'taifa', and as such meant 'group'. Today the term has become synonymous with a prostitute. Unfortunately, this is an extreme corruption of the word, and not at all a reflection of this once noble institution. North Indians use the term *nachwali* to refer to tawaif. *Nautch* is an anglicized form of the Urdu/ Hindi 'nach', which is derived from the term 'nachna' which means 'to dance'. However since the 19th century, the term 'nautch-girl', 'nach-wali', or 'nautch-wali', has been applied to tawaifs and devdasis. There is a wide gap between devdasis and tawaifs. The term 'devdasi' literally means 'a female servant of god'. The devdasis were girls who were attached to the temples. It is important to remember that there was virtually no connection between the devdasis and the tawaifs.

In Hindi films alluring tawaif figure and their culture remains a sumptuous fodder and obsession for many. These are female figures whose work depends on their very existence as women; yet they are also not free from the entanglement of a monogamous love as is depicted by male creators. They are economically independent women and at the same time they financially raise themselves up by the monetary funds of men. Their autonomous life enables them to have their own sexual and moral life. The groups of courtesans are the best illustration of the unconventional aspect of the heterosexuality- the prime weapon of patriarchy against women. A woman becomes a tawaif when she becomes a victim of social conditions. A tawaif is the best example of a female subject who is emotionally involved in narratives that demonstrates the victimization of women. Applying Eco-feminism into tawaif films unveils the hidden correspondence and equivalence between women and nature. A shift in the perception of nature and woman is needed to make a change in the society. The urgency of the situation is very well revealed in the words of Janis Birkeland in the book *Ecofeminism: Women, Animals, Nature* edited by Greeta Gard:

The glorification of what have traditionally been seen as "masculine" values and the drive for power and control are simply maladaptive in an age of toxic waste and nuclear weapons. Healing the powerful psychological undercurrents created by thousands of years of patriarchy requires rigorous self- and social criticism. We must move beyond limiting conceptions of both masculine and feminine in ourselves and in our societies. This requires not only introspection, but a gender-conscious political analysis. (17)

Hence is the birth of ecofeminism, which considers earth as a household and eco-feminists meditates over the relation between earth and women. Tawaifs are not traditional women; hence the interpretation of their representation by using eco-feminism would really prove to be an interesting one.

Etymologically, the term Courtesan or North Indian 'Tawaif' referred to a person who attended the court of a monarch or other powerful person. It denoted a well-educated and an independent woman, eventually a trained artist or artisan of dance and singing, especially one who is associated with wealthy, powerful or upper class society who provided luxuries and status in exchange of entertainment and companionship. They were supported by wealthy men who provided them with anything they could ever want. Applying the principles of ecofeminism, one would delineate the patriarchal ideologies hidden in the portrayal of feminine characters in the Tawaif films and how nature comes in rescue of these poor noble characters. With nature they feel free, or to make it more simple, nature helps them for self-identification.

Devdas, a novella by Sarath Chandra Chattopadhyay has been adapted into Bollywood by many film makers. The Bimal Roy' version of 1955 gives nature or forest a prominent place. The story can be considered as a catharsis of emotional insecurity and psychological impotence. *Devdas* recognizes the cultural constructs and political, religious and class influences of the time that heavily influenced the lives of the men and women trapped within those invisible walls. The novella powerfully depicts the prevailing societal customs in Bengal in the early 1900s, which are largely responsible for preventing the happy ending of a sincere love story. In short the novel focuses on the social, cultural changes happening in a patriarchal society where woman is degraded to the position of a mere plaything. She has to lock herself within the four walls of

her house and the doorstep can be considered as the symbolized form of the restrictions imposed upon her.

Bimal Roy has become successful in delineating the beauty of the forest in his film. The forest symbolizes the innocence, safety, and peaceful tranquility of the characters. Devdas and Paro in their childhood find happiness and safety in the forest. Forest symbolizes their inseparable love for one another. The wildness of the forest has no role here. The ease with which the children climb up to the top of the tree and makes themselves invisible in the thick foliage of the tree bears testimony to the fact that human beings and the nature was living in harmony with one another. Nature seemed to be a place of safety, where they can go and take refuge. It is more or less like a home for them. The merry-making situation also witnesses the indomitable presence of forest in the film where Devdas says Paro to go to a nearby garden where “bulbul kabacchahai, use pakadkeke thughedoonga.”(*Devdas*, 1955). The above mentioned dialogue clearly demonstrates the importance of birds and animals in the life of children in those days. They are not seen as playing with the toys, but in the gardens enjoying the sweet aroma and freshness of the nature. To the amusement of the modern viewer the children are seen as singing songs for the birds. The generosity of the kids revealed in their invitation of the birds to the home to be fed and nurtured. To be precise, the girl child showers more love and concern for the bird and the nature. The identity of the girl, Paro is built around her love for nature. Her character “becomes important through a specific relationship to a particular metaphoric “nature.” This relationship is repeated and naturalized as the key narrative through which feminist relations to environmentalism are understood”. (Sandilands, 4).

When the story progresses the same nature is the silent beholder of their physical separation. Paro’s loneliness, pain and emotional turmoil intertwined with the calmness of the nature. The singers in the film address her miseries by connecting them with natural elements. The forest, for Paro, has become a place to express her feelings outside the domain of culturally constructed patriarchal institutions and this exploration helps her to create a distinctive space for herself.

Water, a symbol of rebirth and rejuvenation, stands helpless in the verbal dispute between Devdas and Paro. They confirm their separation in the

waterfront area where she has to speak rudely to Devdas. Even the hero doesn't hesitate to whip her to make a scar on the forehead. The sharp voice of Paro is at par with the stormy sky and impatient nature. But Devdas's cowardice gets expressed in the feeble act of his violence. The clouded sky and the barren land highlight the dissolution of two lovers. Being in touch with the traditional conceptual framework, the film showcases the village as pure and city as vicious.

In the second part of the film nature seems to hide all its beauty and charm as it has attested the separation of two divine lovers. The pious atmosphere is transformed into a deadly one. The nature lost its sweet lullabies and even the water stand still. The transformation of the nature gets revealed in the following words of Paro's friend in her letter to Paro, "Jab se tumari doligayihaparo, gaanvkanaksha hi badalgaya." (*Devdas*, 1955).

The gloominess of the character Devdas reaches its zenith when he finds himself amidst nature. The place which once had been his hideout or shelter now is seen as sharing his emotional trauma. He addresses nature as his soul-mate. It is interesting to note that the lead characters share their emotional traumatic experiences with nature. The two female characters Paro and Chandra Mukhi have a glimpse of one another under the scrutiny of natural elements. The scene witnesses the silent presence of nature as a bystander. The two female characters, who sacrifice themselves for the sake of an Indian Hamlet, meet in the wilderness of the nature. The meeting is the symbolization of their emotions and feelings for the one person, Devdas. The last scene of the movie pictures the two birds flying above the heights, indicating the freedom of the two lovers from the cultural bondages of the society. In short, the nature can be regarded as a fundamental part of the film because it expresses the emotional state of the characters, especially female ones.

The 2002 version of *Devdas* is noted for its opulent and extravagant spectacle. The director, Sanjay Leela Bhansali, has focused in his concentration on elaborate sets and stunning costumes. The emotional turbulence of the characters finds expression through the hyperventilating style and music. The 2002 version *Devdas* is one of the expensive films produced in the Bollywood film industry. The mise-en-scene of the film bears testimony to this fact. Those

elaborate sets compete with the characters and the story outline to attract the audience. The nature has not much to do here in the second adaptation.

When the novel deteriorates the condition of women in the society, the filmmakers has attached importance with the women characters. There are scenes where tawaifs excel the traditional, conventional heroines. The films cannot isolate the female characters as the twentieth century novel. The so called concept of masculinity can be traced in the acts of women characters. Such type of a daunting move is made by Paro, when she visits Dev in the night. The impasse or blockage in the theorization of film has been deleted by the female characters in the films. Paro is always daring enough to break the barriers of custom, culture, tradition and the various taboos of the society for the fulfillment of her love for Devdas. But he is seen as reluctant to raise a little finger to gain Paro. In the second half of the film, the tawaif character Chandramukhi dominates the scenes to subdue Devdas. She has gone to the extent of giving up her profession for bringing him back to normal life. But the male protagonist always acts as a reason for the despair of the audience. Chandramukhi's bold steps didn't influence the psychologically impotent male character. He is seen as always torn between the traditional norms and modern educational influences.

Hence, the women characters in these films are the embodiment of their liberated self. The empowered nature finds expression in the characters of these heroines. Nature is synonymous with the emotionally independent women characters in the film. The emotional turbulence and peace of mind of the lead characters find expression in the changing climactic conditions. They could create their spaces and identity in nature and with nature. The forest is a testimony of the fact that, women no longer need to bear the brunt, but to build a culture or space which is not contaminated by the presence of men and the masculine dominated ideologies. The nature is considered as an extension of her own personality. The conventional structures like hierarchy, value, independence and tradition and many more are questioned by female characters in their association with nature.

The prerequisite of the liberation of women is the realization of their own expertise. The gifted nature and the genius of the women should get unveiled through the various outlets. One such facet is nature and intimacy with it. A perfect example of this conceptual framework is *Umrao Jaan*, a film by

Muzaffir Ali. The film is an adaptation of Mirza Muhammad Hadi Ruswa's *Umrao Jaan Ada*, published in 1905. The novel is known for its elaborate portrayal of mid-nineteenth century Lucknow, its decadent society, and also describes the moral hypocrisy of the patriarchal system of the times, where Umrao Jaan also becomes the symbol of a nation that had long attracted many suitors who were only looking to exploit her.

Even though the film is the romantic representation of Mughal culture, the realistic portrayal of nature connects the thread line of various events in the film. The narrative begins with the engagement ceremony of Ameeran where an old lady identifies the entire women folk as birds through the song "hum to babul tore pinjade kichidiyaan" (1981). The identification with the nature reveals the inner harmony they experience with nature. For them nature shares their happiness and sadness. The nature which is a silent beholder for happiness continues to be meek at the time of deprivation also. Ameeran gets kidnapped from her garden and even the nature prostrates before the villain Dilawar Khan. The river, the barren land, and the forest stand handcuffed in the abduction of Ameeran. The nature remained in a hand tied manner. She is sold in a Kotha.

In the second part of the movie, the nature enters into a state of stagnation. The 'tawaif-baazi' is underlined in the film. The director mirrors the tawaif culture as is evident in Umrao's embroidered scarlet dresses, jewellery, widely arched dancing halls, gorgeous interior decoration with velvet curtains, huge shimmering chandeliers, smoking hookkas, pandaans, sarangis and tablas. It all represents an age of material pleasure and abundance. The movie pictures the liberation of tawaif characters through the medium of forest. The indolence and fecklessness of the characters are subverted by nature. They all set out for a picnic and in the wilderness of the forest their cheerfulness and exuberance gets intertwined with the splendor of nature. People are shown as preparing food, cracking jokes and engaging in jocund and genial conversations. The two lovers meet under the celestial presence of the nature where the male lover sings by drawing images from nature, "zameenchand se behtharnajaraathihain" (1981). He attributes the qualities of nature to his lover. She becomes synonymous with the spirituality and sanctity of the nature. On the other side we have two other characters and a female kidnapping. The character called Bismillah is taken

away by some dacoits. But later in the film, the scene of revelation uncovers the truth that Bismillah is taken into a safe and secure life where she gets all happiness. Her capture had a silent onlooker, viz, nature. Hence, the forest gives her a safe place to continue her life, since she was dejected in the Kotha. As the film progresses, Umrao, too makes use of the same forest as a means of removal from the patriarchal society. Ironically she is helped by a dacoit, Faiz Ali. But dacoit is attacked by a group of bandits and gets killed. The action scene discloses the deadly, alarming side of the forest. But, eventually Umrao leaves this treacherous world with the bold act of taking refuge in the forest. The film attaches importance to the cordial relationship between human beings and animals also. The animals are shown as holding a key position in the lives of characters. Here is the significance of the nature in the lives of characters in the two films *Devdas* and *Umrao Jaan*. It would be too simple to state that nature occupies a central position in the soul and spirit of human beings. The deep ecological perspective of the postmodern world really needs to be emphasized by the humanity. The sparkle and liveliness of the world will be regained only with the consensus and unanimity of the humanity with the nature.

REFERENCES

1. Chattopdhyaya, D. P. *History of Science, Philosophy and Culture in Indian Civilization*. Vol.IX part 3. Ray, Bharathi. *Women of India: Colonial and Post-Colonial Periods*. New Delhi, 2005. Print.
2. *Devdas*. Dir. BimalRoy. Perf. Dileep Kumar, Vyjayantimala, Suchitra Sen. Bimal Roy Production Company, 1955.
3. Gaard, Greta, Ed. *Ecofeminism: Women, Animals and Nature*. Philadelphia: Temple Uty. Press, 1993. Print.
4. Ganti, Tejaswini. *Bollywood*. London: Routledge: 2004. Print.
5. Gehlawat, Ajay. *Reframing Bollywood*. New Delhi: Sage Publications, 2010.Print.
6. Guha, Sreejata. *Devdas*. India: Penguin Books, 2002.Print.
7. Guha-Takurta, Tapati. *Monuments, Objects, Histories*. New York: Columbia Uty. Press, 2004. Print.

8. Kaplan, E. Anne, Ed. *Psychoanalysis and Cinema*. New York: Routledge, 1999. Print.
9. Kazmi, Fareed. *Sex in Cinema*. New Delhi: Rupa Publications Pvt. Ltd, 2010. Print.
10. Mathews, David. *UmraoJaan Ada*. Culcutta: Rupa & Co.,1996.
11. Monoco, James. *How to Read a Film*. London: Oxford Uty. Press.2009. Print.
12. Sandilands, Catriona. *The Good-Natured Feminist*. London: University of Minnesota, 1999. Print.
13. Shekhar, Poornima, Ed. *English in Social Dimensions*. Chief Seattle. "The End of Living- The Beginning of Survival."New Delhi: Macmillan Publishers, 2010. Print.
14. *The Dirty Picture*. Dir. Milan Luthria. Perf. Vidya Balan, Imran Hashmi. Balaji Motion Pictures, 2011.
15. *Umrao Jaan*. Dir. Muzaffir Ali. Perf. Rekha, Nazruddeen Shah. Integrated Films, 1981.
16. Viridi, Jyotika. *The Cinematic Imagination*. London: Rutgers Uty. Press, 2003. Print.

‘The Neo-white man’s burden’: Journey from Colonialism to Post Colonialism in the movie *Lord Livingstone 7000 Kandi*

Tessa Fani Jose, Athira Babu

Assistant Professors, St. Teresa’s College, Ernakulam

“Colonialism is a practice of domination, which involves the subjugation of one people to another.” It led to the exploitation of nature and people and continues even in the Postcolonial era. During recent times there has been an awakening in the post colonial space regarding this colonial exploitation which is still continuing with the aid of neo colonial structures. And this realization is reflected in their literature and movies.

Lord Livingstone 7000 Kandi is a 2015 Malayalam movie written and directed by Anil Radhakrishna Menon and focuses on the intersection of colonial, postcolonial and environmental issues. It narrates the story of Philipose John Varkey, a nature enthusiast, who takes upon himself the task of saving a forest settlement, 7000 Kandi, from businessmen who try to convert the forest into an industrial area. Varkey sends letter to hundreds of people to help him save 7000 Kandi. C. K. A. K. Menon, Shanmughan Illangovan, Madhumita Krishnan, Prof. N. Neelakandan, Beeran and Ananthakrishnan Iyer came in search of treasure which was mentioned in Varkey’s letter. Varkey reveals that the real treasure is the village. He also informs them about a treaty between a landlord and Lord Livingston company which grants them permission to convert the forest into an industrial area or plantation for 150 years. If they succeed they can extend the validity up to 350 years. Varkey convinces everyone that they need to set aside differences and come together to save the settlement. And with the help of scientific techniques and make believe ghosts they succeed in protecting the village.

The movie traces the journey from colonialism to post colonialism as reflected in a state like Kerala and the emergence of ‘neo-white man’ in the place of White man. We are familiar with the concept of White man’s burden, i.e. the presumed responsibility of white people to impart their education and culture to

non-white people, which is often cited as the west's justification for colonialism. In the movie, we witness the emergence of 'neo-white man' in a post colonial space. The protagonist Mr. Varkey, can be seen as the 'neo-white man'. Belonging to the age of globalization, which is in effect colonialism in a revised outfit, Mr. Varkey has taken upon him to be the savior of natives of 7000 kandi. Neo- white man is similar to white man in the aspect of deciding by himself as to what is best for the native. During colonization white man decided that native is primitive, uncouth and uncivilized and decided to impart education and culture which he lacked and thereby shred him of his indigeneity. Mr. Varkey is exotifying the native life and does not want them to be corrupted by the modern world. He makes the decision to keep them away from the modern civilization and does not give them a chance to make choice.

Mr. Varkey establishes himself as the guardian angel of the post colonial geographical space which is on the verge of destruction by neo colonial structures, whereas the white man looted us of our natural resources and is continuing to do so. This desire of Varkey to protect the 'virgin' forest can also be read as an attempt to gratify the male ego.

