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# शाारीरिक् शिक्षिा एवं स्विकारिस्थि

(Physical Education and Health)

डॉ. अरविन्द मलिक • प्रो. मोनिका वर्मा • डॉ. सुरेश मलिक



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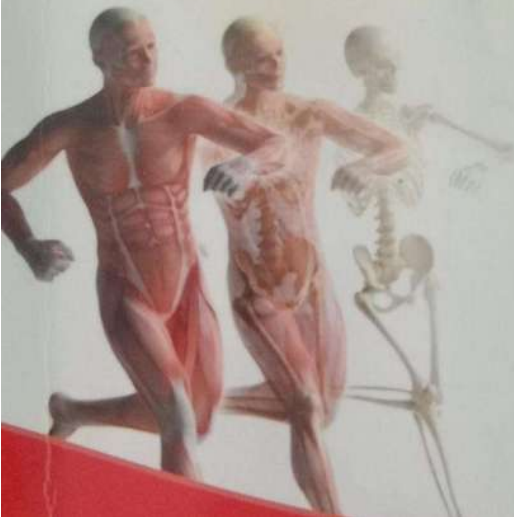


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## Sino-US Trade War: A New Challenge to Globalisation



Surender Mor

The book *Sino-US Trade War: A New Challenge to Globalisation* is a collection of manuscripts deliberated upon in the International Symposium on "Sino-US Trade War: A Potential Threat to World Peace and Prosperity" organized by Faculty of Social Sciences, BhagatPhool Singh Mahila Vishwavidyalaya, Sonapat, India on August 06, 2018. The book is an attempt to highlight some of issues arising out of the ongoing Sino-US trade war which are of immense practical significance. The book tries to analyse the efficacy of WTO in managing the present scenario besides analysing the spirit of free trade. Apart from analyzing the possibility of third world war, currency war, global depression etc., the book explores the process of Globalization and its end in due to this trade spate. Finally, the book recapitulates the impact of this trade war on world development in addition to its impact on India. The book will contribute to existing knowledge and help scholars, researchers, policy makers, administrators and academicians in predicting the incidence of this trade war besides suggesting strategies/ policies/ courses of action not only for resolving the trade conflict but to minimize its impact on global economy. The book will establish the new thoughts and wisdom and try to provide a better understanding of the ongoing trade war between US and China to various classes of readers.

# Revisiting Bhimrao Ambedkar

A Study of Social and Political Justice



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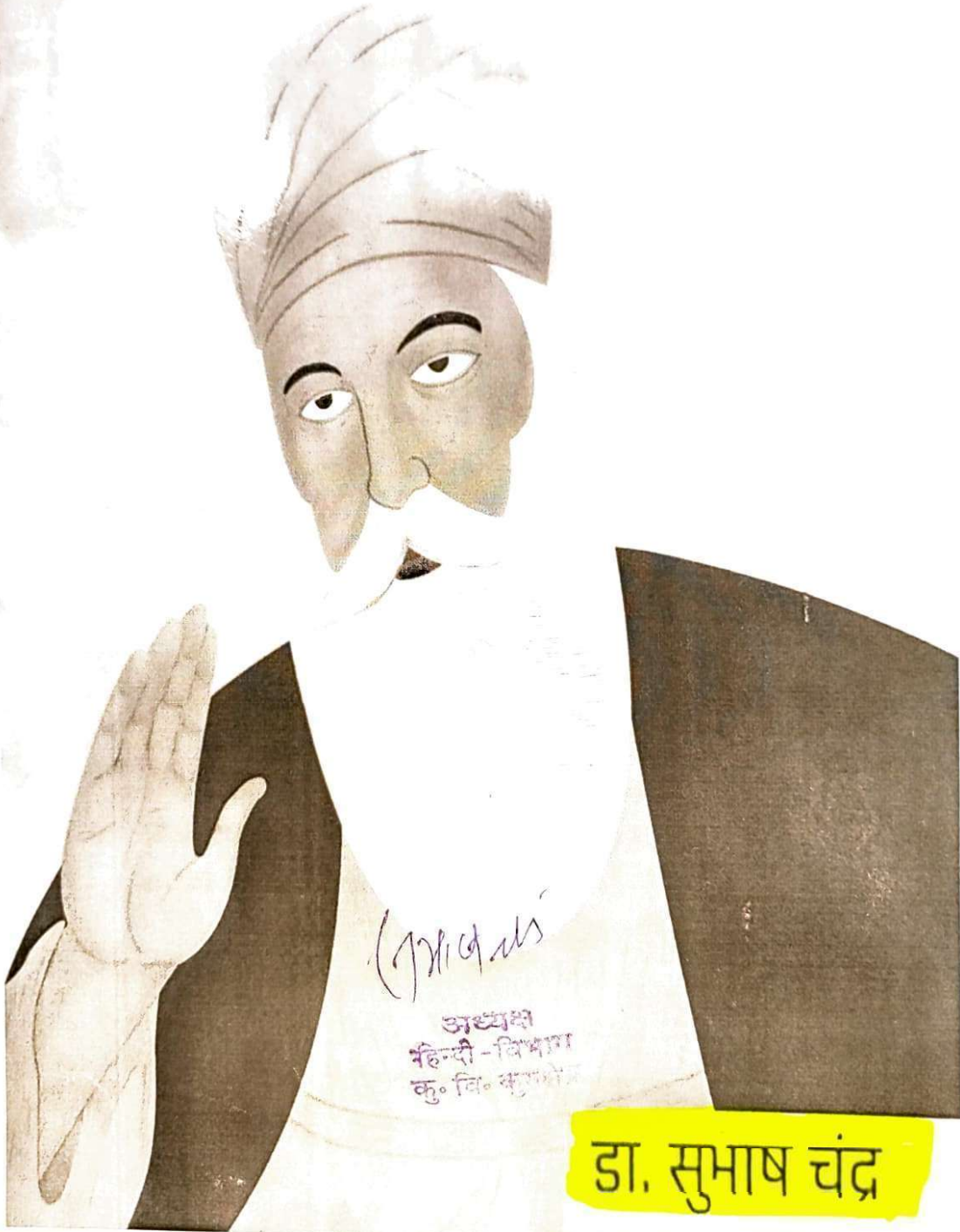
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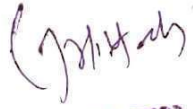