7000 kandi is a post colonial geographical space and it is viewed differently by different groups. For the 'neo white man' and his army of six, it is a Treasure Island which needs to be kept hidden from the capitalist eyes of the world. For the 'neo colonial structure' in the movie, that is, the British company, the forest is a 'Gold mine', a space to be exploited. For the inhabitants on the fringes of the forest, it remains as 'the forbidden' space of their folklore colored in mystical and Gothic shades. And for natives 7000 kandi is an ideal habitat. They see themselves as the offspring of the forest and are provided for and protected by her. This belief of theirs is backed by the back story of the origin of these people.

7000 Kandi was a result of a war between two provinces, Konachery and Simghanagaula which lasted for eighteen years. Simghanagaula conquered Konachery and the settlers made the natives to seek shelter in the nearby forest. The story clearly states that people of Konachery preferred to die than to live as slaves and therefore they moved to the forest haunted by evil spirits. The forest provided them shade and shelter. Thus 7000 Kandi is a village formed as a result of settler colonialism.

Thus the village of 7000 Kandi which began with settler colonialism takes us through the concepts of capitalist colonialism, anthropocentric post colonialism and ends with our thoughts on the relevance and nuances of post colonial eco-criticism. While dwelling on the heavy theoretical notions regarding the intersection of postcolonial and environmental issues, the movie also subtly make us wonder, ‘aren’t we all colonizers?’, where *homosapiens* is the ‘self’ and ‘nature’ is the other.

“How can you buy or sell the sky? The land?
If we do not own the freshness of the air, the sparkle of the water,
How can you buy them?
The earth does not belong to man; man belongs to earth” – Chief Seattle

REFERENCES

1. Kohn, Margaret, "Colonialism", *The Stanford Encyclopedia of Philosophy* (Spring 2014 Edition), Edward N. Zalta (ed.), URL = <https://plato.stanford.edu/archives/spr2014/entries/colonialism/>
2. *Lord Livingston 7000 Kandi*. Directed by Anil Radhakrishnan Menon, Global united Media 16 Oct. 2015.
3. Tiffin, Helen and Graham Huggan. *Postcolonial Ecocriticism*. Routledge, 2010.
4. Seattle, chief. "The End of Living and the Beginning of Survival." *Understanding India: Reflections on Indian Polity, Secularism and Sustainable Environment*, edited by B. Keralavarma, 2015pp. 186-190.

The Simple Symbol: Tracing the Tremendous Shift in the Digital Space from Phoneography to Hashtivi

Lakshmi Anil

Bharata Mata College, Thrikkakara

E-mail: lakshmianil9@gmail.com

ABSTRACT

The world is drowning in images, from presidential selfies to interminable Instagram feeds, where photographs from digital cameras have perished and now superseded by those snapped with smartphones. The popularity of social networking sites bears witnesses to a new visual culture and this paper attempts to go beyond the thrust areas of photography to phoneography and the impact of mass democratisation in this craft. In recent years, images and hashtag symbols confirm the visual effect domination, from a simple social communication to a popular culture phenomenon hashtags are embedded in the fabric of our digital lifestyle and have enlivened our expressions. The value of hashtags is however in the eye of the beholder, thus intruding into the personal sphere and captivating the human psyche by creating an addictive community.

INTRODUCTION

Photography is basically the art of taking picture. What makes a picture good is not just its composition or what's in it, but it's also the feeling that is conveyed in that picture. The way an art can convey that feelings are not just about who and what is in the picture, but it can be additives such as colours, lack of colours or texture. One of the most recent trends and greater advances in the design community is the trend of mobile phone photography, affectionately called "Phoneography". Since the very inception of photography in the mid-19th century, photographers have habitually used the camera to represent themselves. Today one has the ability to take extremely stellar pictures with the same tool they use to make a phone call or send a text message and the reason for this privilege is because of the speedy advances in technology.

The Shift

In the 1850s the rise of photography made many painters who had previously made their livings from painting family portraits been replaced. Now it's the turn of professional photographers to join this community. Many camera phones are equipped with the ability to shoot between five to twenty megapixels, have the ability to focus in for macro shots, provide adjustments for aperture, as well as brightness and contrast. Some have the ability to recognize faces as well as shoot in HDR mode. Many of these features on the camera phones are extremely comparable to that of digital cameras. "Photography has never been so popular, but it's getting destroyed. There have never been so many photographs taken, but photography is dying" (*the guardian*). However the technological advances work to the advantage of the professional photographers to share their work quickly and widely, and tell stories in an engaging and innovative way.

Mobilography is a relatively new trend in the world of digital photography that deals with photos taken by cameras built into various mobiles and originally not designed for professional photography. Mobilographers however do not aim to produce a photo of high quality, they are not much concerned about the distortions which are inevitable while shooting with mobile cameras. Their main aim is to capture a beautiful moment or an interesting event and share it worldwide, because the high quality of the image doesn't always make it to be a high quality work of art.

"Applications like Instagram has changed photography in the way the invention of photography changed painting in the 19th century. This photo-sharing network has actually become photography. Launched in 2010 as a free mobile app, Instagram now has over 500 million users a month and is estimated to be worth over \$30 billion"(*The Telegraph*). It gives the world's two billion smartphone users access to a global marketplace of imagery. The rise of digital technologies witnessed the exponential growth of photographic production and, in particular, photographic self-portraiture. With the introduction of digital cameras, photography became not only more accessible and more affordable, but also, it became quicker and the images were instantaneously visible, this instantaneity of digital photography is one of the key drivers in the rise of the selfie. Digital photography has transformed ones relationship to photography completely.

Photography is no longer the province of professionals. Artistic standards are being forced up daily and selfies are forced out. Instagram has become a vibrant, collaborative and instant museum of real life.

The Simple Symbol

This is the age of social networking sites, and in the last five years, its popularity has grown so much that people from all branches use them, including Hollywood celebrities, famous musicians, politicians, and writers, who choose social networks as their basic means of communication. *Hashtags is an interesting cultural meme. They started as useful and applicable, but evolved so much that now they represent a cultural phenomenon and give the impression of being well-informed.* Regardless of the type, social networking is simply the amplification of emotional reactions to a topic in modern life. If there are no emotions, the communication will not be successful. The hashtag is an essential part of this gut reaction because the emotion will not reach wider audience without it, or become the part of the popular contents online.

“Today, the symbol “#” does not only represent a part of the social network language, but it is also a part of everything one consumes. It even changes the way the society writes and behaves, because grammatically correct forms are no longer necessary. Speed and simplicity are implemented in the new “hashtag culture”. Hashtag has developed from a simple social communication tool into a popular cultural phenomenon in a very short period of time. In a time-crunched world, the hashtag proved itself to be useful shorthand” (*Tanja Tatomirovic*). Until less than a decade ago, the hashtags were used to signify only a term related to phones or a sign for “sharp” in musical notation system. Meanwhile, the perception has changed, and this simple symbol is one of the main tools of communication. The future of communication based on information technology is uncertain, because the possibilities are infinite, and the speed of development is unknown. The things that made hashtag the essential part of communication with audience in modern society are number of hashtags, number of social network users, an easy possibility to create contents that the whole world can access. Hashtags have become more than just a simple way to categorize posts or add a narrative to the story behind. From humble beginnings, the hashtag

has come to dominate social media platform, hashtags is the first place to find information on the latest news and events on a global scale.

The temperament of today's generation can be summed up by this hashmark. If the '90s were full of "quotation marks" indicating irony, a decisive sarcasm and a distance from the opinion of norms, the current climate is dominated by pithy punch lines that summarize the solipsist's always already uploaded narrative. The hashtag is the redemption of Internet statements which is written to be read by everyone, thereby intruding in each one's personal sphere. Hashtags are no longer bound to Twitter. They traverse the channels for all forms of communication. Hashtags are now embedded in the fabric of our digital lifestyle and enlivened in our expressions. Although the value of hashtags is in the eye of the beholder, they are special. Despite of the string of pros it has, this simple symbol cannot be neglected, after all hashtags exploit one's privacy and security.

CONCLUSION

Today, the shift from photography to phonography, has made this professional craft even in the finger tips of a toddler, and the most contemporary method of capturing a wedding is via iPhones. The world is drowning in images, from presidential selfies to interminable Instagram feeds, thereby weaving a branded community of "hashtagers" who are not aware of the other side where their personal happenings are converted to public episodes. Thus this simple symbol has captivated the human psyche hence creating an addictive community.

REFERENCES

1. "Is Instagram the death or saviour of photography?" *Culture art*. The Telegraph, 27 Aug 2016. Web. 15 Nov. 2016.
2. Tatomirovic, Tanja "Hashtag as a popular culture phenomenon." *How communication happens*. 9 Feb. 2016. Web. 15 Nov. 2016.
3. "The death of photography: are camera phones destroying an artform?" *Photography*. The guardian, 13 Dec 2013. Web. 15 Nov. 2016.

K-Drama: A Lodestar to the Indian Telenovelas

Annu Mary Cyriac

II M.A. English, Bharata Mata College, Thrikkakara

ABSTRACT

Media plays a paramount role in determining people's schemas of real world and assumption about cultural ideals. It is commonly believed that for the typical Indian housewives there is no better time-pass than watching the family dramas unfold on small screen. Indian men especially the working husbands also form a part of the large community of viewers. The quotidian quandary that the Indian soap opera confront is the meagerness of novelty. The present day predicament is that the selfsame saas-bahu sagas reiterate in different family backgrounds. The paper answers the question, whether 'soap operas' are only for entertainment purpose. The paper tries to scrutinize Korean soap operas and shows how Korean drama industry maneuvers their resources to enhance their economy via tourism and international trade. It also discusses the way soap operas are used to propagandize traditional cultures. Indian audiences commenced resorting to foreign soap operas. Contretemps sprouting that Indian soaps are consigning negative purport to society. In such situations transmutation of Indian soap operas are necessary.

INTRODUCTION

The common features in Indian soap operas are stereotypical: Bahu in heftily ponderous sari and jewelry, always covering her head with a ruddy on the forehead with a piteous face, a saas (mother-in-law) with agitative face, a doleful sasura (father-in-law) who has no role in decision making, a woman who is nimble and cocksure with conspiring nature, a woman in the modern outlook with no moral quality, people lying, cheating and keeping dreadful secrets and yet no one in the family ever seems to be knowing about it; in joint family where everyone lives in such close proximity. It is amazing that regular lies are never caught, making a mountain out of a molehill by the antiheroine, soliloquy or monologues of main characters like in Shakespearean plays, close-up shots of

each main character, when the shocking news is revealed, vigorous shaking of the camera when a character faints and reiteration of the shot two-three times, *Dheem Ta Na Na* background music whenever protagonist in trouble; people constantly falling in love with one person, but getting married to another, close-up of the house every morning, often people shown to arrange kidnap, murder and rape of their own family members with outside goons and whenever need a convoluted prelude of onerous characters, who always haunts the protagonist. In essence, the common problem that the Indian soap opera faces is the lack of novelty. The current situation is that the same *saas-bahu* sagas reiterate in different family backgrounds. Some exceptions seen in the latest trend of Indian soap operas are the supersession of a crooked sister-in-law, an ex-wife or ex-lover instead of mother-in-law in order to haunt the protagonist. Whatever changes comes into the plot, the eagle eyes of some female character in the family will constantly follow the protagonist. Hence, she is always haunted. Some of the examples are *Saath Nibana Saathiya* (2010-), *Yeh Hey Mohabbatein* (2013-), *Yeh Ristha Kya Kehlata Hey* (2009-), *Balika Vadhu* (2008-) etc.

According to the reports, Indian soaps have many international viewers from UK, USA, Sri Lanka, Afghanistan, Romania, China, Bangladesh, Bhutan and Pakistan (Khanam, Sarwar and Abir 142). The portrayal of the woman in ninety percent of Indian soap operas is the same and piteous. An international viewer might get the feeling that all Indian women are submissive, and have no voice of their own and always dependable. This international viewership is not yet tapped to its full potential. It is time to brush up the system. This paper studies how Korean drama industry uses their resources to enhance their economy via tourism and international trade. It also finds how soap operas may serve as a campaign for traditional cultures.

Reconnaissance of Korean Telenovelas

Korean wave or Hallyu is a phenomenon which is stricken throughout Asia. It is nothing but the increase of popularity of Korean drama and music through different parts of the world. It is a phenomenon recently spreading throughout the world. With the introduction of online drama sites, Korean dramas became the heartthrobs of people in and around the world. It also started streaming in different channels as subbed dramas; even in India. Dramas like *Boys Over Flowers*, *Iris*, *The First Shop of Coffee Prince*, *Winter Sonata*, *You are*

Beautiful etc. are already in the hit chart among the youth all over the world. “Apart from the cultural affinity, there is the refreshingly different content. Korean TV dramas are not about scheming mother-in-laws [s]. Instead, many of them feature young boys and girls trying to find their place in the world” (“Korean Wave” *Times of India* 3 June 2012).

The main way South Korea ballyhoo their tourism is through soap operas. The ploy they used for this is by shooting the momentous scene in the major tourist spots in Korea. As the Korean serials are streamed through online and through a variety of channels in different parts of the world, people overseas and denizen get attracted to this place and eventually visit the place. The government also hypes such tourism by proffering special packages to the filming location of Korean dramas. *My Love from the Star* is a hit drama of 2014 aired on SBS, from 18 December 2013 to 27 February 2014 starring Kim Soo-hyun and Jeon Ji-Hyun. The two pivotal scenes of the drama are filmed in Jangsado Sea Park and Gyeongsangnam-do. The former is a tourist spot in the small island of Jangsado, Tongyeong and latter in South Gyeongsang Province, which is said to be the home to some of Korea’s major historical and cultural assets. According to the sea park staff, the average visitors to the park were three hundred in January. After the airing of the scene in which Do Min-jun and Cheong Song-yi fled to Jangsado to avoid the crowd in episode 19 that was broadcast on 20 February 2014, the visitor number rose to eight hundred and seventy and by March it reached forty one thousand.

Another important spot which has great significance in the Korean tourism is Jeju Island. If we look into the history of drama, the importance given to this place is enormous. Jeju is a volcanic island in the Jeju Province, one of the nine provinces of South Korea. Jeju is one among the New Seven Wonders of Nature. Most of the series have a scene that canvasses for Jeju. Some examples are *Winter Sonata* (2002), *All In* (2003), *Jewel in the Palace* (2003), *My Lovely Samsoon* (2005), *My girl* (2005), *Boys over flowers* (2009), *Iris* (2009), *Cindrella Man* (2009), *Personal Taste* (2010), *Heartstrings* (2011), *Miss Ripley* (2011), *Secret Garden* (2012), *Marry Me if You Dare* (2013), *Fated to Love You* (2014), *Spring Day of My Life* (2014), *Warm and Cozy* (2015), *Legend of the Blue Sea* (2016) etc. Some of the other places are Namsan Tower or Seoul Tower which is at the heart of the capital city Seoul, Petite France, a French cultural village set in the

Korean countryside, Gyeonggi-do province that consists of 16 French-style buildings and Moonlight Rainbow Fountain in Seoul the world's longest bridge fountain on the Banpo Bridge over Han River. Channels like KBS and MBC have their own shooting sets to film historical series (*Sanguek*) with old-fashioned buildings. MBC Dramia is a filming location owned by the MBC Corporation in the city Yongin, South Korea. "Different from other drama sets, Dramia has been re-created based on historical records and very accurately reflects the structures and culture of ancient times" ("Daejanggeum Park."). Mungyeong Filming site is a similar place owned by KBS in Yongsagol, for filming dramas in Goryeo era. Along with them, channels make use of other places with historical relevance like the Korean Folk Village, Goguryeo Blacksmith Village, Hwaseong Haenggung Palace, Jeju Folk Village and Changdeokgung Palace, which has been designated by UNESCO as the world cultural heritage site. The tourism department also supports Location Vacation by providing special packages to these sites.

Another important quality of Korean drama is the importance given to the Traditional Folk Media through Soap Operas. Traditional Folk Media, "exist in the form of traditional Music, drama, dance and puppetry, with unique features in every society, race and religion" (Hasan 658). A country like India has powerful folk media form, but most of the people in India do not even know what it means. "Traditional folk media are rich in variety, readily available and economically viable" (659). *Sanguek* series are the main carriers of traditional folk forms in *K-dramas*. This is also a method of preserving old traditional art forms by making future generations aware of it. Most of the historical dramas have at least some of traditional art forms performed in them. *Hwang Jin yi* is a 2006 KBS2 drama series. *Jee*, the traditional court dances like Korean *Giesha dance*, *Oiran dance*, *Geommu* (the sword dance), *Dongrae hakchum* (the crane dance) and *Bakjeopmu* (fluttering butterfly wings dance) etc. are dramatized so dexterously and splendidly in the drama. In the same way, priority is predisposed to the traditional music also.

Moon Embracing the Sun is a 2012 drama series that subsume performances like *Salpuri* (literally spirit cleansing dance), *Talcum* (Korean mask dance), *Seungmu* (monk dance) and *Korean puppetry*. Along with this, the heedfulness given to the Korean traditional musical instrument *Gayageum*, a stringed musical instrument which belongs to the zither family have to be

specially mentioned. The villainous character in the series *Faith* (2012) Cheon Eum-ja plays the Korean traditional flute, *Tungso* to kill the enemies. *Samgomu Ogomu* (drum dance) is an alluring traditional art form performed in *Gu Family Book* (2014). *Moon Lovers* (2016) inclined art forms like *Salpuri* (literally spirit cleansing dance) and *Talchum* (Korean mask dance) to enhance the beauty and to bestow next generation with the knowledge of traditional art forms. *Gisaeng dance* and the use of traditional instruments like *Gayageum* and *Changgo*, a Korean drum are also ascertainable.

The main reason for the popularity of Korean drama is its simple plot, the dramatization of innocent lives and its brevity. *Fusion Sanguk* is a form of drama, which is a historical drama mixed with traits usually not seen in conventional histories. It is a historical drama with a modern touch. The plot runs in a historical period, sometimes the characters are people who were present in the ancient times, but the story altered without changing the history. Such dramas have the ability to make viewers think. *Legend of the Blue Sea* (2016) is a fusion drama inspired by a classic Joseon legend from Korea's first collection of unofficial historical tales, about a fisherman who captures and kidnaps a mermaid. *Faith* (2012) is a fusion *sanguk* that has to be read between the lines. The main character Wodalchi Choi Young, King Gongmin and Queen Noguk are historical figures in the Goryeo history. The story got amended by bringing a plastic surgeon from the modern times under a circumstantial situation. Yi Sun-shin, the naval commander in the *Gu Family Book* (2013) was the actual naval commander in the Joseon era. The story got renovated by bringing the main character Choi Kang-ju who is half human and half 'gumiho', a Korean mythological creature. *Damo* (2003) is the first fusion *sanguk* that tells the story of a fictional Damo, Chae-ok who became a legendary detective in the Joseon Dynasty.

A satisfactory quality of Korean soap operas is its rating system. Like films, Korean dramas have special rating for viewers based on their age. It is also applicable for all television programs. Mainly there are three ratings for soap operas: 12, 15, and 19. Dramas rated 12 are unsuitable for children under that age because of mild violence, themes and languages. Likewise, ratings of 15 are inappropriate for children under that age due to moderate/ strong adult themes, languages and violence. Programs that rated 19 are only for adults because of adult themes, heavy violence and strong adult languages. Most of the dramas are 15 rated.

CONCLUSION

Mark Twain said, "... nothing has been left undone, either by man or nature, to make India the most extraordinary country that the sun visits on his rounds... India is the cradle of the human race, the birthplace of human speech, the mother of history, the grandmother of legend, and the great grandmother of tradition" (qtd in "Mark Twain Quotes" 2012). India is the land of seven rivers. Even an Indian citizen does not know most of the places in India. Indian *telenovelas* can play an important role in this. Korean dramas set an example that they can be the medium for the promotion of tourism. More the outdoor shooting, more the promotion of tourist sites, thus more the number of tourists. By using their tactics, Indian *telenovelas* can be a carrier for Indian tourism. The importance given to the traditional art forms in Korean dramas is noteworthy. By presenting this not only the people of their country, but also the viewers across the world became aware about their art forms. India is a country with so many such art forms like *Tmasha*, *Nautanki*, *Jatra*, *Bhavai*, *Puppetry*, *Ramleela* and *Rasleela*, *Street theatre*, *Pawali*, *Keerthana* and others. The novelty of the theme is yet another step that the Indian dramas should consider. Drama makers must make dramas for all communities instead of for a particular age group who loves the cunningness and crookedness that happens in the families. It should be based with Indian values, culture, the bond between the family members and their togetherness. Along with Indian markets, foreign market needs should be taken into consideration.

Indian soap operas can be made more attractive and of high standards by decreasing the number of episodes and by using that budget on the rest of the episodes. As the producers are willing to invest more in the soap opera industry, it can be used to increase the quality of the soaps. . Lesser the number of episodes more the income through drama. The main problem that the Indian drama faces in the international market is the number of episodes, which makes the drama hard to sell in the market. So the best way to get into the international market is the deduction of episodes. Stories should be told in a concise and beautiful manner.

REFERENCES

1. Chitransh, Augya. "Korean Wave takes Indian kids in its Sway." *Times of India*. Times of India, 3 June 2012. Web. 6 Dec 2014.
2. "Daejanggeum Park." *Imagine Your Korea*. Korean Tourism Organization, 2008. Web. 17 Nov. 2014.
3. Hassan, Seema. *Mass communication: Principles and Concepts*. 2nd ed. New Delhi: CBS & Distributors Pvt, 2013. Print.
4. Khanam, Dilafrize, Mohammad Mufajjal Sarwar and Tareq Mahamud Abir. "'Broadcasting Indian TV Serials In Bangladesh: The Beginning of the Social Change': A Study on Present Situation of Bangladesh." *IOSR Journal of Humanities and Social Science* 19.7 (2014): Web. 8 Nov. 2014.
5. "Mark Twain Quotes". *Quotes.net*. Quotes.net, 8 May 2012. Web. 28 Feb. 2015.

Virgo Intacta: Of the Mind

Swathi O. A.

II MA English, Bharata Mata College, Thrikkakkara

E-mail: swathiajayaghosh@gmail.com

ABSTRACT

When Vyasa asked Lord Ganesha to become his amanuensis, the elephant-headed god put forth a condition that the dictation would proceed without any pause. Vyasa, however, countered this condition of the son of lord Shiva with another condition of his own that Ganesha should transcribe nothing without comprehension. Vyasa composed verses so abstruse that the elephant-headed god had to pause in order to decipher the meaning before writing them down. In Mahabharata it is not just these verses of Vyasa that challenge comprehension but the concept of virginity boon also poses an enigma. This paper is an attempt to explore the concept of virginity boon by tracing the myths of four maidens from the great epic of Vyasa, who had been blessed with this boon, and the relevance of those myths in the current world.

Vyasa's great epic *Mahabharata* narrates the story of the descendants of Bharata making the Kurukshetra war between the Pandavas and Kauravas, which marks the end of an epoch, its central focus. But for Indians *Mahabharata* is not just an imaginary narrative; it is a record of a real event that took place around 1000 BC. It is an inexhaustible mine with so many unique features. Such a unique feature is the concept of the boon of virginity portrayed through the myths of four women- Madhavi, Satyawati, Kunti and Draupadi- in the epic.

A maiden, who practises sexual abstinence, is commonly called a virgin. But the four female figures of Vyasa, retaining their virginity even after practicing polygamy poses an enigma. This mystery can be solved only through a deep exploration of the myths associated with these women.

Madhavi, the daughter of King Yayati, is given as the compensation to the sage Galava once the king fails to meet the sage's demand for eight hundred

horses of the finest breed, with their body as white as moonlight and one side of their ears of a dark colour. As a property for barter in exchange of two hundred horses of the kind he desired, Galava offers Madhavi first to Hayarshva, the king of Ayodhya, and then to Divodasa, the king of Kashi, Ushinara, king of Bhojanagar, for one year each, in course of which she begets each of them a son. Finally she is offered by Galava to his *guru* Vishwamithra along with the six hundred horses he has collected from the three kings as his *guru-dakshina*. Vishwamithra after keeping Madhavi for one year as his wife and begetting a son from her, returns her to Galava, who takes her back to her father Yayati. Later, when Yayati arranges a *swayamvara* for her, she chooses the forest, *Vana-devata*, as her husband, and walks away into the forest from the midst of the suitors, who has assembled to win her hand in marriage. All the while she remains a virgin as she has attained a boon from a sage that every time after giving birth to a child she would be a virgin again.

Although Satyawati, born to an apsara-turned-fish, plays an important role in moulding the royal lineage of Hastinapura, little is written about her in *Mahabharata*. She is introduced as an adolescent fisher girl plying her boat across the river Yamuna. One day sage Parasara, while sailing in her boat as a lone passenger, gets intoxicated by her beauty and approaches her to satisfy his desires. When she finds him impossible to repulse and importunate, she yields to him but only after extracting two boons from him; one is of her unimpaired virginity and the other is that her disgusting body odour will be replaced with musk fragrance. Thus after the intercourse with the sage she is transformed from Matsyagandha to Yojanaganda with the status of *virgointacta*. Later she captivates Shantanu, king of Hastinapura and ultimately becomes the Queen-Mother to the kingdom of Hastinapura.

The lives of Kunti and Draupadi, “who shape the entire course of dynastic destiny in the *Mahabharata*” (*Of Kunti and Satyawati* 21), run parallel to each other. Both are forced by the circumstances to consort with more than one man. The large-eyed and well-endowed Kunti is granted a boon, which becomes both a blessing and a curse in the course of her life, by the ascetic Durvasa that gives her the power to summon any god to gift her with a son. In her curiosity she summons Lord Surya, and he impregnates her with a son. After the encounter with Surya she wins two boons from him: “her own *virgointacta* and special powers for her

son” (*Of Kunti*22). She chooses the scion of Hastinapura, Pandu, as her husband in the *swayamvara*, and later accompanies him into the exile along with her co-wife Madri, where she is forced by her impotent husband to use the boon repeatedly in order to have the sons he desired. After Pandu invites “death-in-intercourse” (*One-in Herself* 25) with Madri, Kunti becomes the archetype of the modern icon the single mother by bringing up her five sons and moulding their destiny in a hostile court. Once she fulfils her destiny, which is the throne of Hastinapura for her sons, she retires to the forest and embraces death in the form of a forest fire.

“If Kunti is a death-in-flame, her daughter-in-law Draupadi is Fire-alter-born” (*She Who Must Be Obeyed* 20). Draupadi, who has emerged from the fire *mahamakhe*, is forced to marry all the five Pandava brothers after she is won by Arjuna in the *swayamvara*. Yajnaseni, by living in harmonious fraternal polyandry with the Pandavas, becomes the unifying thread that holds the five brothers together in their battle to win back their rightful inheritance over the kingdom of Hastinapura from the Kauravas. She spends one year with each of her husband, and baths in the fire at the end of each year out of which she emerges chaste as ever, for she is given a boon of unimpaired virginity by the sage Vyasa at the time of her marriage. It is the humiliation, especially the disrobing, of Draupadi at the royal court of Hastinapura become trumpet call for the great Kurukshetra war and the death knell for the Kauravas.

Madhavi, Satyawati, Kunti and Draupadi do not belong just to the past. Their existence is beyond time. They had the virginity boon, which keep them virgins even after practicing polygamy but their suffering is not different from that of the modern women. Madhavis exist today as the property for barter. In today’s world, which is ‘developing’ each and every day, there occurs the degradation of human values. Galavas of the modern age treat women as mere commodities to be exchanged, exploited and used for personal gains.

Satyawatis exist in the rape victims. Just like them she has been forced by the circumstances to have a sexual encounter with the sage Parasara. She knows that once his lust is fulfilled the sage would make his departure and there is no possibility of a marriage as there is no love but only lust. Though she is gifted the boon of virginity and the musk fragrance for surrendering to him, her encounter with the Parasara is a rape itself in a strict sense. Has she refused adamantly her

fate would not have been much different from that of the Delhi rape victim Nirbhaya. Sadly, unlike her fate, it is not a boon but a curse of damnation that befalls on the Satyawatis of modern era.

Kunti's case is a bit ironical. The two youngest Pandavas born to Madri and the eldest three born to Kunti with the use of the boon given by sage Durvasa become the legitimate sons of Pandu, while Kunti's first born Karna remains illegitimate for he was born when she had been unmarried. Her life becomes a trial of fire after abandoning her first born on the waves of river Yamuna, and later she is forced by the circumstances to witness her first born being insulted, even by her own sons Pandavas, for being a low caste and an illegitimate. Her life reflects the life of each unmarried woman, who gives birth to a child, as the child then becomes an illegitimate and hence an outcaste in front of the world. The mother of that child is compelled either to abandon her kid, as Kunti does, or to fight against the surge of the society, which would make life difficult for her and her child through continuous verbal assaults.

True, Draupadi is given a boon of unimpaired virginity, but that status of *virgointacta* doesn't lessen the pain she has to endure as she is passed from one husband to another nor does it diminish the insult she has to bear for being wife to five men at a time. It is only for the Pandavas that the boon is a blessing because as their turn comes once in every five years each gets a wife who is chaste as a polar star. They represent the man of all the time, who prefer the monogamous chastity in women above all other qualities though they themselves practice polygamy. Draupadi has been a "*nathavatianathavat...* She was the wife of five but bereft the daughter of a rich house but like an orphan, she had brave allies but she was alone. This was the pity of her situation." (Karve 91).

An exploration into the myths of the four female figures from the great epic of *Mahabharata* shows that "The boon of virginity is not just a physical condition but refers to an inner state of the psyche that remains untrammled by any slavish dependence on another, on a particular man. She is "one-in-herself"... " (*One-in* 32). It is the virgin mind of these four women that help them to face the torrents of life yet sustain till the end. Vyasa has given the boon of *virgointacta* to four of his female figures, but it is not a literal but a metaphorical boon and hence can be applied to the present. In our society it is the unbroken hymen that makes a woman chaste and pure, and defines her. If she happens to

lose her virginity then she is sinned and damned forever. This concept of virginity that is linked to the vagina and the unbroken hymen is a scheme used by the patriarchal society to restrict the freedom of woman and keep her imprisoned behind its bars.

Bringing the myths of Madhavi, Satyawati, Kunti and Draupadi from the epic to the present day one could find that the plight of women of the 21st century is not different from that of the women of the ancient times. The society's approach towards women remains unchanged. They have always been challenged, exploited and humiliated. It is time for the women to break the cocoons into which they have been confined for ages, and throw away the shackles of the false notion of virginity or chastity, and thus make a new present and future, which is not the repetition of the past.

REFERENCES

1. Bhattacharya, Pradeep. "Of Kunthi and Satyawati." *Five Holy Virgins, Five Sacred Myths* 142 (1971): 21-25. Web. 12 Nov 2016.
2. "One-in Herself." *Five Holy Virgins, Five Sacred Myths* 143 (1971): 25-33. Web. 12 Nov 2016.
3. "She Who Must Be Obeyed." *Five Holy Virgins, Five Sacred Myths* 144 (1971): 19-30. Web. 12 Nov 2016.
4. Karve, Irawati. *Yuganta*. Hyderabad: Orient Blackswan, 2008. Print.

Truncated Portrait of Nature: Unveiling the Era of Ecological Awakening in Malayalam Literature

Liz Mary Antony

Research Scholar, St. Teresa's College, Ernakulam

E-mail: lizjoseph24@gmail.com

ABSTRACT

The history and culture of Kerala are the major streams that enriched the composite culture of India. Its unique geographical and physical features have invested Kerala with distinct individuality. This individuality is seen in the literary tradition of Kerala. Kerala owes its cultural genesis to the mixture of Aryan and Dravidian cultures. Modern Kerala culture took shape after many migrations. These cultural variations had a serious impact on the literary history of Kerala in the past few decades. Classical works of Kerala was impregnated with ritual, custom and code. Literature was seldom recognized as literature in its present sense. It was more ritual, performance and entertainment. Nature was seen as an unconquerable wonder by most writers. Hence it was praised throughout.

Ecology defines the relationship of organisms and their environment. We can find this mutuality of species and their environment as an inspiration for most writers. Meanwhile Kerala's social and cultural history was going through different phases of renaissance, democratic movement and colonization. Industrialization through gulf boom uprooted woods and forests. The waves of communism synergized most Malayalam writers' perception about nature. So the blind worship of nature disappeared from Malayalam literary scene. Silent Valley movement and mindless destruction of natural resources became a crucial aspect in the evolution of works that stood for environmental awareness. This paper presumes to portray the drastic change that happened over the years in writers' perception on nature.

INTRODUCTION

Kerala is resplendent for its scenic splendour as well as its sizeable contribution to literature. Malayalam literature shared a strong relationship with nature from the very beginnings. Nature was alive in different art forms like painting, sculpture, music, folklore, poetry, novels and so on. Ancient writers always saw nature as a primordial wonder. Hence they admired nature through their works. Ezhuthachan, the father of Malayalam language used a parrot to narrate his epic *Adhyathma Ramayanam*. Through a bird Ezhuthachan instills in us a realization that each and every life form is an indispensable element in this world. Nature was an inevitable background in most poems. The Western Ghats and Bharathapuzha inspired the creative facets of many writers. In the Malayalam literary scenario nature was not just a factor or backdrop. In fact nature was synonymous with human beings.

An ecological awakening took place in the literary history of Kerala from 1970 onwards. The ecological crisis that our nature went through arose primarily from our attitude. For decades we followed the western anthropocentric views. Western anthropocentric value systems see nature in terms of its value to humans. They place humans as the primary and supreme holders of moral standing. So other forms of life remain only as a resource that is to be utilized by human beings. But according to Indian perception both human and nature are one single entity. Indian concepts of nature are highly ecocentric. Ecocentrism places ecosystem at the center. Robyn Eckersley in his book *Environmentalism and Political Theory: Toward an Ecocentric Approach* says

Ecocentrism is based on an ecologically informed philosophy of internal relatedness according to which all organisms are not simply interrelated with their environment but also constituted by those environmental interrelationships. (49)

In Indian mythology rivers, mountains, plants and trees have equal existence with humans. According to Hindu mythology Lord Krishna asked his foster father Nanda to forgo the sacrifice to Lord Indra and to worship Govardhan Mountains which causes rain and thus makes the grains grow. During the Dravidian and the Aryan ages nature was considered as sacred. The Mahabharata, Ramayana, Vedas, Upanishads, Bhagavad Gita, Puranas and Smriti contain the earliest messages for the preservation of ecological balance. In Kerala we

celebrate Onam in memory of Asura king Mahabali. Onam is also a harvest festival. It is during the month of Chingham that our main harvest takes place. Here the myth of Mahabali can be attributed to a grain which is pushed into the Earth, where it gets life. The Hindu myth revolves on birth, death and rebirth principle. This same principle is attributed to agriculture. Thus the legacy is continued.