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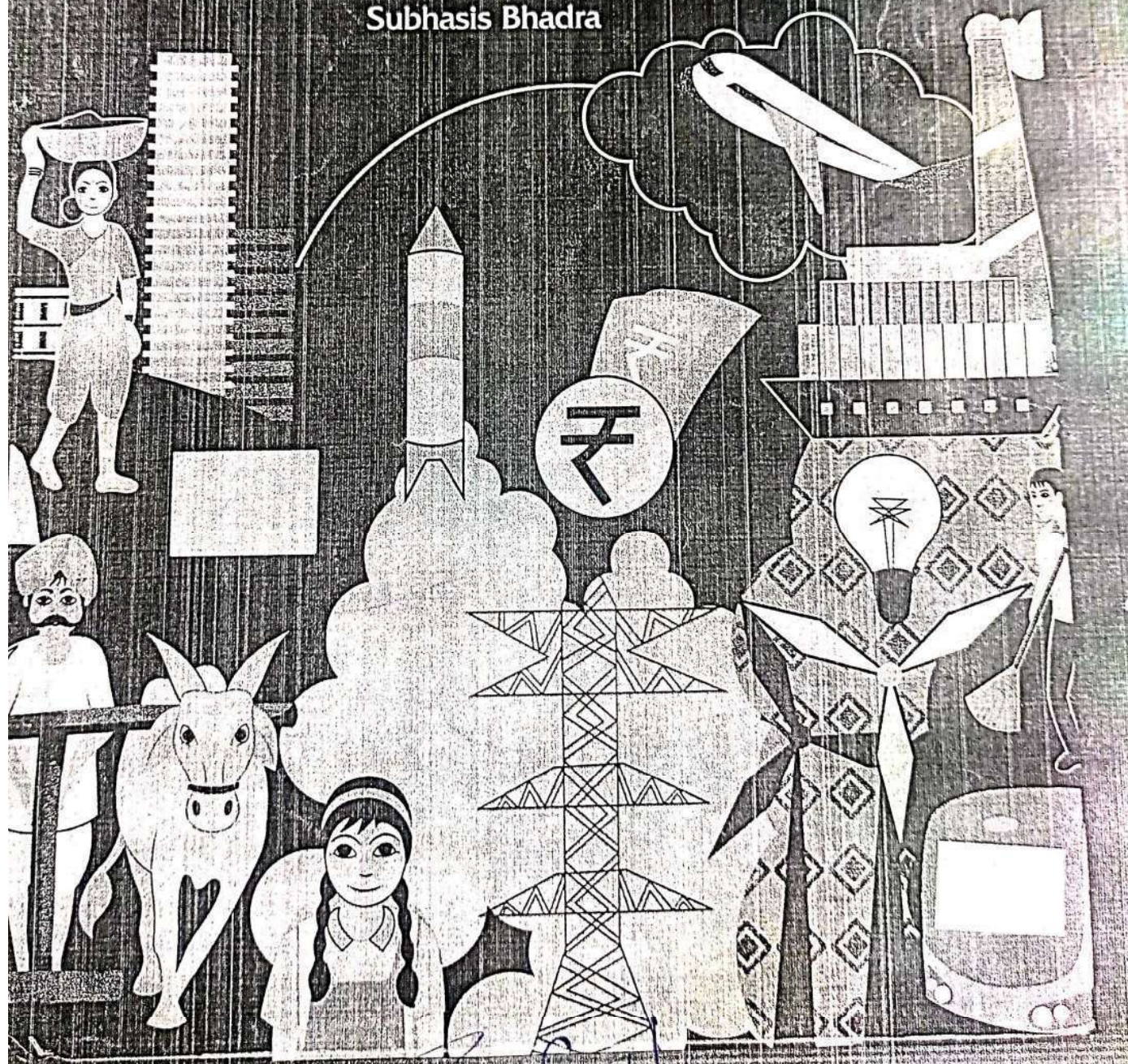


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# SOCIAL POLICIES IN INDIA CONTEMPORARY PERSPECTIVES

Nagendra Ambedkar Sole  
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# SOCIAL POLICIES IN INDIA

## CONTEMPORARY PERSPECTIVES

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# SOCIAL WORK

# PRACTICE

Expanding Scope and Challenges



Editors  
C.P. Singh  
Vanita Dhingra

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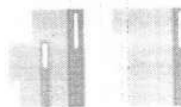
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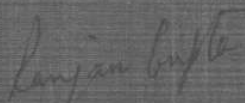
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Mirza Hasanuzzaman · Kamrun Nahar  
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# Wheat Production in Changing Environments

Responses, Adaptation and Tolerance

  
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# Wheat Responses and Tolerance to Terminal Heat Stress: A Review

Davinder Sharma, Rajender Singh, Ratan Tiwari, Rakesh Kumar, and Vijay Kumar Gupta

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**Abstract** Supraoptimal temperatures and unpredictable fluctuations in global climate adversely affect plant growth and development resulting in a severe threat to wheat production. Although all the growth stages of wheat are sensitive to supraoptimal temperatures, the reproductive phase is the most sensitive one as it affects both grain setting and grain filling (GF). High temperature can alter biochemical, physiological, and morpho-anatomical behavior in wheat, which in turn affects its growth and development causing a reduction in pollen viability, duration of GF, and starch synthesis in the endosperm. At flowering, temperature above optimum results in seed sterility, while post-anthesis heat stress (HS) causes a reduction in starch biosynthesis and alters its composition. Wheat crop has evolved appropriate mechanisms such as escape, avoidance, and/or stay green to cope with HS. In addition, plants hasten the production of HS-related proteins such as heat shock proteins (HSPs) as their defense approach. An overview of wheat responses and tolerance to HS at biochemical, physiological, and morpho-anatomical behavior may help in formulating appropriate breeding strategies for wheat crop improvement.