The epoch of novels and stories with ecological perspective emerged in Kerala before 1970s. It was mainly due to the advent and advancement of anthropocentric admiration of man. Before 1970s the focus of novels/stories was the reciprocal relations between human and land, urbanization, environmental conditions etc. A literary revival occurred in the first half of 20th century in Kerala. It was mainly due to the progressive waves of communism. Caste, sub caste, land lordism and royalty were considered as ordained by nature, fate or God. During those times the city could hardly be distinguished from village. Literature representations connected everyday life and nature. A real renaissance began as a result of the disintegration of a quasi feudal caste based society. Exploitation and inequality behind feudal masks were identified by the downtrodden. It was the Communist movement that restructured the texture of Kerala's social fabric. They fought against feudalism. Feudal lords occupied plenty of land. But communism ensured ownership right to peasants. These subaltern peasants used the verse of ONV when they led the upheaval. "Nammalkoiyyum vayallellaam/ Nammudethakum paingiliye" 'The farmlands where we work / will be ours someday'. Novels during this phase were realistic. Ecological concerns were not the constant focus of the writers as the nature was not injured much. Still a few works of prophetic nature unknowingly emerged. The lead writers were Takazhi Sivasankara Pillai, Uroob and Vaikom Muhammad Basheer. Astonishing industriousness, courage, self-sufficiency and confidence of the peasants urged these writers to create novels which were so deep rooted with nature theme. These realistic writers found themselves a place in Malayalam literature when they used nature as a medium to speak against feudalism, discrimination and manipulation. Takazhi underlined his connection with Kuttanad and agriculture in most of his works. Uroob remarked that the inspiration and source of novels were the socio-cultural world view of that time. An anxiety caused by ecological imbalance is reflected in Uroob's *Visakanyaka* (1948). *Bhoomiyude Avakashikal* (1977) by Basheer echoes a different voice on

environment. He yearns to create a sustainable way of life for all inhabitants on Earth. All forms of life should coexist in nature. But ever since man became a numerous species he has affected his environment notably. Intentionally or unintentionally change in human ways affected non-human nature. Basheer pleads to end this. Agriculture, political inclinations, caste and urbanization are some basic factors which influenced Malayalam literature before 1970s. When man thought of detaching himself from soil, environmental crisis became vigorous. In the 1970s an intense environmental dispute was triggered off in Kerala. The Silent Valley Hydroelectric Project controversy created ecological awareness among Malayali audience. This controversy created a discursive corridor for politics and literature. It would be uncritical to assume that the pervasiveness of ecological concerns among the Malayalam writers was unanimously approved. Prominent writers like Basheer, Uroob, Chemmanur Chacko and O V Vijayan came forward to educate the public about the aftermath of this project. Poets were actively involved in this issue than novelists. And the name we cannot ignore is that of Sugathakumari. This issue urged Keralites to classify their thinking by looking in some historical depth, presuppositions that underlies modern technology, development and science.

A mass migration of people from Kerala to Gulf countries occurred during the same period (1972-1983). Gulf migrants from working and lower middle class gradually became rich and they gained social status. This Gulf boom found its expression in literature. The impact of migration changed the perception of Malayali. Before migration land was considered as a place for their existence. They shared an unbreakable bond with their native place and land. But when they returned they saw land as an object to be owned. Urbanization breaks the bondage of humans with their environment. Nature is the root of our existence and scathing of roots does not enable the urbanized world to survive its own implications. Literature reflects the impact of migration through the novels of Malayattoor Ramakrishnan and M T Vasudevan Nair.

After 1990s the new philosophies of science increased the divide between human and nature. Earth was treated as an object to earn money. Land became an object of modern culture. People bought land to cultivate cash crops. Value of agriculture increased for the sake of seed. Artificial fertilizers destroyed the rhythm and symphony of nature. But there was a time where man was a slave to

his soil; where nature was respected by him. Advancement of science brought a sea change in mentality. From slave he became a master. Nature became an opponent to him and later an enemy to be conquered and plundered. He tried to subjugate the powers of nature which includes water, fire, light and wind. Later this overpowering mentality was delineated on other living creatures. The importance of every species is to be understood not by its strength but by valuing its connection with nature. Man failed to realize this and it resulted in his own threat.

The materialist greed allows one to view belief system as weak. It may gradually result in unanticipated change in the environment, which can be more extensive than the predicted transformation. When antibiotics reduce immunity, flood control measures accentuate floods and fertilizers rob soil of its fertility the problem is not merely between use and misuse of technology. It is rooted in the very process of the knowledge which increasingly gave attention to material gain than the ecological instabilities.

In ancient times we had a Gurukula system where the teacher taught the student everything that the child needs to know. All learning was connected with nature. A life distinct from nature was unimaginable for them. Today modern school system is teaching them subjects. Teaching is restricted to classrooms and the link with nature is broken because of limited space. Today in our age of advancement technologies are growing. Now nature became a background to selfies and our children know nature through 'Farmville'. Future cannot be moulded by avoiding technology/science but by embracing it in nature's ways. But we have reached an age of environmental limits and as William Rueckert points out in *Literature and Ecology*, we

. . . need to see even the smallest, most remote part in relation to a very large whole is the central intellectual action required by ecology and of an ecological vision . . . nature should also be protected by human laws, that trees should have lawyers to articulate and defend their rights is one of the most marvelous and characteristic parts of the ecological vision. (108)

An emergence of such concept will provide a strong foundation for the truthful relation with the earth.

REFERENCES

1. Anand. *Jaivamanushyan*. D C Books, 2012.
2. Balaram, N. E. "Marubhoomiyude Soundharyam." *Theranjedutha Prabhandangal*. edited by Vallikavu Mohandas, Kerala Sahitya Academy, 2009, pp. 213-220.
3. Cyril, D. V. *Manushyanum Prakruthiyum*. Current Books, 2007.
4. Eckersley, Robyn. *Environmentalism and Political Theory: Toward an Ecocentric Approach*. State University of New York Press, 1992.
5. Love, Glen. A. "Revaluing Nature." *The Ecocriticism Reader: Landmarks in Literary Ecology*, edited by Cheryll Glotfelty and Harold Fromm, The University of Georgia Press, 1996, pp. 225-240.
6. Madhusudhanan, G., editor. *Harithaniroopanam Malayalathil*. Current Books, 2002.
7. Nampoothiry, Vyrassery Vaman. "Eco-critical Readings of *Visakanyaka*." *Malayalam Literary Survey Kerala Sahitya Academy*, vol.33, no.4, 2013, pp. 14-17.
8. www.keralasahityaakademi.org/pdf/MLS/MLS_dec13.pdf.
9. Pavan. *Keralam Engane Jeevikunnu*. Green Books Private Limited, 2007.
10. Radhakrishnan, R., and Joji Kootummel. *Silent Valley: Cheruthunilpinte Naalvazhi*. Kerala Sastra Sahitya Parishad, 2012.
11. Rueckert, William. "Literature and Ecology." *The Ecocriticism Reader: Landmarks in Literary Ecology*, edited by Cheryll Glotfelty and Harold Fromm, The University of Georgia Press, 1996, pp. 105-123.
12. Satchidanandan, K. *Indian Literature Positions and Prepositions*. Pencraft International, 1999.
13. Shiva, Vandana. *Staying Alive: Women, Ecology and Survival in India*. Kali for Women, 1988.

‘Matsyaganddhi’ as a Text of the Marginalized

Sheena Kaimal N. *, Shalvi P. P.

**Assistant Professor and Head of the Department of English, Sree Sankara
Vidyapeetom College, Valayanchirangara.*

E-mail: sheenakaimaln@gmail.com

‘Matsyaganddhi’, a one- act play by Sajitha Madathil focuses on the lives of one of the marginalized groups, the fisher folk. The play deals with the different social, cultural and economic factors that lead to their marginalization. The impact of globalization, tourism, ecological and environmental degradation etc. always places them in the margins. The solo performance is entirely narrated by a *matsyaganddhi* (a fisher woman who smells fish). She is a widowed fisher woman and she narrates the pathetic and miserable condition of the life she leads. As Sajitha Madathil says, “*Matsyaganddhi*” is not just a play, but a documentation of the lives of fisher woman as well. The script is based on the conversations with them. I know my play has reached out to them when I have found a woman weeping at the end of my performance. She is the sister of a fisher woman who has been raped” (76).

The play begins by introducing the element of harmony with nature. “Gleaming silvery fishes flitting around. Their murmur, in tune with the rhythm of the sea, falling on my ears. And I keep talking to them like a mermaid” (60). The actress-narrator feels that she is a mermaid and she can understand them. A fisher women’s life is associated with nature and she is one with nature. She identifies herself with the sea, the *Kadamma*. *Kadamma* is her life. Here, the playwright introduces the element of eco-feminism which gives woman and ecology the same status.

Suddenly, the narrator becomes breathless and terrified. She hears the growling sound of a giant ship. She feels that the sound comes from within her chest. Then she feels the growling sounds of many ships shattering her eardrums. She feels that the terrified little baby fishes have found shelter under her clothes. The empathetic feeling makes her feel that a huge net has trapped her and the baby fishes. Though she wants to be a saviour, she is helpless and the baby fishes

are dead. She is then reminded of her *arayan*, her husband, who is also dead by being hit by a trawler boat. Her deep intimacy with the sea and her identification with the elements of the sea can be seen here. For the fisher folk there is no life without sea and its resources. Sea is an inevitable part of their lives.

The giant growling ships show the advent of globalization, which has a dreadful effect on the fisher folk. The introduction of mechanized trawler boats which use capital intensive technologies destroy the resources of the sea. The full control of the sea gets transferred to the hands of the capitalists and corporate giants. The ordinary fisher folk cannot access the benefits of the sea resources. They have to borrow money from money lenders paying them huge interests. The commodity prices also increase. The fisher folk find it very difficult to lead their lives. The government who is liable to protect the existing living conditions of the marginalized communities pushes them in to the pit of utter poverty, debt and misery. Thus the fisher folk are forced to remain in the margins of the social hierarchy.

There was a time when the sea was full of fish. Fish was less expensive too. And the children of the seashore were healthy. You didn't have to hunt for fish in the harbour and other markets. What you had at the shore was enough and more. Gleaming, silvery fish. Fish that leapt off your hands. Amma would pick up some and sell them at far off markets. And we'd wait for her to come back with her basket full of rice and vegetables and peas and chilies and bananas. Labour had its rewards then. And kadamma used to protect her children. There were no motorboats screaming their way through. No trawler boats tearing open the bosom of the sea and no foreign fishing vessels dredging up Kadamma's womb (63).

Globalisation adversely affected man's relationship with nature. The fisher folk always knew to find the part of the sea where they could find fish. They knew the depth and the colour and the smell of the sea, "And to catch the fish, you have to look at the stars and the birds and the floating drone of the fish" (60). The narrator of the play feels it "lovely watching someone fishing in a boat made out of a single block of wood" (61). Her *arayan* used to go to sea looking at the sky and stars and he "fished in tune with the seasons and in tune with the rhythm of the sea....Into the depths of the waters, oblivious of the rhythm of the trawler

nets scuttling around” (62). Like the fishes that got trapped inside the net of globalization, her *arayan* also becomes a victim of globalization.

The death of her *arayan* forces the woman (narrator) to earn a living. The fisher women were supposed to wait for their husbands to bring the fish. The narrator is reminded of the myth of chastity imposed by the male dominated society upon the women. She playfully asks “Haven’t you seen *Chemeen*? It tells you, for the mukkuvas who go out to the sea to be protected by *Kadamma* the Sea - Mother, their women have to remain chaste. Chaste and faithful” (60). A widowed fisher woman is one who is placed on the margins of the marginalized. The tendency of the society is to put blame on her for her husband’s death. But she asks, “...when my stomach’s on fire, how can I stay back in my hut?” (60). She does not know any other means of living than her traditional occupation. “Where am I to go, leaving *Kadamma* and all my ancestors who roamed these shores? How can the children of the sea live forgetting their mother?” (60). She has to take care of her children as well.

The women who are engaged in selling fish have to face a lot of problems from the male dominated society. They get only bad stuff from the fish traders and that too only after having arguments with them. They have to pay up the interest on the debt promptly. They have to pay for the fish, find money for transport, ice, sawdust etc. And thus they get little profit.

The widowed fisher woman is indignant at people wrinkling their noses at the fish baskets and the smell of the fish, when she reaches bus stop. She reacts against the hypocrisy of the society,

And they say I stink. Fish stink. Going around selling fish, what else can I smell of? Jasmine? These fellows –don’t they have mothers and sisters? It’s such a tough job selling fish. But –when you have a plate full of fish on the dining table, it’s so delicious, isn’t it?! (61).

When a bus comes and goes without letting her in, she curses, and her anger is directed towards the society, the main stream of which is occupied by the males.

Son of a bitch! See if you don't reach the market in time, it's such a hassle. All the tidy spots will be taken over by those puffed-up males. And they can put on polyester shirts, spray themselves with perfumes and go around in vehicles. Sons of bitches! And they sell it cheap, the fish, so all the regulars are after them. And what do we do but take whatever dirty spots are left, getting muffled up by the flies and bitten by the mosquitoes? (61-62).

The widowed fisher woman is reminded of the story of Satyavati, the *Matsyaganddhi*. From the sage Parasara she becomes pregnant and gives birth to Vyasa. There is a fusion of fiction and fact, when the woman speaks about a real incident; how "Flory, a fisher woman was cruelly raped by three such sages together near the Ulloor market. And they didn't need even an excuse of a cover"(62). It is because of the marginalized condition of the women that they face such cruel sexual assaults. The woman then blames the government for its development policies,

You have swimming pools and water parks and rain dance and what not all over the place. But look at this tap at the fish market –not a drop of water. Let our heads and hands and breasts smell of fish. Not clean enough, eh? Under the tap the women tear at each other's hair for a drop of drinking water. And our men break our heads saying there's no water to drink. Do you think clean drinking water cannot go down our throats? Do you think we cannot take a bath in clean water? Fish stink you say! (62).

The government introduces new development agenda by giving false promises to the marginalized people. The woman talks about the celebratory mood generated by the news of a harbour about to be built on their sea shore. The government has forced them to believe that as a result of the new harbor, foreign ships will come and it will be good for them and that the people on the shore will get jobs at the harbor. Big hotels will be built and they get jobs there too. "Hearing it all, we too felt happy" (63). Her musings show that the fisher folk can never detach themselves from the sea.

The entire play 'Matsyaganddhi' which is a form of monologue or stream of consciousness is an angry outburst on the pathetic and miserable lives led by

the fisher folk, especially the women of the community. The fisher folk are only one of the marginalized sections. They have to face discrimination because of the development policies of the Government such as globalization, promotion of tourism etc. This, in effect, helps only the capitalist sections of the society. There are also hints at the dangerous consequences which will be resulted by ecological and environmental degradation. Moreover, the play is a harsh accusation at the male dominated society which is not at all scrupulous in committing cruel violence against women. Sajitha Madathil's 'Matsyaganddhi' is definitely a text of the marginalized people who are totally neglected by the main stream society.

The promotion of tourism by spreading the myth of "GOD'S OWN COUNTRY" will affect the quality of their lives. When *Kadamma* is snatched away from them by the government they will lose their habitat, culture, identity and even occupation.

...my only hope is this *matsyaganddham*, this smell of fish. To those who visit the seashore looking for a good time I can offer not fish alone, but *matsyaganddhis* too. And a whole shoreful of illiterate, fatherless little Vyasas!" (63).

With anger and contempt for the whole society which is responsible for their degradation, the woman bursts out,

Let *kadamma* grow into a rage. Let her break up all those trawler boats and foreign vessels. Look, this stench doesn't come from my basket. It's the stench of the sea decaying. It's the stench of the little fishes being slaughtered by the trawler nets. It's the stench of the decaying dreams of *matsyaganddhis*. But, for you, it's nothing but fish stink! (64).

'Matsyaganddhi' is a powerful play which portrays the utter misery faced by the fisher folk, especially the fisher women who are pushed towards the periphery of the society. Sajitha Madathil tries to present a realistic portrayal of the exclusion and discrimination faced by the fisher women. The play shows how globalization and the government policies as well as the ecological imbalance caused by man's craving for more profit negatively affect the human beings. The poor and those who are denied human rights have to pay for all these. The fisher

woman who is closely related to nature laments over man's thoughtlessness. The entire play is a craving for human rights.

REFERENCES

1. *Globalization, Marginalization and Development*. Ed. Mansoob Murshed. New Delhi: Routledge, 2002. Print.
2. Madathil, Sajitha. 'Matsyaganddhi'. Translated by V. C. Harris. *Soul Gone Home and Other Plays*. Ed. V. C. Harris. Kottayam: M. G. University, 2003. Print.

Influence of Different Intensity Aerobic Speed among Education Students

Simmi I. S.

H.S.S.T, Mathematics, St Raphael's H.S.S. Ezupunna, Alleppey

E-mail: simmishaji37@gmail.com

ABSTRACT

The purpose of the study was to find out the influence of different intensity aerobic speed among education students. Forty five males ($n = 45$) bachelor of education students were randomly selected as subjects and their age ranged from 20 to 26 years. The selected subjects were randomly assigned into three equal groups of fifteen subjects each ($n = 15$), namely experimental group I underwent moderate intensity aerobic training (MAEG), group II underwent high intensity aerobic training (HAEG) were designed by the investigator and was administered for a period of 12 weeks 5 days a week and a session on each day, and group III control was not exposed to any specific training (CG) apart from their regular activities. Speed was selected as criterion variable for this study. Analysis of covariance (ANCOVA) was used to analyse the data and Scheffe's test was applied as a post hoc test to determine which of the paired mean difference significantly. The result of the study revealed that both training groups such as moderate intensity aerobic training group and high intensity aerobic training group were produced significant improvement in speed ($p \leq 0.05$) as compared to control group.

Keywords: *High intensity aerobic, moderate intensity aerobic, speed.*

INTRODUCTION

Aerobics is a form of physical exercise that combines rhythmic aerobic exercise with stretching and strength training routines with the goal of improving all elements of fitness like flexibility, muscular strength, speed and cardiovascular fitness. It is an activity that uses large muscle group. This is rhythmic in nature. It is simple and more beneficial. It means 'with air' any exercise is aerobic if the muscle being exercised gets the oxygen needed (Kenneth, 1970). It can be very

simple like fast walking a distance for 30 minutes, in 3-5 days a week. It is defined as any repetitive physical activity that is hard enough, to enhance circulatory and respiratory efficiency (Bucher & Wuest, 1987). It is usually performed to music and may be practiced in a group setting led by an instructor although it can be done also and without musical accompaniment. 'Aerobics' means 'in the presence of oxygen' many exercises are aerobic since these activities increased oxygen uptake in the body. Aerobic fitness refers to the capacity to take in, transport and utilize oxygen, since aerobic fitness involves many important bodily organs and systems like the heart, lungs, muscles, respiration and blood circulation etc. (Obert *et al.*, 2001) Aerobic training is very useful for motor fitness and health in general.

Speed is the capacity to travel or move very quickly. It is an ability to execute motor action under given condition in maximum possible time (Clarke & Clarke, 1987). It may mean the whole body moving at maximal running speed, as in the sprint. Muscles are made up of a combination of fast-switch and slow-switch fibers. Fast-switch fibers contract rapidly and slow-switch fibers contract more slowly and with lower level of force. If all other things are equal, athletes with longest muscle fibers and greater percentage of fast switch fiber should have the ability to run faster (Jarver, 1978) than an athlete with shorter slow -switch fibers. Eicher (1975) pointed out that speed is the product of two factors, stride length and stride frequency. Increasing either factor automatically increases a runners sprinting speed. The stride length can be increased by increasing the leg strength and power. Many studies have indicated that different intensities of aerobic training are helping to improve the strength and power that will help to achieve sprinting speed (Zafeiridis *et al.*, 2005). In this study fifty meters sprint has been taken as a test for measuring the speed of the subjects.

MATERIALS AND METHODS

The aim of this study was to determine the influence of different intensity aerobic exercise on speed among education students. Forty five males ($n = 45$) bachelor of education (B. Ed) students from teachers training colleges, Idukki district, Kerala, India were randomly selected as subjects and their age ranged from 20 to 26 years. The selected subjects were randomly divided into three equal groups of fifteen subjects each ($n = 15$). The groups were moderate intensity aerobic exercise group (MREG), high intensity aerobic exercise group (HAEG)

and one control (CG). During the training period, the experimental groups underwent their respective training programme for 5 days in a week for twelve weeks and a session on each day. Control group (CG) was not exposed to any specific training apart from their regular curriculum. Speed was selected as the dependent variable for this study and it was measured by using 50 meter run. The aerobic exercise program was scheduled for one session per day in the morning between 6:30 am and 7:30 am. During every session the work out lasted approximately for 60 minutes included warming up, training and warming down process. Aerobic training was given under the direct supervision of the investigator. These are the exercise used as aerobics 1. Continuous run, 2. Step aerobics, 3. Aerobic dance, 4. Skipping.

DATA ANALYSIS

Mean and standard deviation were calculated for speed for each training group. And the data were analyzed by using analysis of covariance (ANCOVA). If the '*F*' value was found to be significant for adjusted post-test mean, Scheffe's test was applied as a post hoc test to determine the significant difference between the paired mean. Statistical significance was set to priority at 0.05 levels.

RESULTS

Test	MAEG	HAEG	CG	SOV	SS	df	MS	F
Pre-test								
Mean	8.27	8.2	8.33	B G	0.12	2	0.06	0.22
S.D (±)	0.54	0.51	0.54	W G	11.71	42	0.28	
Post-test								
Mean	7.75	7.53	8.08	B G	2.35	2	1.17	4.74*
S.D (±)	0.46	0.53	0.50	W G	10.40	42	0.25	
Adjusted Post-test								
Mean	7.75	7.58	8.04	B G	1.62	2	0.81	8.56*
				W G	3.87	41	0.09	

Table I: Analysis of Covariance for Pre, Post and Adjusted Post Test Data on Speed of Moderate Intensity and High Intensity Aerobic Exercise Groups and Control Group

*Significant at 0.05 level of confidence

(The table values required for significance at 0.05 levels with df 2 and 42 is 3.22 and 2 and 41 is 3.23)

The table 1 shows that the pre tests mean of speed for moderate intensity aerobic exercise group, high intensity aerobic exercise group and a control group are 8.27, 8.2 and 8.33 respectively. The obtained '*F*' ratio of 0.22 is lesser than the table value 3.22 required for significance at 0.05 levels of df 2 and 42. It shows that there is no significant difference in speed among the three groups before the commencement of training.

The post test mean of speed for the moderate intensity aerobic exercise group is 7.75, high intensity aerobic exercise group is 7.53 and the control group is 8.08. The obtained '*F*' ratio of 4.74 is higher than the table value of 3.22 required for significance at 0.05 levels of df 2 and 42. The adjusted post test mean of speed for the moderate intensity aerobic exercise group is 7.75, high intensity aerobic exercise group is 7.58 and the control group is 8.04. The obtained '*F*' ratio of 8.56 is higher than the table value of 3.23 required for significance at 0.05 levels of df 2 and 41. The result of the study indicates that there was significant improvement of the post and adjust post test mean of moderate intensity aerobic exercise, high intensity aerobic exercise and control group on the development of speed. To determine which of the paired mean had a significant difference in speed, Scheffe's test was applied as post hoc test and the results are presented in table II.

MATG	HATG	CG	MD	CI
7.75	7.58		0.17	0.28
7.75		8.04	0.29*	
	7.58	8.04	0.46*	

Table II: Scheffe's Test for the Difference between the Adjusted Post Test Mean on Speed

*Significant at 0.05 level of confidence

(The confidence interval required for significance at 0.05 levels is 0.28)

Table II indicates that the adjusted post test mean difference of speed between moderate intensity aerobic exercise group and control group and high intensity aerobic exercise group and control group are 0.29 and 0.46 respectively. These values are higher than the confidence interval value of 0.28, which shows significant difference at the 0.05 level of confidence.

However the above table showed that there is no significant difference between the moderate intensity aerobic exercise group and high intensity aerobic exercise group in speed. It is concluded that high intensity aerobic exercise group is better than moderate intensity aerobic exercise group in improving speed. The pre, post and adjusted post test mean values of moderate intensity aerobic training group, high intensity aerobic training group and control group on speed is graphically presented in figure1.

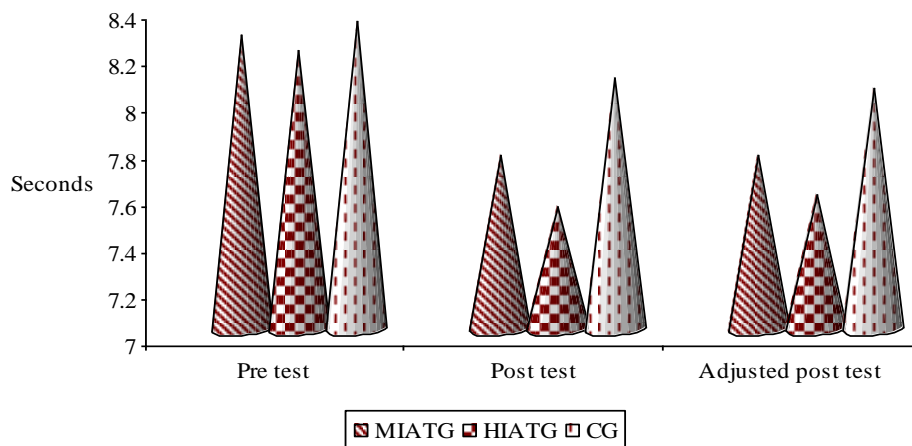


Figure 1: The Pre, Post and Adjusted Post Test Mean Values of Moderate Intensity Aerobic Training Group, High Intensity Aerobic Training Group and Control Group on Speed

CONCLUSION

Any practical application requires careful implementation and individual experimentation. In summary, the speed can be improved during the age between 20 and 26 years of male students and favour the prescription of moderate intensity and high intensity aerobic exercise. From this study we can conclude that high

intensity aerobic exercise is the best to improve speed followed by moderate intensity. Finally, the studies presented in this review demonstrate that there was a significant improvement on speed due to moderate intensity and high intensity aerobic exercise as compared to control group.

REFERENCES

1. Kenneth, H. (1970). Cooper. *The new Aerobics* (New York: M Evans and Company). Inc.
2. Bucher, Charles A. & Wuest D. (1987): *Foundations of Physical Education and Sports*. St.Louis; L.V.Mosby.
3. Clarke Harrison, H., & David, H. Clarke. (1987). *Application of Measurements to Physical Education*. (6th Ed.). Englewood Cliffs, New Jersey: Prentice Hall Inc.
4. Eicher Tom. (1975). "Improving Sprinting Speed through Strength Training". *Athletic Journal*, Vol. 65, 12-14.
5. Jarver J. (1978). Sprinting in a nutshell in-Jarver. J(Ed).*Sprints and Relays*. Ist Edison. Mountain view, CA: TAFNEWS press.
6. Obert, P., Mandigout, M., Vinet, A., & Courteix, D. (2001). Effect of a 13 week aerobic training programme on the maximal power developed during a force velocity test in Prepubertal boys and girls, *International Journal of Sports Medicine*, 22, 442- 446.
7. Zafeiridis, A., Saraslanidis, P., Manou, V., Ioakimidis,P., Dipla, K., & Kelliss. (2005). The effect of resisted sled-pulling sprint training on acceleration and maximum speed performance. *Journal of Sports Medicine and Physical Fitness*, Vol. 45(30, pp.284-290.

Current and Emerging Topics in Sports Video Processing

Shaji Jose

*Assistant Professor, Department of Physical Education, Aquinas College,
Edacochin*

E-mail: shjosev@gmail.com

INTRODUCTION

Sports broadcasts constitute a major percentage in the total of public and commercial television broadcasts. The growing demands of the viewers require advances in video capturing, storage, delivery, and video processing ability. With the advent of large storage capabilities and more TV channels with full coverage of large sport events, the organization and search in these data-sets becomes more appealing. This situation poses a challenging research problem: how to quickly find the interesting video segments for various consumers with differing preferences. In other words, the consumers want a system that allows them to retrieve specific segments quickly from the huge volume of available sports video, thus saving time. Other growing demands of viewers are new enhancement and presentation techniques that provide a better viewing experience, or that even generate the feeling to actually take part in the sports event, instead of only watching a transmission of a video captured by a single camera. These presentations require research in the fields of reconstruction, virtual reality generation, enrichment, etc. Sports videos have a game-specific structure because sports games are under rules and regulations. Furthermore, most of the games take place in restricted playfields with a defined layout. With the specific domain knowledge, sports video analysis can provide results of higher semantic levels compared to the analysis of other kinds of videos, for example, arbitrary home video. The playfield also provides a great aid in reconstructing the sports video using computer vision technology. Since a playfield is restricted, several fixed cameras can cover the whole playfield to capture enough information for a 3D (*three-dimensional*) reconstruction of the sports event. We can roughly classify sports video research into the following two main goals:

Indexing and Retrieval Systems: To build indexing and retrieval systems that can find requested sports scenes based on high-level semantic queries.

Augmented Reality Presentation: To present the sports videos with additional information to provide new viewing experience to the users. In the following sections, we first describe some basic algorithmic building blocks that reappear continuously in different contexts. Subsequently, we describe the main applications of sports video processing, and we close with some concluding remarks. Because of the vast amount of research conducted in this area, the presented topics and references can only be a restricted selection.

ALGORITHMIC BUILDING BLOCKS

2.1. Event and highlight detection

Event detection examines the sports video for events like goal-shootings, fouls, scoring a point, etc. Usually, various features of the video are used to infer the occurrences of events. The analysis of events can be carried out by combining various attributes of the video, including its structure, events, and other content properties. The content analysis problem can be addressed in two steps. First, we have to identify relations between the features and the semantic concepts that we want to detect. Second, we must find the procedure that captures the relation between the features and the semantic concept.

Highlights in sports videos are the special events that the viewers are especially interested in. The definition of what is interesting differs for each viewer. While sport fans are more interested in events like goals or spectacular points in tennis, the coaches might be more interested in the errors of the players to help them improve their capabilities. Highlight detection is the process to find the occurrences of highlights and their starting and ending times in the video. In event detection, features can be extracted from three channels: video, audio, and text. Each channel provides some cues that correlate with the occurrence of events. In other words, we can detect the events through inferring from these cues. We briefly describe the different approaches and methods of designing the event detection algorithms by pointing out opposing concepts below.

Low-Level Feature vs. Object-Related Feature: Low-level features are the *cinematic* features [38], acquired directly from the input video by using simple feature extractors. Examples are the dominant color, dominant texture, motion vectors, audio volume, keywords of text, etc. Many algorithms have been developed [1, 28, 32, 37] based on these low-level features. The low-level feature-based algorithms are popular because they are simple and efficient. However, for many events we cannot achieve satisfactory results by using such algorithms, because the events have a complex semantic nature and there are no clear relations between low-level features and these semantic concepts.

Object-related features are attributes of objects such as ball locations and player shapes, acquired by more complex algorithms. Event detectors based on object-related features often use both object-related and low-level features [13, 40]. An important object-related feature is the position of players and of the ball (see below). For example, a goal in a soccer game is defined as the event that the ball passes one of the goalmouths on the soccer field. Also a growing number of algorithms were designed to detect events with the aid of ball location or ball trajectory. Object-related features are usually difficult to be obtained [6, 11-12, 39-40, 42], but more events can be detected by using object-related features.

Single Channel vs. Multiple Channels: Some events can be detected using the features from a single channel [37]. However, for most events, we have to combine the features from multiple channels to detect the specific events [3, 8-9, 20, 22, 35-36]. The usually available channels are video and audio; the text channel can be available in the case of analysis of the commentary text in the internet, the superimposed text, and commentary speech [35, 45].

Game-Specific vs. Generic: Most of the developed event detectors are game-specific because different games have different events. These detectors need to use the domain knowledge of the particular game to infer the events [22, 39-41]. Obviously, it is better if an algorithm can detect the events of multiple games. Unfortunately, such algorithms are hard to attain. A compromise to design such systems is to build frameworks that can be configured to different games [8, 11-12].

Feature Model vs. Shot Pattern: Some algorithms directly model the relations between the features and the events. Such algorithms are intuitive and efficient.

However, some events have no intuitive relations with the features but require context information for the detection. One kind of algorithms uses the shot patterns to capture the context information [7-8]. They take four steps to detect the events. First, they segment the video into shots. Second, they extract the features within each shot. Third, they classify the shots into the predefined categories. Fourth, they infer events using a procedure that models the shot patterns.

Learning-Based vs. Normal: Most current algorithms use hard-wired procedures to capture the relations between the features and the events. They are efficient but not generic. Learning-based algorithms capture the relations between the features and the events by statistical analysis and optimization [34, 37]. In general, the machine learning approach is chosen when it is difficult to intuitively define the relations between the features and the events.

Broadcast Video vs. Non-broadcast Video: In the literature, most of the algorithms were designed for broadcast sports video from which they can use the editing information as an additional source of information. For example, such algorithms can use the information from the text, speech, and the graphics (with the known meanings) superimposed in the video [45]. The algorithms for non-broadcast video have only video and audio before editing [33]. Hence, they face more research challenges because they have less information to be used. However, the on-site systems for sports have to use such algorithms because they have to produce the results prior to broadcasting.

2.2. Structure Analysis

Video structure denotes the temporal grouping of the video. An example for a sport with a clear temporal structure is tennis. Each match comprises several sets, which are again divided in games, which are built from points. Other sports like soccer have less structure.

In sports video research, video structure analysis is not equivalent to simple cut detection, but it combines the knowledge about the rules of the game with general video structure analysis methods. An important structure is the distinction between play and break periods, because the consumers can save a lot of time by skipping the break periods [34].