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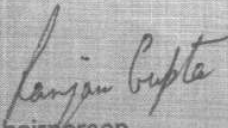
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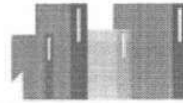
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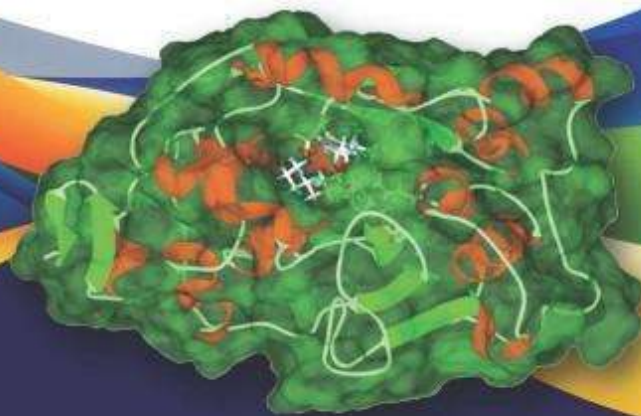
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*Chapter*

## **SERS FOR SURVEILLANCE OF FOOD, WATER AND ENVIRONMENT SAFETY**

***Anita Yadav<sup>1</sup>, PhD, Vinay Bhardwaj<sup>2</sup>, PhD,  
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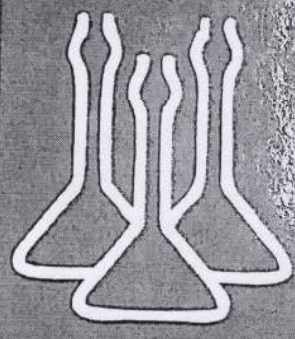
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### **ABSTRACT**

To protect our health, it is important to continuously monitor the quality and safety of our food, water, and environment. Classical analytical technologies are not suitable for screening and surveillance of toxins as they are costly, time consuming and not portable for in-field and in-situ applications. SERS meets these short-comings and can be an excellent surveillance technology. This chapter discusses applications of SERS to monitor some important classes of toxins that need to be regulated in food,

# Emerging Trends and Challenges in Biosciences



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## Chapter 3

# *In vitro* Study and Micropropagation of a Thalloid Liverwort: *Reboulia Hemisphaerica* (L.) Raddi.

Vishal Awasthi, Neerja Pande and Virendra Nath

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### Abstract

*Reboulia hemisphaerica* (L.) Raddi, the only species of genus *Reboulia* belonging to the family Aytoniaceae of the order Marchantiales is one of the potential liverworts that have medicinal importance. Well differentiated thalli of *R. hemisphaerica* have been raised and multiplied *in vitro* in order to facilitate the availability of the living material in pure population for other experimental studies and maintenance of its germplasm as a mean of *ex-situ* conservation. The *ex plants* (spores), inoculated into half strength Knop's macronutrients and Nitsch trace elements along with 10 ppm freshly prepared ferric citrate produced dichotomously branched thalli, while the same when supplemented with 1% sucrose, produced a cluster of many well developed thalli within 12 weeks of culture. Multiplication of thalli was readily achieved by transferring of the apical portion of cultured thalli or innovations produced from cultured plants on fresh basal medium with above constituents. An enhanced growth has been observed in continuous light of 4000-5500 lux at a temperature of  $21 \pm 2^\circ\text{C}$ . MS medium responded improper growth led to the formation of twisted and deformed thalli, while Gamborg B-5 medium produced callus like pulpy mass of undifferentiated tissue. Thalli developed in culture were acclimatized and transferred to soil for their further propagation where sexual phase induced at low temperature ( $16-18^\circ\text{C}$ ) simultaneously with alternate light (1600-2000 lux) and dark condition of 10 hours and 14 hours respectively.

**Keywords:** Acclimatization, germplasm, *Reboulia hemisphaerica*, propagation, spores

# Chapter 14

## Tissue culture studies of *Tinospora cordifolia* using different explants

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### Abstract

*Tinospora cordifolia* is a large deciduous climbing shrub found throughout India, especially in tropical part of India and also in certain parts of China. The plant is mainly known for its medicinal properties. The present investigation was carried out to standardize an *in vitro* regeneration protocol for *Tinospora*. Different explants such as leaves, nodes and inter-nodes were used for *in vitro* studies. For *in vitro* regeneration, explants were cultured on Murashige and Skoog medium supplemented with different concentrations and combinations of cytokinins and auxins for shoots and roots proliferation. Hormonal concentration of media and explants types play important role for *in vitro* regeneration process. Concentration and combinations of hormones which favour callus induction are different from those which induce organogenesis. The callusing was exhibited by all the three explants but leaf and nodal explants were somewhat better than their inter-nodal counterpart. The direct shoot formation capability of nodal explants was excellent while leaf and inter-nodal explants give inferior results. Hence nodal explants were found to be more potent and used further for direct *in vitro* regeneration. Different concentration and combinations of hormones for *in vitro* regeneration studies was worked out for nodal explants. BAP at lower concentration displays callus formation but at higher concentration induce direct shoots while Kinetin at lower concentration promotes formation of shoot buds and at higher concentration stimulates shoots elongation. BAP in combination with Kinetin endorses direct multiple shoots and BAP along with NAA encourages callus production and proliferation. Among different concentration of IAA, IBA and NAA, the highest degree of root induction for nodal explants was found on the MS media containing 1mg/l concentration of IAA. It shows 90% of roots development within 25-28 days.

**Keywords:** *Tinospora cordifolia*, Growth regulators, MS Media, BAP, IAA, Callus.

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# नीलाम्बरा

(सकलित काव्य संग्रह)

भाग-४

संपादक

पवन जैन

प्रायोजक : 'आगमन'

सकमति पब्लिशर्स एण्ड डिस्ट्रीब्यूटर्स

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# विश्व में हिन्दी का विकास



डॉ. महासिंह पूनिया

इस पुस्तक के सर्वाधिकार सुरक्षित हैं। लेखक प्रकाशक की लिखित अनुमति के बिना इसके किसी भी अंश को, फोटोकॉपी एवं रिकॉर्डिंग सहित इलेक्ट्रॉनिक अथवा मशीनी, किसी भी माध्यम से अथवा ज्ञान के संग्रहण एवं पुनर्प्रयोग की प्रणाली द्वारा, किसी भी रूप में पुनरुत्पादित अथवा संचारित-प्रसारित नहीं किया जा सकता।

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# HUMANE TEACHERS ATTRIBUTES AND TRENDS

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## MULTIDIMENSIONALITY OF TEACHER: ALIGNING SOCIO-EMOTIONAL ATTRIBUTES WITH DOMAIN KNOWLEDGE