2.3. Object Detection and Segmentation

In sports videos, the important acting objects are well defined. In some sports, only the position of the players is of interest (soccer, tennis), for other sports like gymnastics or diving, the shape and movements of the athletes is the main interest. Automatic analysis of these sports requires automatic segmentation algorithms that provide exact object shapes and algorithms that can infer behavior from the object shape [11-12]. These accurate object boundaries are also required for synthesizing new views in a 3D reconstruction [19].

2.4. Ball and Player Tracking

Because of the importance of the ball and player locations, specialized algorithms have been developed to track their position. Especially the tracking of a small ball is a difficult problem [7] and algorithms have been developed that detect the ball trajectory through several frames in one step [39-40] to increase the algorithm robustness.

2.5. Camera Calibration

Tracking the players only determines their position in the image coordinate system, but does not provide information about their position on the playfield, or more generally in the real world. To determine the geometric mapping between the image coordinates and the real-world positions, the camera parameters are required. Since the playfield itself is usually marked with certain lines whose real-world position is known, these lines can be used to carry out the camera calibration [11-12, 26].

2.6. 3D Reconstruction

One step further, multiple cameras can be used to obtain views from different positions and compute a complete 3D reconstruction of the playfield [37]. Usually, fixed multiple cameras are used, which simplifies their calibration, reduces the computing time, and improves the accuracy of camera calibration. More importantly, they can cover the whole playfield while current broadcast sports videos only display a portion of large playfields such as soccer fields.

APPLICATIONS OF SPORTS VIDEO PROCESSING

3.1. Abstracting

Video abstracting is the process of creating a shortened version of a video that still comprises the essential information from the complete video. The video abstract is a very important tool for sports video, as several periods during some games may be boring to the consumers and watching the abstract can save a lot of time. Generating a video abstract seems to be strongly related to finding the highlight events, but techniques have been proposed that estimate the excitement of a scene directly. Several researchers have used audio features to detect the highlights, because audio contains information about audience applause and of the excitement in the voice of the commentator. For example, Rui *et al.* [28] used audio features such as excited speech and baseball hits to detect the highlights. Instead of synthesizing a fixed abstract, an alternative approach is to use the structural analysis to detect semantic units. These can be used to build video indices and the table of contents according to different categorization schemes. The advantage of this approach is that the user has more control about what he wants to view and the probability to miss an interesting scene is smaller.

3.2. Tactics and performance analysis

Tactics analysis is to understand the tactics that teams or individual players have used. Performance analysis is to evaluate the performance of a team or a player through analyzing their motion and activity in games. Coaches and players are interested in such results for improving their performance in later games. The consumers are interested in such results for enjoying sports video with additional statistical information. The main tasks in tactics and performance analysis are to find the traces and the actions of players. Past work includes team behavior analysis [18, 29], team and player possession analysis [41, 43], player and ball detection, and tracking [19, 39-40]. The essential algorithmic techniques for tactics analysis are ball and player tracking as well as camera calibration [11-12] to find the corresponding real-world position of the players based on their position in the video.

3.3. Augmented Reality Presentation of Sports

The presentation of sport videos can be improved with two basic techniques. One is the 3D reconstruction of the game to provide arbitrary views and thus to increase the viewing experience to consumers [4, 19, 21]. The second technique is to insert some illustrations into the original video or to provide the illustration in extra windows to help consumers to understand the video easier [25, 44]. An example that is already used in practice is to superimpose virtual lines onto the field, for example, the distance between a player and the goal in football [46]. Another kind of enrichment is to insert advertisements into the original video to improve the commercial value of the video [31].

Sports video reconstruction provides 3D video to consumers. The advances in computer vision, computer graphics, and image processing have provided the techniques to build 3D reconstruction systems for sports. 3D reconstruction systems have been designed to serve different purposes. For example, they can be designed to generate virtual 3D views such that a viewer can examine a scene from the viewpoint of the referee or a player on the field [6, 15, 19, 21]. They can also be designed to generate 3Dreconstructed video such that it gives a better viewing experience than the original video [44].

3.4. Sports video for small devices

The transmission of sport events on small devices like PDA,3G/UMTS phones will become more popular in the future. Because the screen size of these devices is limited, different content is required, compared with TV broadcasts [32]. Since the production of special content is expensive, automatic transcoding applications that, for example, focus the view to the most important image area, will be employed. Because small devices have only a narrow transmission bandwidth, it is likely that a class of special compression algorithms for small devices will be developed in the near future.

3.5. Referee assistance

Referee assistant systems target to help the referee in cases of difficult decisions and partially replace the work of the referee. Such systems can use either specialized electrical sensors, or they can use more flexible real-time video

analysis systems. Currently, some tennis championships like Wimbledon, US Open and Australian Open use video systems to display the landing positions that are very close to the boundary lines of the court, where the technology is provided by Hawkeye [47]. Hence, such systems are useful to help the referee to decide if a doubtful decision was correct. For other sports, like an offside position in soccer, some decisions cannot be decided at fixed lines, but should be detected at varying positions on the field. These cases require a more complex and powerful video solution. We expect that referee assistance systems will become more important in the future since they ensure an unprejudiced decision and they support the large commercial value.

CONCLUSIONS

This paper has discussed the main techniques and approaches in sports video research. The specialty of sports video processing lies in the available domain knowledge of sports. A lot of work has already been carried out on content analysis of sports videos, and the work on enhancement and enrichment of sports video is growing quickly due to the great demands of customers. The development of video analysis systems still concentrates on the extraction of low level features. We believe that the future direction of research will concentrate on a more specialized, but also more in depth analysis. For the enrichment and 3D reconstruction of sports events, current systems exist for specialized applications. However, more general systems that are adaptable to cover a larger variety of applications will be an important design goal for future systems. Probably, more emerging topics will appear in enhance the quality and value of the sports video in the near future.

REFERENCES

1. J. Assfalg, M. Bertini, C. Colombo, A. Del Bimbo, *Semantic annotation of sports videos*, IEEE Multimedia, April 2002, vol. 9; pp 52-60.
2. J. Assfalg, M. Bertini, C. Colombo, A. Del Bimbo, W. Nunziati, *Semantic annotation of soccer videos: automatic highlights identification*, Computer Vision and Image Understanding, April 2002, vol. 92; pp 295-305.

3. N. Babaguchi, Y. Kawai, and T. Kitahashi, *Event based indexing of broadcasted sports video by intermodal collaboration*, IEEE Trans. on Multimedia, 2002, 4(1); 68-75.
4. T. Bebie, H. Bieri, *A video-based 3D-reconstruction of soccer games*, Eurographics, 2000, vol. 19 (3).
5. S. F. Chang, *The Holy Grail of content-based media analysis*, IEEE Multimedia, 2002, vol. 9(2); 6-10.
6. T. D. Orazio, C. Guaragnella, M. Leo, A. Distanto, *A new algorithm for ball recognition using circle Hough transform and neural classifier*, Pattern Recognition, 2004, vol. 37; pp 393-408.
7. L. Duan, M. Xu, and Q. Tian, *Semantic Shot Classification in Sports Video*, SPIE: (SRMD), 2003, 03; pp. 300-313.
8. L. Duan, M. Xu, T. S. Chua, Q. Tian, and C. Xu, *A mid-level representation framework for semantic sports video analysis*, ACM Multimedia, 2003, 33-44.
9. Ekin, A.M. Tekalp, R. Mehrotra, *Automatic soccer video analysis and summarization*, IEEE Trans. on Image Processing, 2003, vol. 12:7; 796-807.
10. D. Farin, T. Haenselmann, S. Kopf, G. Kühne, and W. Effelsberg, *Segmentation and classification of moving video objects*, in B. Furth and O. Marques (eds.): "Video databases, design and applications", CRC Press, 2003.
11. D. Farin, J. Han, P. H. N. de With, *Fast camera calibration for the analysis of sport sequence*, ICME 2005.
12. D. Farin, S. Krabbe, W. Effelsberg, P. H. N. de With, *Robust camera calibration for sport videos using court models*, SPIE, 2004, vol. 5307; pp 80-91.
13. Y. Gong, T. S. Lim, H. C. Chua, H. J. Zhang, M. Sakauchi, *Automatic parsing of TV soccer programs*, 2nd Int. C. on Multimedia Comp. and Sys., 1995, pp.167-174.

14. M. Han, W. Hua, W. Xu, Y. Gong, *An integrated baseball digest system using maximum entropy method*, ACM MM 02, Dec 01-06-2002, Juan-les-Pins, France.
15. N. Inamoto, H. Saito, *Free viewpoint video synthesis and presentation from multiple sporting videos*, ICME 2005.
16. N. Inamoto, H. Saito, *Immersive observation of virtualized soccer match at real stadium model*, 2nd IEEE & ACM Int. Symp. on Mixed & Aug. Reality, 7-10-2003, pp.188-197, Japan.
17. S. Iwase and H. Saito, *Tracking soccer players based on homography among multiple views*, SPIE, 2003, vol. 5150; pp 283-292.
18. T. Kawashima, K. Yoshino and Y. Aoki, *Qualitative image analysis of group behavior*, CVPR 94, 1994, pp. 690-693.
19. T. Koyama, I. Kitahara, Y. Ohta, *Live 3D video in soccer stadium*, 2nd IEEE & ACM Int. Symp. on Mixed and Aug. Reality, 7-10 Oct. 2003, pp 178-186, Japan.
20. W. N. Lie, S. H. Shia, *Combining caption and visual features for semantic event classification of baseball video*, ICME 2005.
21. K. Matsui, M. Iwase, M. Agata, T. Tanaka, and N. Ohnishi, *Soccer image sequence computed by a virtual camera*, CVPR 1998.
22. S. Nepal, U. Srinivasan, G. Reynolds, *Automatic detection of 'goal' segments in basketball videos*, ACM MM01, 2001, pp 261-269.
23. Y. Ohno, J. Miura and Y. Shirai, *Tracking players and estimation of 3D position of a ball in soccer games*, ICPR 00, 3-7 Sept. 2000, vol. 1; pp. 145-148.
24. G. S. Pingali, Y. Jean, I. Carlbom, *Real time tracking for enhanced tennis broadcasts*, CVPR, 1998, pp 260-265.
25. G. S. Pingali, A. Opalach, Y. Jean, I. Carlbom, *Visualization of sports using motion trajectories: providing insights into performance, style, and strategy*, Proc. 12th IEEE Visualization Conf., Oct. 2001, pp 75-82, 544, San Diego.

26. Reid, A. Zisserman, *Goal-directed video metrology*, ECCV 96, 1996, vol II; LNCS 1065, pp. 647-658.
27. J. Ren, J. Orwell, G. A. Jones, and M. Xu, *A general framework for 3D soccer ball estimation and tracking*, ICIP04, 2004, pp 1935-1938, Singapore.
28. Y. Rui, A. Gupta, A. Acero, *Automatically extracting highlights for TV Baseball programs*, ACM MM00, Oct. 2000, pp 105-115.
29. T. Taki, J. Hasegawa and T. Fukumura, *Development of motion analysis system for quantitative evaluation of teamwork in soccer games*, ICIP 96, 1996, pp 815-818.
30. V. Tovinkere, R. J. Qian, *Detecting semantic events in soccer games: Towards a complete solution*, ICME01, 2001, pp 1040-1043.
31. K. W. Wan, X. Yan, X. Yu, C. Xu, *Robust goalmouth detection for virtual content insertion*, ACM MM03, 2003, pp 468-469.
32. K. W. Wan, X. Yan, and C. Xu. *Automatic mobile sports highlights*, ICME 2005.
33. J. Wang, C. Xu, E. Chng, K. W. Wan, Q. Tian, *Automatic replay generation for soccer video broadcasting*, ACM MM 04, 2004, pp 32-39.
34. L. Xie, P. Xu, S. F. Chang, A. Divakaran, H. Sun, *Structure analysis of soccer video with domain knowledge and hidden Markov models*, P. R. Letter, 2004, vol 25; pp 767-775.
35. Z. Xiong, R. Radhakrishnan, A. Divakaran, T. S. Huang, *Highlights extraction from sports video based on an audio-visual marker detection framework*, ICME 2005.
36. H. Xu, T. H. Fong, and T. S. Chua, *Fusion of multiple asynchronous information sources for event detection in team sports video*, ICME 2005.
37. M. Xu, N. C. Maddage, C. Xu, M. Kankanhalli, Q. Tian, *Creating audio keywords for event detection in soccer video*, ICME 2003, vol II; 281-284.

38. Y. Q. Yang, Y. D. Lu, W. Chen, *A framework for automatic detection of soccer goal event based on cinematic template*, Int'l Conf. on Machine Learning and Cybernetics, Shanghai, Aug. 2004, 26-29.
39. X. Yu, C. H. Sim, J. R. Wang, F. C. Loong, *A trajectory based ball detection and tracking algorithm in broadcast tennis video*, ICIP04, 2004, pp 1049-1052.
40. X. Yu, C. Xu, H. W. Leong, Q. Tian, Q. Tang, K. W. Wan, *Trajectory-based ball detection and tracking with applications to semantic analysis of broadcast soccer video*, ACM MM03, 2003, pp 11-20.
41. X. Yu, H. W. Leong, J. H. Lim, Q. Tian, Z. Jiang, *Team possession analysis for broadcast soccer video based on ball trajectory*, PCM 03, 2003, pp 1811-1815.
42. X. Yu, H. W. Leong, C. Xu, Q. Tian, *A robust and accumulator-free ellipse Hough transform*, ACM MM04, 2004, pp.256-259.
43. X. Yu, T. S. Hay, Xin Yan, E. Chng, *A player-possession acquisition system for broadcast soccer video*, ICME 2005.
44. X. Yu, Xin Yan, T. S. Hay, H. W. Leong, *3D reconstruction and enrichment of broadcast soccer video*, ACM MM04, 2004, pp 260-263.
45. D. Zhang, S. F. Chang, *Event detection in baseball video using superimposed caption recognition*, ACM MM02, Dec. 01-06,2002, Juan-les-Pins, France Sportvision Inc., "System for enhancing a video presentation of a live event", U.S. Patent 6,597,406, January 26, 2001.

Relationship of Anxiety and Aggression with the Penalty Kick Performance in College Level Women Football Players

Saran K. S.

Ph.D Scholar, S.R.M. University, Chennai

ABSTRACT

The use of psychological interference in competitive sport and games to enhance performance has become gradually popular. The present study was conducted to “Analyze the relationship among Anxiety, Aggression and Penalty kick performance in college women football players”. The investigator has selected 50 college women football players from Tamil Nadu Physical Education and Sports University and YMCA college of Physical Education Nandanam, Chennai. Their age group ranged between 18 and 25 years. The standardized questionnaire were used for analyzing Anxiety and Aggression, such as Spielberger’s Anxiety inventor for measuring (Anxiety) and Berry’s Aggression questionnaire for (Aggression) scoring method of Anxiety is 3 point rating scale, like likert scale method, ranging from 1 to 3 and Aggression It was measured on a 5 point rating scale, like likert scale method ranging from 1 to 5. The data collected on Anxiety and Aggression from women football players were statistically analyzed by Computing Person Product Moment Correlation. The level of significance was fixed as 0.05 level. Within the limitations of the present study the followings conclusions were drawn: the selected psychological variable, namely Anxiety and Aggression has proved negative significant relationship with penalty kick in football players.

Keywords: Anxiety, Aggression, Penalty kick, and likert scale.

INTRODUCTION

In recent years the understanding and implementation of real relationship between the “psycho” and the “soma” in various disciplines, a new avenue has been opened for physical educationist to devise suitable physical education programmers to prevent and cure those disorders that appears to result from disturbances in the relationship between “psyche” and “soma” which are usually called psychosomatic disorders. In these disorders ‘anxiety’ appears to be the root cause which may result from any of the several psychological disorders like hate, envy and conflict. This anxiety is manifested in different forms and in varying degrees of intensity affecting the behavioral patterns of individuals. Anxiety is both a trait and state. As a trait, anxiety is more or less permanent inborn characteristics of human personality and as a state; it is a universal, environmental phenomenon. Anxiety is one of the important psychological factors influencing sports performance. Anxiety, a complex emotional state, may be characterized as a general fear or forbidding usually accompanied by tension. It is related to fear of failure, either real or anticipated.

Aggression

Predatory or defensive behavior between members of different species is not normally considered “aggression”. Aggression takes a variety of forms among humans and can be physical, mental, or verbal. Aggression should not be confused with assertiveness, although the terms are often used interchangeably among laypeople, e.g. an aggressive salesperson. Some research indicates that people with tendencies toward effective aggression have lower IQs than those with tendencies toward predatory aggression. If only considering physical aggression, males tend to be more aggressive than females. One explanation for this difference is that females are physically weaker than men, and so need to resort to other means. Females of different cultures have a variety of non physical means to cause harm to their husbands.

Penalty kick: A Penalty kick (also known as penalty or spot kick) is a type of direct free kick in association with soccer, taken from 12 yards (approximately 11 meters) out from the goal, on the penalty mark. Penalty kicks are performed during normal play. They are awarded when a foul normally punishable by a direct free kick is committed within the defending player’s own

penalty area. Similar kicks are made in a penalty shootout in some tournaments to determine which team is victorious after a drawn match; through similar in procedure, these are not penalty kicks and are governed by slightly different rules.