*Taruna. C. Dhall*

### INTRODUCTION

Time and again we find ourselves focusing our attention on the central role of the teacher at all levels of education as well as impressive expansion of educational facilities in terms of increased access. While doing so we are also confronted with societal concerns regarding the mismatch between the laid down objectives of education and its outcome in the world around us. System of education doesn't operate in a vacuum but is naturally embedded in the socio-cultural milieu and is incrementally influenced by it in terms of shaping the goals and delivery process. We are fortunate to have had rich educational heritage of ancient India and Vedic system. Progressive and consistent efforts have been made to design and shape the educational system in manners that aligns with the aspirations of the society. Interventions like different Education commissions, National Policy of education (NPEs), setting up of institutions (NCERT, SCERTs) and regulatory bodies (UGC, NCTE, AICTE etc) are some of the examples in this direction. Statistical evidence indicates an upward trend in terms of increased access to education at all levels. Research evidence indicates towards advancements in our understanding about what works best to realize the aims of education. In spite of all these proactive considerations, why is it that we find our educational system loathed with challenges to align with the aspirations of the society. Is the increased access in proportion with the increase in the number of seekers? Is the curriculum in line with the diverse as well as changing aspiration of the seekers? What about the efficacy of the teacher, considered to be the key player in realizing the goals of education? Is the perceived role of the teacher synchronized with the understanding about the process of teaching? These are some of the questions that need to be addressed in a perspective that lead us to creating learning environments geared towards *Humane World* in line with the Sustainable Development Goals.

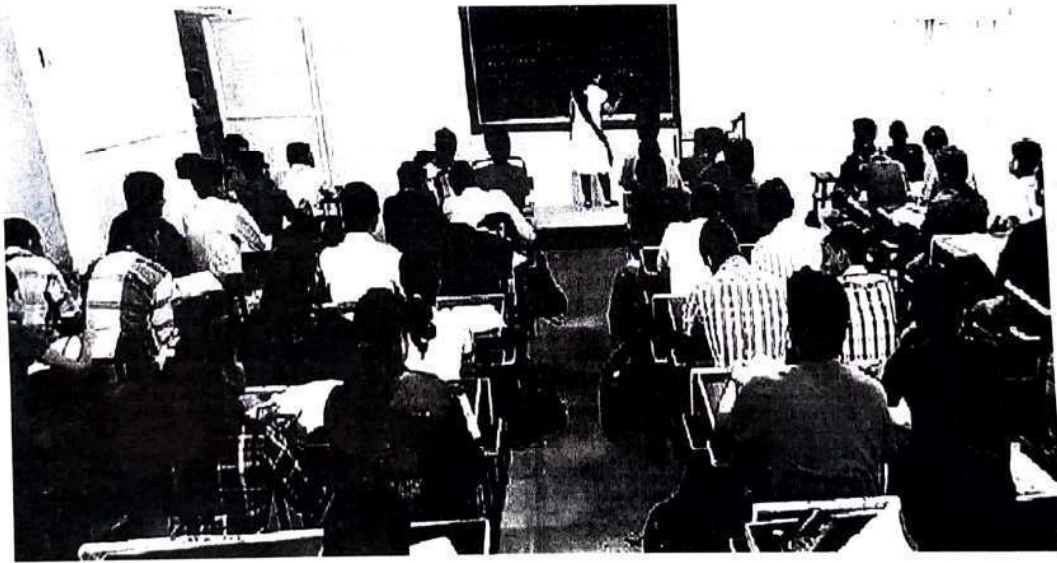
### EDUCATIONAL OPPORTUNITIES

Every nation strives to move towards achieving national goals through education. An established understanding towards this end is that education is the most important tool for social, economic and political development. Rooted in the rich legacy of ancient and Vedic system of education, a consistent endeavor at the national level has been to provide wings to fly in the form of educational opportunities and learning spaces. Educational opportunities are planned around those goals in a manner that members of the society are adequately equipped with necessary skills to meet their individual needs as well as contribute collectively towards national goals. It is assumed that



# TEACHER PERFORMANCE ASSESSMENT IN EDUCATION

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## PERFORMANCE ASSESSMENT FOR QUALITY EDUCATION: A CASE STUDY OF EXISTING PRACTICES

*Taruna. C. Dhall*

### BACKGROUND

For a parent the most basic understanding about an education system is the belief that it provides an environment to shape the child as a contributing member of the society. A repertoire of critical thinking, problem solving, communication skills are considered to be the potential 'ability resource' of an individual to get involved and contribute effectively for the onward march of any society. India as a nation has been consistently working towards articulating national goals and formulating educational policies for its citizen to access available resources as well as opportunities that are specifically aimed at nurturing abilities to realize these goals. Since independence, policy makers have designed strategies and recommend framework reflecting national goals as well as expectations of the members of the society. Over a period of time these policies have gone through the rigour of evaluating feedback commensurate with the changing needs of a diverse and pragmatic society. Successive educational policy documents have considered the expected 'outcome gaps' and recommended steps to bridge the same. Draft NEP 2016 is a latest effort in this direction. An almost consensual outcome of all these policy documents is that Teacher, as a practitioner in the school, is centrally placed to 'kick start' the process of realizing the goals of education. The success of entire spectrum of school activities or processes is organically depended upon the skilled competency of the teachers. Based on the policy framework and accepted aims, a teacher designs goal oriented curriculum, applies appropriate transactional strategies and evaluates learning outcomes. Knowledge, skills, creativity, attitudes, motivation, value orientation are some of the critical characteristics that influence the working performance of the teachers in this direction.

### PERFORMANCE ASSESSMENT AND EXCELLENCE IN EDUCATION

Available literature indicates that various experts have attempted to describe the associated terms in the context of teaching and learning. Accordingly, the term *assessment* refers to the wide variety of methods or tools that educators use to evaluate, measure, and document the



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## Challenges during Adolescence

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Adolescence is a period full of challenges. During this period child is neither very young nor too old to cope up the changes of life. They usually live in fantasy. They have to undergo with numerous rapid physical changes, make them self-conscious. As a result, they develop unhealthy eating habits. Emotional instability may lead to risky or illegal behavior. Violent behavior, using drugs, acute health problems, poor performance in studies, excessive use of cyberspace, adolescent pregnancy are some of the common challenges of this period. Awareness is the only way to prevent them from indulging in antisocial activities. The best way to help the teenagers to get through this stage is to make them aware of the changes well in advance. It would be better to explain that during this stage every teenager has to go through it as the normal bodily changes and make them comfortable to accept them. Listen to them without judging and avoid giving advice when they are not ready for it. Involvement in some creative activity may help them channelize their emotions.

**Keywords:** Adolescence, Emotional instability, creativity, health problems.

Adolescence is a transitional stage of physical and psychological development that generally occurs during the period from puberty to legal adulthood. Adolescence is usually associated with the teenage years accompanied by an increasing independence allowed by the parents or legal guardians, including less supervision as compared to preadolescence [1].

Adolescence is the age of drastic change. They are emotionally and physically vulnerable. They tend to feel very emotional just about anything and everything can make them happy, excited, mad or angry. Mood swings are very common. However, adolescent girls are vulnerable to crying. Feelings of inferiority or superiority may arise at this time. They become demotivated due to poor performance in academics and low IQ and very often develop the 'I'm not good enough' attitude towards life. Adolescence often strives for their independence result in as argumentative stubbornness. As a part of new-found independence, adolescents may also want to try new things and take risks, resulting in careless behavior. This is also one of the common teenage behavioral issues.

It is a vulnerable time when kids can develop unhealthy habits that grow into problems in their adult life. Unhealthy eating habits check them from getting the nutrition they need. Teenagers have a hectic schedule as they hop from one activity to another with little time to eat or rest properly. Consciousness about their body image can also lead to eating disorders especially in girls. Adolescent girls who worry about their weight and appearance can develop disorders like anorexia and bulimia. Without proper nutrition and healthcare, they are susceptible to illnesses. According to a WHO(2015) report 11 million adolescents died in 2015, a majority of who had preventable diseases [2].

In order to tackle the problems of adolescence period in an effective manner, it becomes very essential for everyone to be aware of the characteristics of adolescence. Various biological changes can be seen on the onset of the puberty. They have to undergo with numerous rapid physical changes make them conscious about their bodily image may further lead to emotional instability. It is a period of unrealism, day dreaming, search for identity and hero worship. Biological changes make them feel a strong attraction towards the Opposite Sex. For an adolescent, the peer group grows more in importance even than parents. Their dress, hairstyle, likings, dislikings and hobbies are more influenced by their peers.

Behavior issues of adolescence, which are quite common, also crop up during this time, making it impossible for parents to reach out to their teenagers. The only way to deal with needs and problems of this age is to know about them and be ready to face them. Here is the list of the most common problems, and their solutions that adolescents have to deal with.

The most common problems among adolescents relate to growth and development, school, childhood illness, and how to continue into adolescence, mental health disorders, and the consequences of risky or illegal behaviors including injury.

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## Dyslipidemia in Hypertension

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Dyslipidemia and hypertension are two of the most prevalent and asymptomatic risk factors for cardiovascular disease. Indeed, comorbid hypertension and dyslipidemia increase the risk for cardiovascular disease multiplicatively. Interrelated Dyslipidemia causes endothelial dysfunction which may lead to hypertension. Hypertension is a condition in which systolic blood pressure (SBP) > 140 mm Hg and/ or diastolic blood pressure (DBP) > 90 mm Hg. Excess sodium intake, alcohol intake, lack of physical activity, psycho-social factors, socio-economic status are the modifiable risk factors whereas age, gender, heredity, race are the non-modifiable risk factors for hypertension. Dyslipidemia is a condition in which total cholesterol is > 240 mg/dl and/or low density lipoprotein cholesterol is > 160 mg/dl and/or triglycerides is > 150 mg/dl and/or high density lipoprotein cholesterol is < 40 mg/dl. Risk factors for dyslipidemia include obesity, increased intake of saturated fatty acid and trans fatty acid, smoking, lack of physical exercise. In order to reduce the load of cardiovascular diseases, it is important to regulate hypertension as well as dyslipidemia. Therefore, following the established nutritional recommendations for dyslipidemia and hypertension along with regular physical activity, reduced alcohol consumption and quitting smoking can reduce the risk of mortality and morbidity due to cardiovascular disease.

**Key words:** Dyslipidemia, Hypertension, Lifestyle Modification

### **Introduction**

The epidemic of cardiovascular diseases (CVDs) is the most prevalent cause of death and disability in both developed as well as developing countries. Two of the most prevalent and asymptomatic risk factors for cardiovascular disease i.e. hypertension and dyslipidemia, commonly coexist, and the risk of CVD associated with having both symptoms is greater than the risk associated only either with having hypertension or dyslipidemia. Hypertension or elevated blood pressure is an important public health problem that affects more than one billion people worldwide. It is also an important risk factor for chronic disease burden in our country. A recent regional case study in India, reported that nearly 118 million people had hypertension in the year 2000, and this is projected to increase to 214 million by the year 2025. Joint National Committee on Prevention, Detection, Evaluation and Treatment of High Blood Pressure (JNC7) defines hypertension as a condition in which systolic blood pressure (SBP) exceeds 140 mm Hg and/ or diastolic blood pressure (DBP) exceeds 90 mm Hg.

**Risk Factors Causing Hypertension:** Hypertension is a consequence of genetic factors, environmental factors and lifestyle factors. Interaction among these factors. Risk factors for hypertension may be classified as: Modifiable (Body weight, Physical activity, Sodium intake, Alcohol intake, Psycho-social factors and Socio-Economic Factors) and Non-Modifiable (Age, Gender, Heredity, Ethnicity/Race).

**Types of Hypertension:** Hypertension is classified into two categories i.e. Primary (Essential) and Secondary.

While 90-95 per cent of patients having high blood pressure (BP) have no clear causes and are classified as primary hypertension, 5-10 per cent people may have an underlying pathology or a reversible cause behind their high blood pressure (secondary hypertension). Primary hypertension is usually linked to genetics, poor diet, lack of exercise and obesity. Secondary hypertension, on the other hand, can be caused by a number of uncommon causes or kidney and endocrine disorders.

**Symptoms of Hypertension:** Many persons with hypertension have no symptoms but some of the common symptoms of hypertension present in patients with extreme high blood pressure are headache, fatigue, confusion, shortness of breath, dizziness, difficulty in concentrating and chest pain.