METHODOLOGY

The investigator has selected 50 college women football players from Tamil Nadu Physical Education and Sports University and YMCA college of Physical Education, Nandanam, Chennai. Their age group ranged between 18 and 25 years. The research reviewed the available scientific literature and selected the following variables, Anxiety and Aggression. The standardized questionnaire were used namely Spielbereger's Anxiety inventor for measuring Anxiety and Berry's Aggression questionnaire. Before collection of data, subjects were oriented about the purpose of the study. The investigator explained each questionnaire in detail to the subjects. The investigator had given proper instruction to fill questionnaires, so the subject has no doubt to fill the questionnaires.

This questionnaire was designed to measure the anxiety. This was developed and standardized by Spielberger the questionnaire consist of 15 statements describes the thoughts at the present situation. The subject is requested to indicate the appropriate response out the given three responses. This questionnaire was designed to measure the aggression this was developed and standardized by Berry consist of 29 statements describes different situation relating to physical, verbal, Anger and Hostility characters. The subjects requested to indicate the best appropriate response out of the given five responses elicited by the situation from persons described in the question.

Penalty kicking performance, Opportunity was to the subjects to shoot the ball towards the goal post for 10 times at 11 meter distance. The player will be given 10 chance he shoot the ball into the goal post in 11meter distance if she shoot is correctly she will be given five point otherwise zero.

STATISTICAL TECHNIQUES

The data collected on Anxiety and Aggression from women football players were statistically analyzed by Computing Person Product Moment Correlation. The level of significance was fixed as 0.05 levels.

RESULTS AND DISCUSSIONS

The selected criterion variables were measured from the college level football players. Person correlation was used to find out the relationship between independent and dependent variables. In all the cases, 0.05 level was fixed to test the level of significance, which was considered as appropriate.

DESCRIPTIVE STATISTICS

The means and standard deviation on anxiety aggression in penalty kick performance in football players. We tested and the same is subject were presented in table I.

S. No	Variables	No Of Subjects	Mean	Standard Deviation
1	Anxiety	50	20.7	2.88
2	Aggression	50	72.1	6.45
3	Penalty kick performance	50	28	16.06

Table I

Table- I shows that the mean values of anxiety was 20.74 with standard deviation of 2.88. The mean value of aggression was 72.12 with standard deviation of 6.45. the mean value of penalty kick performance 28.00 with standard deviation 16.06.

Person's Product Moment Correlation:

1. Relationship between Anxiety and Penalty kick performance
2. Relationship between aggression and penalty kick performance

The obtained person product moment correlation of anxiety aggression and penalty kick performance are presented in table –II

s.no	Between variables	N	Obtained 'r'	Required 'r'
1	Penalty kicking Performance Vs Anxiety	50	0.28	0.214
2	Penalty Kicking Performance Vs Aggression	50	0.21	0.214

Tables –II: Relationship anxiety and penalty kick performance, aggression and penalty kick performance in women football players.

Significant at 0.05 levels.

The result presented in table II showed that the obtained 'r' value for penalty kick performance Vs Anxiety is 0.28. the obtained 'r' value of 0.28 was greater than the required 'r' value of 0.214 and Penalty kicking performance Vs aggression The obtained 'r' value of 0.21 was less than the required 'r' value of 0.214. Hence the result proved that there was a significant relationship between anxiety and penalty kick performance, aggression and penalty kicking performance in football players at 0.05 level of significance.

CONCLUSIONS

Within the limitations of the present study the followings conclusions were drawn:

- ✓ The selected psychological variable, namely anxiety has proved negative significant relationship with penalty kick in women soccer players.
- ✓ The selected psychological variable, namely aggression has proved negative significant relationship with penalty kick in women soccer players.

REFERENCES

1. Cox R. H., Yoo H. S., Journal of sports behavior, 1995, Vol. 18; No. 3; pp. 183-194.
2. Pippa Grange and John Kerr, *Conducted a study on physical aggression in Australian football*, J Strength Cond Res, 2008 Jan, 22(1); 174-81.
3. Vanttinen T., Blomqvist M. and Hakkinen K., Development of body composition, hormone profile, physical fitness, general perceptual motor skills, soccer skills and on-the-ball performance in soccer specific laboratory test among adolescent soccer players, 2010, Vol 9(4); pp 547-56.
4. Sullivan C et al., Bilsborough J. C., Cianciosi M., Hocking J., Corody J., Coutts A. J., Match score effects activity profile and skill performance in professional Australian football players, 2013, Vol 1440-2440 (13); pp 00108-4.
5. Rascole O., et al.) *“Analyzed aggression and goal orientations in handball”*, The purpose of this study was to examine the relationship of goal orientations with aggression in male adolescent handball across three institutional sport, Strength Cond Res., 1998 Jan, 22(1); 153-8.
6. Barry L., Johnson and Jack K. Nelson, Practice measurement for evaluation in physical education, 1998, pp. 227- 288.

Comparative Study on Achievement Motivation and Unforced Error among State Level Badminton Players

Nithin Nazarudeen

M.Phil Scholar, S.R.M. University, Chennai

ABSTRACT

The awareness of Achievement motivation and unforced error is transferred from ancient culture. Through knowing the level of Achievement motivation we can improve the standard of physical education. In modern age the importance of Achievement motivation increases day by day. The purpose of this study was to find out the unforced error and achievement motivation of the state level badminton players. A total of 32 state level badminton players (N=32) were selected from the state level badminton tournament. The subjects are randomly selected for the study. Their age ranged from 15-21 years. Before conducting the test, all the subjects were given proper instruction. The collected data on selected criterion variables was statistically analyzed by using co- relation to find out the significant difference in unforced error of the state level badminton players. In all the cases, 0.05 level of confidence was fixed to the test significant, which was considered appropriate.

INTRODUCTION

“Motivation is based on your emotions and achievement-related goals. Achievement motivation is based on reaching success and achieving all of our aspirations in life “reports the Rochester institute of technology (RIT)”. Peoples need and desires visibly influence their behavior. People with a high achievement prefer work with a moderate probability (around 50%) of success. For these people, low-risk situations do not achieve motivation. Psychologist David McClell studied work place motivation extensively and theorized that workers as well as their superiors have influence on their performance at work. One of these needs is to achieve motivation – which can be defined as an individual’s need to

meet realistic goals, receive feedback and experience a sense of accomplishment. As a group we quickly came to understand that when the coach stopped shouting he was satisfied. Here was a coach determined to remain in control and achieving his aims by intimidation. Although he was reasonably successful, most players disliked him and I soon felt it was time to move on. This example demonstrates the negative approach to coaching and motivation, which relies on negative reinforcement to shape behavior, so that players do exactly what the coach, requires in order to avoid punishment and/or humiliation.

Unforced Error

An unforced error is a mistake that you make due to simply hitting the ball incorrectly (shanks, mishit) or using improper positioning, lack of precision or just bad luck (such as hitting the net and having it drop back on your side). In other words, if you are playing a neutral rally and your shot goes out of bounds or hits the net that is an unforced error.

Forced Error

Forced Error- A forced error is when your opponent hits a really good shot (powerful smash shots, net shot, drop shot, attacking strokes etc), that you have to run, stretch, dive or scramble to get. Once you get there you are unable to put it back into the court or you hit the net. Technically, you made a mistake but since your opponents hit a superior shot; they "forced" that error. Basically, if you hit a shot on the run and it doesn't go in, it's a forced error.

DELIMITATION

- The study was delimited to male badminton players.
- The age group of the subjects will be ranged from 15-21 years.
- The study was delimited to the team which qualified to semi-finals in the Kerala state level tournament.

SIGNIFICANCE OF THE STUDY

- The study will be helpful for physical education teacher and coaches to evaluate their students.

- The finding of the study may provide a great variable feedback to improve on coaching programmes.

METHODOLOGY

- The subjects for the study were selected from the men badminton team which qualified to semi-finals in the state level tournament.
- The age groups of the subjects were ranged between 15-21.
- Dependent variable: - unforced error, achievement motivation.
- Independent variable: - observation, questionnaire.

ADMINISTRATION OF TEST

Questionnaire tool was used for this investigation. Questionnaire was distributed to individuals and was filled out by the respondent under the supervision of the investigator. The investigator is observing the state level badminton tournament collecting unforced error of all teams. The team which has less unforced error will be the winner. The questionnaire is given to assess the achievement level of all players.

STATISTICAL TECHNIQUE

Physical variable was used for the statistical treatment to find out whether there was any significant difference between the four groups by analysis of correlation is used.

FINDINGS

In this study 32 female students were selected from various districts of Kerala they qualified to semi finals same of tournament players (n=8 in 4 group's). Achievement motivation and unforced error on state level men badminton players were taken as a variable of the study. During data collection standard procedures were followed. Further descriptive statistics and standard deviation test were employed to find out the achievement motivation and unforced error on state level men badminton players. After analysis obtained data presented in table 1.-4

District	N	MIN	MAX	MEAN	SD
Mlprm	5	153	175	161.4	8.8
Ekm	5	132	164	150.6	10.8
Pal	8	143	175	164.88	10.9
Tvm	6	134	169	149.83	12.6

Table I: Descriptive analysis of achievement motivation district level men badminton players

The above table shows the descriptive statistics of achievement motivation of men badminton players. The minimum and maximum values of achievement motivation of Malapuram team 153-175, Ernakulam team 132-164, Palakad 143-175 and Trivandrum 134-169. District team. The mean of the achievement motivation is Malapuram 161.400, Ernakulam 150.6000, Palakad 164.8750 and Trivandrum 149.8333 and standard deviation of achievement motivation is Malapuram 8.7636, Ernakulam 10.8028, Palakad 10.8948 and Trivandrum 12.5764.

	Sum of Squence	df	Mean square	f
Btw Group	1101.75	3	367.24	2.9
Within Group	2498.1	20	124.9	
total	3599.833	23		

Table II: Anova of achievement motivation of men badminton players in district team

Significant at 0.05 level of confidence, the tabulate value is 3.0984.

The above table indicates that there is a no significant difference between the unforced error and achievement motivation of state level badminton players, of each district team since the calculated value of badminton players, 2.940 is lesser than tabulated f' value of 3.0984 at 0.05 level of significance with 23 degrees of freedom.

District	N	MIN	MAX	ME AN	SD
Mlprm	5	16	40	27	10.9
Ekm	5	12	38	25	10.8
Pal	8	2	49	22	18
Tvm	6	15	39	25	9.69

Table III: Descriptive analysis of unforced error in district level men badminton players

The above table shows the descriptive statistics of unforced error of men badminton players. The minimum and maximum values of unforced error of Malapuram team are 16 and 40, Ernakulam team 12-38, Palakad 2-49, and Trivandrum 15-39. District team. The mean of the achievement motivation is Malapuram 26.6000, Ernakulam 25.2000, Palakad 22.000 and Trivandrum 25.000 and standard deviation of achievement motivation is Malapuram 10.9453, Ernakulam 10.8028, Palakad 18.0238 and Trivandrum 9.6954.

	Sum of Squence	df	Mean square	f
Btw Group	75.6	3	25.2	0.14
Within Group	3690	20	184.5	
total	3765.6	23		

Table IV: Anova of unforced error state level men badminton players

Significant at 0.05 level of confidence, the tabulate value is 3.0984.

The above table indicates that there is a no significant difference between the unforced error and achievement motivation of district level badminton players, since the calculated' value of badminton players, 137 is lesser than tabulated f' value of 3.0984 at 0.05 level of significance with 23 degrees of freedom.

SUMMARY

Achievement motivation is very essential for the physical education. The awareness of Achievement motivation and unforced error is transferred from ancient culture. Through knowing the level of Achievement motivation we can improve the standard of physical education. In modern age the importance of Achievement motivation increases day by day. The purpose of this study was to find out the unforced error and achievement motivation of the state level badminton players. A total of 32 state level badminton players (N=32) were selected from the state level badminton tournament. The subjects are randomly selected for the study. Their age ranged from 15-21 years. Before conducting the test, all the subjects were given proper instruction. The collected data on selected criterion variables was statistically analyzed by using co- relation to find out the significant difference in unforced error of the state level badminton players. In all the cases, 0.05 level of confidence was fixed to the test significant, which was considered appropriate.

REFERENCE

1. Vanttinen T., Blomqvist M. and Hakkinen K., Development of body composition, hormone profile, physical fitness, general perceptual motor skills, soccer skills and on-the-ball performance in soccer specific laboratory test among adolescent soccer players, 2010, Vol 9(4); pp 547-56.
2. Sullivan C et al., Bilsborough J. C., Cianciosi M., Hocking J., Corody J., Coutts A. J., Match score effects activity profile and skill performance in professional Australian football players, 2013, Vol 1440-2440(13); pp 00108-4.
3. Rascole O.et.al, "Analyzed aggression and goal orientations in handball". The purpose of this study was to examine the relationship of goal orientations with aggression in male adolescent handball across three institutional sports, Strength Cond Res, 1998 Jan, 22(1); 153-8.

Comparison of the Service Efficiency between State Level and District Level Volleyball Players

Rahul R. Nair

ABSTRACT

The study was undertaken to compare the service efficiency between state level and district level volleyball players. It had the purpose of comparing and analyzing the data collected from the variable among state level and district level sub-junior volleyball players. For the purpose of the study, twenty four male students were selected as subjects. The twelve district level volleyball players and twelve state level volleyball players were selected as the subjects for the investigation. The selected variable for the study was the service efficiency in volleyball. The test administered to assess the service efficiency in volleyball was Russell-Lange Volleyball Test. The experimental design was double group. The result of the study supported the hypothesis that there would be significant difference in the service efficiency between state level and district level volleyball players and hence the hypothesis was accepted. Since it was indicated that t -ratio obtained from scores by employing Russell-Lange Volleyball Test was 2.318. This value was significant as it was greater than the t -value of 2.078 required for the significance at 0.05 level.

INTRODUCTION

Volleyball is a team sport in which two teams of six players are separated by a net. Each team tries to score points by grounding a ball on the other team's court under organized rules. It has been a part of the official program of the Summer Olympic Games since 1964. The complete rules are extensive. But simply, play proceeds as follows: a player on one of the teams begins a 'rally' by serving the ball (tossing or releasing it and then hitting it with a hand or arm), from behind the back boundary line of the court, over the net, and into the receiving team's court. The receiving team must not let the ball be grounded within their court. The team may touch the ball up to 3 times but individual players may not touch the ball twice consecutively. Typically,

the first two touches are used to set up for an attack, an attempt to direct the ball back over the net in such a way that the serving team is unable to prevent it from being grounded in their court. The rally continues, with each team allowed as many as three consecutive touches, until either (1): a team makes a kill, grounding the ball on the opponent's court and winning the rally; or (2): a team commits a fault and loses the rally. Service is one of the original volleyball skills that William G. Morgan introduced in the first written rules back in 1897. Nevertheless, is better not to make the mistake of considering the service a minor skill of the game. Even as one of the few techniques in volleyball in which there is no interaction with the partner or the opponent in its execution, most authors agree about the importance of volleyball service as one of the capital skills in the game (Javier Pena Lopez, 2013). The purpose of this study was to compare the service efficiency of state level sub-junior players with the district level volleyball players. This study helped to analyze the level of improvement in executing a volleyball serve of state level players who were advanced than the district level players. It also helped to understand whether the service efficiency was depended on their age and level of competition.

STATEMENT OF THE PROPOSED PROBLEM

The purpose of the study was to compare the service efficiency between state level and district level volleyball players.

Delimitations

The following were the delimitations of study.

1. The subjects will be the male students of St. Joseph higher secondary school, Angamaly.
2. The subjects selected were sub-junior level players.
3. The subjects were state level and district level volleyball players.
4. Numbers of the subjects were twenty four.
5. The age groups of students were 13-15 years.
6. The variables selected for the study was the service efficiency in volleyball.

The test for the assessment of variables was:- Service efficiency test of *Russell-Lange Volleyball Test*.

Significance of the study

The result of the study may help us to analyze the difference of service efficiency of state and district level volleyball player.

METHODOLOGY

Selection of subjects

The twenty four male state level and district level volleyball players were selected as subjects. The subjects for the investigation were selected from St. Joseph higher secondary school Angamaly. Their age range from 13 to 15 years.

Selection of variables

Following were selected as variables for the study:-

- Dependent variable: - Service efficiency in Volleyball.
- Independent variable :- Russell-Lange Volleyball Test.

Administration of test

Russell-Lange Volleyball Test

The subjects were ask to serve ten times in a legal manner in to a target on the court across the net. 'Let' serves were repeated. Special court marking is (1) chalk line across court 5feet inside and parallel to end line. (2) chalk line across court parallel to and 12 ½ feet from the line under the net (3) chalk line 5 feet inside and parallel to each side line, extending from line under the net to line.

Scoring

Each service was scored according to the value of the target area in which the ball landed. A ball landed on a line separating two areas was given the highest value. The ball landed on aside or the end line scores the value of the area

adjacent. Trials in which foot faults occurred was scored zero.

Statistical technique

In order to find the significant difference among the two groups on selected variables the 't' ratio was applied. The level of significance was kept at 0.05 level.

ANALYSIS OF DATA

Descriptive statistics and Independent 't' test were employed to find the significant difference in service efficiency between state level and district level volleyball players. After analysis obtain data presented in the following table.