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## Perils of Junk Food Consumption and Its Impact on Adolescent's Health

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Being healthful, lively and unimpaired are one of the most elemental and essential requirements for the good quality of life. But in today's urbanization, modernization and industrialization era, this thought has been rapidly growing faint. Due to the life style changes incorporated which has severely impacted on the health system of human body. In the present modernized era, consumption of western foods has become one of the biggest trends especially among Indian adolescents. Consuming these western foods which are popularly considered as Junk foods has deep impact on the metabolic system of adolescents especially adolescents. These Junk foods are rich in empty calories, saturated, trans fats and different demineralised nutrients. Its excess consumption by adolescents has created biggest global health problem and a huge burden of metabolic disorders like obesity, cardio vascular disease, hypertension, cancer, diabetes, etc. These problems are the biggest global health and challenges faced by our country. For overcoming this major global health issue, good quality of nutrition counseling and education should be provided to the adolescents emphasizing and promoting the benefits of balanced, fresh and additional diet so as to eradicate the problem of consumption of refined and processed junk food among adolescents.

**Keywords :** Adolescents, Junk food hazards, trans fats, saturated fats, , metabolic problems

### Introduction

"Being healthy and living healthy" is one of the essential and fundamental necessities for living a good quality of healthy life. However the trend of eating junk food in past years is rapidly increasing especially among Indians which is making our life gloomy and dark due to the burden of different metabolic disorders or diseases on the future generations especially adolescents. Adolescence is a significant period of physical, social, and emotional development. It is the only period of life where rate of physical growth actually increases. This sudden growth spurt occurring in the age between 10-15 years is associated with not only hormonal, cognitive and emotional changes but also undergoes rapid nutritional changes that make the adolescence phase most vulnerable period of life. During this phase, due to high growth requirement there is a greater demand for good quality of nutrients like calories, protein, carbohydrates along with vitamins and minerals (G and Mishra S, (2013)). But due to the strong influence of social environments (peer networks, schools/colleges, parents, media) adolescents have more inclination towards the habits of consuming excessive junk foods. These foods are considered to be junk as they contain a poor nutritional value and lack the essential nutrients that our body requires to be healthy. The term 'junk food' was coined as a slang in the public interest in 1972 by Michael Jacobson, Director of the Center for Science, Washington D.C [Ashakiran and Deepthi, (2012)]. These junk food mostly contain unhealthy fats, sugars and if eaten regularly and daily have a worse impact on the health of human body. Fast food culture, an emerging type of food which is prepared, served and delivered within a few minutes and junk food is considered as a fast

Adolescents going to different schools and colleges opt to have attractive looking delicious processed foods as compared to natural foods due to better option of convenience, easiness, accessibility, taste, cost and quick service. Though they know the negative effects of food on themselves but prefer to have these junk food.

### of Addiction-

Human brain has a system called as reward system was designed to "reward" humans when they do things that encourage survival. This includes primal behaviors like eating. The brain knows that when they eat or doing something right, it releases a bunch of feel-good chemicals in the reward system such as the neurotransmitter dopamine - interpreted by the brain as pleasure. The brain is hardwired to seek out behaviors that release dopamine in the reward system. The problem



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## Eating Disorders among Adolescents

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Eating disorders have a devastating effect on a large number of adolescents, which alter cognitive function, judgement, emotional stability and restrict the life activities effected with eating disorders. Adolescents are characterized by peak growth and physical maturation. In this time bloom there is severe disturbance in eating patterns. India is reported to be in a phase of change in its dietary pattern fuelled by economic changes, rapid urbanization, increased women's participation in workforce, the effect of globalization, and targeted advertisements. These phenomenon are often accompanied by shift from traditional balanced to carbohydrate-rich western diet. Adolescents also have a body image problem that is inability to acknowledge their change in body weight imposed by the media and socio-cultural value. Along with biological, family factors, physiological factor and interpersonal factor are also responsible for the development of eating disorder. The present narrative review aims to summarise researches related to eating disorders.

**Keywords-** Eating Disorders, Adolescents, Anorexia Nervosa, Bulimia Nervosa, Binge Eating Disorder, Media

### **Introduction**

In India, adolescents (from 10 to 19 years) accounted for 22.8 percent of the population (Working group report on adolescents-of Planning Commission, 2013) and they face a series of serious nutritional challenges that are affecting not only their growth and development but also their livelihood as adults. On the other hand, presently Indians are experiencing nutritional and lifestyle transition due to globalisation. Currently, there is a higher occurrence of biopsychosocial diseases, especially eating disorders. According to American Psychiatry Association (2013) an eating disorder is a mental disorder defined by abnormal eating habits that negatively affect a person's physical or mental health. The earliest description of an eating disorder (ED)-like syndrome appears in a treatise by Morton (1694), under the section "Nervous consumption," where the author talks about two adolescents who presented with loss of appetite, extreme fasting, weight loss and their treatment and outcome (Pearce 2004). Historical reports point to the existence of ED even in the 17<sup>th</sup> century, referred to as "holy anorexia." However, one of the first scientific reports of this condition, in the late 19<sup>th</sup> century, was by William Gull who is credited with coining the term anorexia nervosa (AN) (Gull, 1997). In India, the occurrence of ED was first reported until the late 20<sup>th</sup> century (Jha and Awadhia 1967), perhaps, media-related glorification of "size zero" body image and culturally sanctioned drive for thinness, body shaming, and dissatisfaction have contributed to the recent upsurge in ED cases. (Lal et al 2015, Padhy et al., 2014, Mannat et al., 2016). Yet another reason for the recent increase in the prevalence of ED such as bulimia nervosa (BN) and binge eating disorder (BED) is easier access to media outlets promoting unhealthy body types. (Chugh and Puri 2001, Mishra and Mukhopadhyay, 2011). Binge eating disorder had the highest prevalence of ED, followed by BN and AN, among young females across China, Japan, Africa, and Latin America (Lal et al 2016). Conversely, in the Indian setting, no known cases of binge eating disorder been reported and only five cases of BN have been reported of BN (Mandal et al., 2013, Deb et al., 2014, Makhil and Majumder, 2014).

### **Types of eating disorder**

Eating disorders are usually classified into three major types: 1) Anorexia nervosa 2) Bulimia nervosa 3) Binge eating disorder.

**Anorexia Nervosa:** Oxford Dictionary of English defines Anorexia as "An emotional disorder characterized by an obsessive desire to lose weight by refusing to eat, and a distorted image of the body". Most of the people with anorexia nervosa see themselves as overweight, even when they are clearly underweight. They typically weigh themselves repeatedly, avoid food carefully and eat very small quantities of only certain foods. Some people with anorexia nervosa also may

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## Impact of social media on food choices of the Adolescent

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Social media is ubiquitous in the lives of adolescents. Adolescent being critical period for identity formation and relationship with peer group very vulnerable to adapt faulty food habits because adolescence is very In such situation it is very easy for food marketing company to sell their product of befooling them by using different tempting tricks to attract adolescent such as discounted coupons, endorsed by celebrities, sports person and famous personalities Media also project a perfect body image in the mind of adolescent. Adolescent is a very stressful and transition stage from dependency to independency so they have low self esteem and are very prone to develop eating disorder. This paper reviews the role of the media in development of faulty eating habits along with how media content might be attended and positively incorporated.

**Keywords:** Internet, social media, adolescent, marketing, eating disorders

### **Introduction**

Food is no longer seen just as essential for the body; it has become a currency that can be used to buy attention online for improving one's social status. In our highly connected virtual day and age, food has found its way to social media, or rather, social media has found food. It's nearly impossible to scroll through any social media feed without seeing pictures of food, recipes, food-related videos, or simply posts from friends and family discussing what they are having or will eat. Social media is usually defined as Internet-based service that permits users to construct personal profiles, generate and access searchable online content (e.g., images, videos), form online connections with other users, and view these social connections (CDC, 2011). The number of internet users in India has registered an annual growth of 18 percent and was estimated at 566 million as of December 2018 (ICUBE 2018). Since the launch of MySpace in 2003 and its becoming one of the world's most visited social networking sites, a plethora of sites like Facebook, YouTube, Instagram, Twitter and Snapchat have emerged. Social media platforms are no longer just a place to connect with friends, but are increasingly a medium for users to consume the content and learn about new things, including food. Today's adolescents grow up in a world flooded with mass media (television, films, videos, billboards, magazines, movies, newspapers and the Internet) content. Adolescent period is marked by changes in body composition, dietary habits, psychological issues, and is a critical time for identity formation and a very sensitive period for social ties and relationships, which puts youngsters at an increased risk of adapting unhealthy lifestyles (Alberga et al., 2012, VukPisk et al. 2012). In case of Double Income Single Kid (DISK) nuclear families, affordability for ready-to-eat foods has gone up, resulting in a shift of dietary behaviour. Fierce marketing techniques by food manufacturers, coupled with enticing messages of mass media have culminated in increased sales of junk food. Adolescents in today's world increasingly rely on the internet to obtain information about food, in order to compare various purchasing alternatives and maximize their knowledge before making important decisions about food purchases. Kent et al., 2019 estimated that adolescents saw food marketing posts 189 times on average per week on social media apps. Advertising special offers or coupons via the web is becoming more popular on sites like Facebook, that are easily accessible and have a higher reach. Reau (2013) observed that 47 percent of survey respondents reported that they have searched for coupons online. The study done by Sivathanu (2017) clearly showed that repetition of the message, brand image, celebrity endorsements, premiums, product placements, viral marketing, integrated marketing strategies, attention-getting products had a significant impact on the adolescents' food choices. The findings from the perception study of parents showed that food marketing targeted at adolescents affected their food choices and influenced their health due to unhealthy food choices, making them vulnerable consumers (Maheshwar et al., 2018).

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## Depression among Adolescents: Role of Nutrition

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Depression in adolescence is linked with a range of adverse outcomes and substantial risk for morbidity and mortality across the lifespan. Improvement in diet and nutrition may offer an inexpensive and acceptable alternative to standard depression treatment. However, to this date, alternative treatment has been widely overlooked, due to lack of evidence and knowledge. This is crucial, as understanding and promoting the role of diet and nutrition in mental health could significantly reduce the impact of depression in young people. This systematic review sets out to examine the current literature on diet, nutrition and adolescent mental health, in particular, the impact of diet and nutrition in the prevention and management of depression during adolescence.

**Keywords:** Depression, adolescence, diet, mental health

### **Introduction**

Adolescence is a time of biological and psychosocial change during which rapid growth occurs, with half of the adult weight gained and most of the peak bone mass accumulated during this time. This dramatic physical growth increases an adolescent's energy, protein, vitamin and mineral needs. Nutrition refers to the intake of food about the body's dietary needs. There are good and bad nutrition practices. Good nutrition is a well-balanced diet combined with regular physical activity. Whereas poor nutrition leads to impaired emotional, physical and mental development, reduced immunity and a greater susceptibility to disease (Bamber, Stokes, and Stephen, 2007).

Adolescence is a time of growth and change. Diet and nutrition are particularly important during this period. By observing and understanding how diet and nutrition play a part in an individual's physical and mental health, modifications can be made better one's quality of life. The present review is set to examine the role of nutrition during adolescent depression.

### **Depression during Adolescence**

Depression refers to a disorder associated with symptoms such as depressed mood, increased sadness and anxiety, loss or gain of appetite and a loss of interest in pleasurable activities.

The prevalence of depression among school going adolescents was found to be 52.9 per cent 57.7 per cent in a studies reported by (Kumar et al., Davangere and Nagendra K et al., 2012). Mohanraj et al., (2010) reported 60.8 per cent, 11.3 per cent and 1.8 per cent prevalence of mild, moderate and severe depression respectively among adolescents of Chennai.

### **Research Purpose**

The purpose of this systematic literature review is to explore the question: how does Diet and Nutrition Impact Depression During Adolescence?