GROUP	N	MEAN	MIN	MAX	RANGE	SD
DISTRICT LEVEL	12	31	24	40	16	
STATE LEVEL	12	36	31	43	12	2

Table 1: Descriptive analysis of service efficiency between state and district level volleyball players

GROUP	DM	DF	T
DISTRICT LEVEL			
STATE LEVEL	-5	22	2.318*

Table 2: The Significance Difference

*Significant at .05 level $t_{.05}(22) = 2.074$

An observation of table 4.2 indicates that t-ratio obtained from the scores of the Russell-Lange Volleyball Test was 2.318. This value was significant as it was greater than the t-value of 2.074 that required for the significance at 0.05 level.

Discussion of findings

The study had the purpose of comparing and analyzing the service efficiency between state and district level male volleyball players. During data collection standard procedure were followed. In this study the results shows that

there was a significant difference in the service efficiency among state and district level male volleyball players. The descriptive analysis shows that state level volleyball players were more efficient in servicing in volleyball when compare to the district level volleyball players.

SUMMARY

This study was undertaken to compare the service efficiency between state level and district level volleyball players. It had the purpose of comparing and analyzing the data collected from the variable among state level and district level sub-junior volleyball players. For the purpose of the study, twenty four male students were selected as subjects. The twelve district level volleyball players and twelve state level volleyball players were selected as the subjects for the investigation. The selected variable for the study was the service efficiency in volleyball. The test administrated to assess the service efficiency in volleyball was Russell-Lange Volleyball Test. The experimental design was double group. The result of the study supported the hypothesis that there would be significant difference in the service efficiency between state level and district level volleyball players and hence the hypothesis was accepted. Since it was indicated that t-ratio obtained from scores by employing Russell-Lange Volleyball Test was 2.318. This value was significant as it was greater than the t-value of 2.078 required for the significance at 0.05 level.

CONCLUSION

Based on the finding and within the limitation of the study it is noticed that there was a significant difference in the efficiency of service in volleyball among state level and district level players. It was seen that the state level volleyball players are more efficient in executing the service when compared to district level players.

RECOMMENDATIONS

The following recommendations are made for future investigations:-

- Similar studies can be conducted on different skills of volleyball.
- Researcher can also be selected different major game and the related

skills.

- Similar studies can be done on female groups too.
- Studies with different age group can also be conducted.

REFERENCES

1. Silva M., Lacerda D. and João P. V., *Game-Related Volleyball Skills that Influence Victory*, Journal of sports medicine, 2014.
2. Peña J., Rodríguez-Guerra J., Buscà B. and Serra N., *Which skills and factors better predict winning and losing in high-level men's volleyball*, Journal of sports medicine, 2013, pp 87-114.
3. João P. V., Leite N., Mesquita I. and Sampaio J., *Sex differences in discriminative power of volleyball game-related statistics*, Journal of sports medicine, 2007, pp 53- 67.
4. Afrouzeh M., Sohrabi E., Haghkhan A., Rowshani F. and Goharrokhi S., *Effectiveness of PETTLEP imager on performance of passing skill in volleyball*, Journal of sportsmedicine, 2015, pp 30-36.

Effect of Core Workout on Abdominal Strength and Flexibility among College Students

Mithin Anand

Ph.D Scholar, S.R.M. University, Chennai

ABSTRACT

This study was undertaken to analyze the effect of ABS- Workout on selected variable among the College students. It had the purpose of comparing and analyzing the data collected from each variable during pre-test and post-test. For the purpose of the study, twenty boys of 22 to 28 years old were selected as the subjects for the investigation. These students were started ABS-Workout in Department of College, St. Joseph's college, Moolamattom. The pre-test was administered after four weeks of training. The selected variables for the study were abdomen strength and flexibility. The test administered to assess the abdomen strength and flexibility were one minute sit-ups and sit and reach test respectively. A pre-test and post-test score of the experimental group and controlled group were analyzed by employing the T-test. To find out the significance of difference between pre-test and post-test scores of the experimental group and the controlled group, the t-ratio was employed.

INTRODUCTION

ABS- Workout is a non-impact, non-aerobic, deep muscle conditioning method. When performed regularly it can positively change the body, strengthening the body's "powerhouse", the abdominal, gluteus and back muscles. It can help to increase flexibility and improve posture while strengthening the muscles deep in the body and around the spine to help prevent injuries and alleviate pain. Every workout session helps eliminate mental and physical distractions naturally by applying these principles effectively training your mind and body to coordinate movement. Highly disciplined athletes and professional dancers find that Pilate's technique gives them a comparative edge in enhancing their mental and physical performance. Pilate's combine's awareness of the spine, proper breathing, and strength and flexibility training, helping to sculpt the body

(developing slenderness rather than bulk) improve coordination, correct body imbalances, and help prevent injuries and osteoporosis. The core fundamentals of the Method are based upon a thorough understanding of the anatomy of the human body and the eight principles. The ABS- Workout method is so safe and so effective, Osteopaths, physiotherapists and general practitioners are now recommending ABS- Workout. Joseph Hubertus Pilates was a man who believed completely in his method and practiced what he prescribed to others well into his eighties. Even as an older man he was quite robust and vital until his death, at the age of 87. ABS- Workout is for everyone to enjoy. The exercises can be modified to range from gentle to challenging, depending on your fitness level and goals. ABS- Workout is now used by millions of people across the globe because it is one of the safest forms of exercise. Pilate's exercises encompass stretch, strength and improve flexibility in the safest way. Forget going for a run, pounding on pavement with the potential risk of getting shin splints, a knee injury or worse, falling and getting an even more severe injury. ABS- Workout is one of the safest exercise systems in existence. The only equipment used is a floor mat. But for more advanced ABS-Workout exercise enthusiasts, other equipment can be added to simple routines. Nevertheless, once you begin this solid workout regimen, you will begin to notice healthy improvements in your body.

Regardless of whether you are 20 or 60 years of age, Pilate's exercises can work for anyone – male or female, old or young. No matter what condition you're in, the health and fitness benefits are endless. ABS- Workout improves flexibility, core strength and range of motion. It is also known to help alleviate chronic health ailments as well as fight back pain. It's an exercise that bonds the mind and body allowing them to work together to establish balance. But the biggest benefit is ABS- Workout improves overall body alignment, making it less prone to injury.

Benefits of ABS- Workout training

- Corrects spinal and pelvic alignment through the concentration of slow, flowing, smooth movements with maximum power.
- Builds long, lean muscles that are less prone to injury, while building strength - without the bulk.
- Improves flexibility and range of motion.
- Improves back and abdominal strength.
- Creates balance between muscles - as weak muscles become stronger and

the strong muscles also gain more strength never over training or under training any particular muscle group. This balance makes it easier to enjoy daily activities with less risk of injury. ABS- Workout allows you to retrain your body to move in smoother safer, more efficient patterns of motion, which is essential in optimal performance and overall health.

- There is no pounding or bouncing in ABS- Workout. It is the safest form of exercise. This is why it began as a rehabilitation exercise system for sports athletes and dancers. It is an intense exercise system working all muscle groups but still sustaining and improving overall balance and fitness.

STATEMENT OF THE PROBLEM

The purpose of the study is to measure the abdominal strength and flexibility of college students.

LIMITATIONS

- Heredity and environmental factors.
- Mood of the subject, living condition, lifestyle and family conditions, habits.
- Student's routine work.

DELIMITATION

- The study will be delimited to twenty (N=20) college students.
- Only male subjects are selected for the study.
- The researcher divides the 20 subjects into two equal groups that are control group and experimental group.
- The subject's age ranged from 22 to 28.

HYPOTHESIS

It was hypothesized that there may be significant difference of abdominal strength and flexibility due to ABS- Workout.

SIGNIFICANCE OF THE STUDY

- The study will be helpful for college teachers and coaches to evaluate their students.
- The finding of the study may provide a great valuable feedback to improve upon the coaching program.

METHODOLOGY

This chapter describes the methodology and procedure adopted for the selection of the subjects, selection of variables, administration of test, collection of data and statistical technique employed for the analysis of data.

SELECTION OF SUBJECTS

- For the purpose of the study twenty college students of St. Joseph's College, Moolamattom were selected as subjects.
- From the twenty students, ten (N=10) were control group and ten (N=10) were experimental group.
- The study was delimited to the subjects of the age group from 20-25 years.

SELECTION OF VARIABLE

Variables are the conditions or characteristics that the researcher manipulates or observe.

- Dependent variable: - abdominal strength and flexibility.
- Independent variable: - sit up test and sit and reach test.

EXPERIMENTAL DESIGN

The study was formulated as a dynamic group design consisting of one experimental group. For the randomly selected 20 subjects pre-test was administrated. Based on the obtained data the groups were equated in to two groups. Group one served as experimental group and group two represented the control group. Various specific ABS- Workout exercise training was assigned.

The effect of ABS- Workout exercise training was scheduled for a period of four weeks with training 5 days in a week. To the selected subjects N=10, a pre-test and post test were conducted on the criterion measure at the end of the experimental training programmed.

RELIABILITY OF DATA

The reliability of data was measured by ensuring instrument reliability and tester reliability. To ensure that the investigator was well versed with the techniques of conducting the tests, the investigator had a number of practice sessions in testing procedure, under the guidance of an expert.

ORIENTATION OF THE SUBJECTS

An orientation session was conducted for the selected subjects and they were given a detailed account of the whole study and test which they had to undergo.

ADMINISTRATION OF TEST

The nature and importance of study was explained to the subjects for their maximum participation. The researcher verbally explained the ABS- Workout exercise to the experimental group. The experimental group was given four weeks ABS- Workout exercise training.

STATISTICAL TECHNIQUE

The score are computed by dependent “t” test for finding the effect of four week ABS- Workout exercise training on abdominal strength and flexibility among students of M.P.Ed of Sree Sankaracharya University of Sanskrit, kalady.

ANALYSIS OF DATA AND RESULTS OF THE STUDY

The present study was formulated to determine the difference among experimental and control group. Table I shows the number of subjects, mean, standard deviation and ‘t’ value of abdominal strength of experimental and control group. The mean values of experimental group pre and post test were 48.9 and

60.6 and that of control group pre and post were 42.3 and 41.5. The standard deviation of experimental and control group pre and post were 9.44, 6.36 and 2.45, 2.68 respectively.

Control factors	Pre-test			Post-test			df	T
	N	Mean	sd	N	Mean	sd		
Experimental	10	48.9	9.4	10	60.6	6.4	18	6.77*
Control	10	42.3	2.5	10	41.5	2.7	18	1.2

Table I: Mean difference of the experimental and control group on abdominal strength

* Significant at 0.05 level of, the tabulated value is 2.101

The above table indicates that, there was a significant difference between the pre and post test performance on abdominal strength of experimental group, since the calculated 't' value of 6.779 is higher than tabulated 't' value of 2.101 at 0.05 level of significance with 18 degrees of freedom. In the case of control group there was no significant difference.

Control factors	Pre-test			Post-test			df	T
	N	Mean	sd	N	Mean	sd		
Experimental	10	8.9	5.9	10	11.2	6.6	18	5.44*
Control	10	5.4	5.8	10	5	5.4	18	0.8

Table II: Mean difference of the experimental and control group on flexibility

* Significant at 0.05 level of, the tabulated value is 2.101

Table II shows the number of subjects, mean, standard deviation

and 't' value of flexibility of experimental and control group. The mean values of experimental group pre and post test were 8.9 and 11.2 and that of control group pre and post were 5.4 and 5. The standard deviation of experimental and control group pre and post were 5.91, 6.28 and 5.78, 5.39 respectively. The above table indicates that, there was a significant difference between the pre and post test performance on flexibility of experimental group, since the calculated 't' value of 5.438 is higher than tabulated 't' value of 2.101 at 0.05 level of significance with 18 degrees of freedom. In the case of control group there was no significant difference.

DISCUSSION ON FINDINGS

Four weeks of ABS- Workout exercise had improved the abdominal strength and flexibility of college students of St. Joseph's college, Moolamattom. ABS- Workout for improvement of muscle endurance, flexibility, balance and posture. The result shows that there was a significant difference found among the two variables of Experimental group.

DISCUSSION ON HYPOTHESIS

The hypothesis stated in the first chapter that there will be a significant difference of ABS- Workout on abdominal strength and flexibility. The statistical analysis proved that there is a significant difference in abdominal strength and flexibility in college students.

SUMMARY

This study was undertaken to analyze the effect of ABS- Workout on selected variables among the College students. It had the purpose of comparing and analyzing the data collected from each variable during pre-test and post-test. For the purpose of the study, twenty boys of 22 to 28 years old were selected as the subjects for the investigation. These students were started ABS-Workout in Department of College, St. Joseph's college, Moolamattom. The pre-test was administered after four weeks of training. The selected variables for the study were abdomen strength and flexibility. The test administered to assess the abdomen strength and flexibility were one minute sit-ups and sit and reach test respectively. A pre-test and post-test score of the experimental group and

controlled group were analyzed by employing the T-test. To find out the significance of difference between pre-test and post-test scores of the experimental group and the controlled group, the t-ratio was employed.

CONCLUSIONS

Within the limits and limitations of the present study and on the basis of the result, the following conclusions may be drawn.

- Four weeks of ABS-Workout programme improved the abdominal strength of college students of Sree Sankaracharya university of Sanskrit, Kalady.
- Four weeks of ABS-Workout programme improved the flexibility of college students of Sree Sankaracharya university of Sanskrit, Kalady.

REFERENCE

1. Dalemood Frank F. Musker and David A. Armbruster, Sports and Recreational Activities for Men and Women, (Saint Louis: The C.V. Mosby Company), 1983, P. 332.
2. Devinder K. Kansal, Text book of applied measurement evaluation and sports selection, Sports and spiritual science publication, 2008, page no: 303-304.
3. Harrison Clarke as cited by Robert V., Physical Fitness: The Pathway to Healthful Living, (Saint Louis: C. V. Mosby Company), 1985, P. 8.

AQUINAS JOURNAL OF MULTIDISCIPLINARY RESEARCH

AQUINAS JOURNAL OF MULTIDISCIPLINARY RESEARCH is an annual multidisciplinary reference journal with a wide spectrum of contemporary contributions in the various genres of science, management, humanities and social sciences aimed for fertile interaction, interpretation and sharing of knowledge.

SUBSCRIPTION RATES

Individual Annual (one issue) Rs. 150/-

Institution Annual (one issue) Rs. 300/-

Payment must be made through demand draft in favour of Principal, Aquinas College, Edacochin, Kochi-10, payable at State Bank of Travancore, Thoppumpady, Cochin, Kerala.

CALL FOR PAPERS

Next Issue	: Volume 4, April 2018
Last Date for submission of Research papers	: January 30, 2018
Address for Communication	: Chief Editor Aquinas Journal of Multidisciplinary Research Aquinas College, Edacochin, Kochi, Kerala- 682010 Mob: 9847430489 Email: aquinasjournal@gmail.com

Guidelines for submission of research paper

1. Electronic submission of the manuscript as MS word file attached to an e-mail message sent to aquinasjournal@gmail.com along with a hard copy in desired format for submission of papers.
2. Manuscript should have a size of 4-7 pages (A4 sized); Title 16 point Times New Roman, main text 12 point Times New Roman, 1.5 spacing. Papers from humanity category should follow the MLA style of documentation.
3. Centered title should be brief, followed by centered name, affiliation and address of author(s). Indicate to whom correspondence should be sent, including e-mail address.
4. Manuscript should be in the order- less than 200word abstract, brief introduction followed by the main text documentation and 200-250 word conclusions summarizing the findings of the paper.
5. Illustrations
 - a. Computer generated graphics should be in jpeg format, in 300 dpi resolution.
 - b. Graphs should not be larger than 20x25 cm. Measurements should be indicated in SI units. Grids should not be shown in the graph.
 - c. Photographs should be supplied as glossy prints, of the same size as they are to appear in the journal.
 - d. Illustrations should be referred to as Fig.1, Fig.2 etc followed by a caption at the bottom of the figure.
6. Journal and book references should be identified in the text using the Vancouver system (numbered throughout the text and numbered list at the end of the article).

Reference should be listed by number at the end of the manuscript as reference number, Author(s), *title of the article*, Journal name, year of publication, volume; page.

Eg. 1. Name A.A., Name B.B., *Effect of Carbon Black on Devulcanized Ground Rubber Tire Vulcanizates*, Journal of Elastomers and Plastics, USA, 2013, 56(2); 275-283.

Text references as reference number, Author(s), *name of the chapter*, Name of the book and publisher, year of publication, page.

7. Figures, tables and equations should be inside the text near/after where they are referred in the text. Tables should be numbered consecutively with a heading. Use Arabic numerals. Column headings should be explanatory and carry units.
8. Papers prepared on the basis of questionnaire survey must include the questionnaire also along with the manuscript.
9. Contributors' assurance in the prescribed format that the paper is original in nature and has not been published/accepted for publication elsewhere is needed.
10. The copyrights of the contributions published in the journal lie with the publishers of the journal.
11. The author alone will be liable in respect of any dispute involving violation of the copyright in respect of the material given by him or her for publication in the journal.
12. The editor reserves the right to make required editing of the manuscript.
13. The journal is published annually in April.
14. The decision regarding the acceptance or otherwise of any contribution will normally be intimated within two months. We do not take the responsibility to return unaccepted manuscript.

ISSN 2395-7751



9 772395 775009