### **Nutritional Practices during Adolescence**

Typically, adolescent diets are characterized by health compromising eating patterns such as skipping meals, dieting inappropriately and relying on sugar-sweetened beverages, fast foods and energy dense snacks (Bamber et al., 2007). Most adolescents consume diets that are too high in fats, cholesterol, sodium, sugar and deficient in fruits and vegetables (Carlson et al., 2001). Youth Risk Behavior Surveillance System, reported only 22.3 percent of youth met the recommendations for

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## Adolescent Health: Issues and Challenges for the Society

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Adolescents are the young people aged between 10 to 19 yrs. The world is home to 1.2 billion individuals aged 10–19 years i.e. roughly one in every six persons is an adolescent. India has the largest national population of adolescents (243 million) followed by China (207 million), United States (44 million), Indonesia and Pakistan (both 41 million). Adolescence is generally described as a transitional phase of physical, physiological and psychological development that begins at the onset of puberty and continues into early adulthood. Adolescence is the critical phase of life with myriad of behavioural changes having changing patterns of social interactions and relationships. It is the window of opportunity that sets the stage for a healthy and productive adulthood and to reduce the likelihood of health problems in later years. It is also an age of impulsivity accompanied by vulnerability, influenced by peer groups & media that result in changes in perception & practice and characterized by decision making skills/abilities along with acquisition of new emotional, cognitive & social skills. Adolescent period being the transitional stage between the childhood and adulthood passes through many fold of changes, come across new challenges and experience. Although adolescence is generally considered healthy times of life, several important public health and social behaviors and problems either start or peak during these years. Also, many adolescents do die prematurely due to various reasons that are either preventable or treatable and many more suffer from chronic ill-health and disability. The present review focuses on the health behaviors and problems affecting adolescents in India. The review also identifies issues that need to be addressed for health and safety of young people in India.

**Keywords:** Adolescents, Peer group, Behavioural changes, Puberty, Transitional phase

### Introduction

**Adolescent's Health Issues:** Adolescents are presumed to be healthy but as per WHO, an estimated 2.6 million young people aged 10 to 24 yr die each year and a much greater number of young people suffer from illnesses 'behaviours' which hinder their ability to grow and develop to their full potential. Most of these problems are linked with social determinants and lifestyles operating and interacting in complex environments that precipitate or trigger these conditions or behaviours. Developmental transition of young people make them vulnerable particularly to environmental, contextual or surrounding influences. Nearly two-thirds of premature deaths and one-third of the total disease burden in adults are associated with conditions or behaviours initiated in their youth. The behavioural patterns established during this developmental phase determine their current health status and the risk for developing some chronic diseases in later years.

**Nutritional Health:** Adolescents have increased nutritional requirements demanding diet rich in energy, protein, vitamins, minerals (calcium, iodine, phosphorus & iron) due to rapid growth spurt and increased physical activity. Poor nutritional status of adolescents is an outcome of socio-cultural, economic and public policies relating to household food security compounded by behavioural dimensions.

**Under-nutrition:** Studies indicated a high prevalence of under-nutrition and stunting among adolescents that has an adverse bearing on their health. Nutrition Survey of NIN showed that more than half the population aged 10-18 yr was undernourished. This observation is also supported by other studies with the prevalence of undernutrition ranging from 56.4 to 68.5 per cent, micronutrient deficiencies with high prevalence of anaemia, more among girls, ranging from 30-82 per cent. Anaemic adolescent mothers are at a high risk of miscarriage, maternal mortality and still births; also, low birth weight babies with low iron reserves.

**Over-nutrition:** Conversely, overweight and obesity - another form of malnutrition with serious health consequences is increasing among other young people in India. A review of studies showed a prevalence of overweight (9.9 to 19.9%) among children aged 10-19 yr indicating early onset of obesity. Use of mass media is higher among adolescents (male 88.2% and



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**Neeraj K. Aggarwal** is presently working as a chairman in the Department of Microbiology, Kurukshetra University, Kurukshetra, India. He has more than 12 years of research and teaching experience of postgraduation classes. He has guided 15 PhD research students, and presently, 6 students are working under his guidance. He is gold medalist and has been awarded prestigious S.R. Vyas Gold Medal for being the best microbiological research worker. He has published more than 120 research papers, reviews and book chapters in various journals of national and international repute. He has also authored a popular text book *Introduction to Biotechnology* for BTech students and is also one of the editors of the book published by Nova Science Publishers, USA. He is a member of various academic and professional bodies. His research areas include microbial biotechnology for different metabolites, biomass valorization, molecular genetics and biological control agents.

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One of the biggest challenges facing the food industry and society is the reduction of food waste. Annually, all over the world, millions of tons of agro-food waste are produced, and their efficient management and valorization represents one of the main objectives of EU actions towards sustainable development. The book compiles information on the possibilities of the recovery of valuable compounds...

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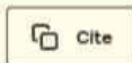
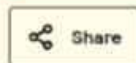
# Efficacy of Plant Antimicrobials as Preservative in Food

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## WRITTEN BY

Romika Dhiman and Neeraj Kumar Aggarwal



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## Abstract

Safe and hygienic food is a requirement for a healthy society. The problem of food-borne outbreaks has built a challenge against the food and health regulatory authorities to control the pathogenic microorganisms. Chemical preservative has created some health problems in foods, so the recent trend is towards the use of natural antimicrobials in foods. Plants are valuable source of bioactive molecules exhibiting antimicrobial activities. The plant antimicrobial compounds have diverse chemical nature such as alkaloids, phenolics, terpenes, terpenoids, flavonoids, essential oil, etc. Many plant antimicrobials possess antimicrobial activity against pathogens and spoilage microorganisms. But variation in effectiveness of these compounds against microorganisms in laboratory system and in real food systems is major determinant in their food use. Several plant extract or purified compounds are part of human diet since thousands of years. Although some plant compounds enjoy the status of generally recognised as safe (GRAS), typical toxicological information of their use in food is not available. So the improvement in cost-effective isolation and toxicological information of these compounds is helpful in their use as biopreservative in foods.

## Keywords

biopreservative

antimicrobial

essential oil

flavonoids



# Recent Developments in Veterinary and Zoological Sciences



*Editors*  
**Kuldeep Krishan Sharma**  
**Vijay Laxmi Saxena**



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## ECOLOGICAL STUDIES ON GROUP SIZE AND AGE CLASS COMPOSITION OF BLACKBUCK, *ANTILOPE CERVICAPRA* (LINNAEUS, 1758) IN HARYANA (INDIA)

Jyoti<sup>1</sup> and Deepak Rai<sup>2</sup>

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### ABSTRACT

In India, increasing human population has continually causing destruction in the natural habitats of many wild ungulates species due to which population of endemic species are declining at such an alarming rate that they falls in the threatened categories of IUCN Red List of Threatened species. One such Near Threatened ungulates species is Blackbuck, *Antilope cervicapra* (Linnaeus, 1758) which is listed in schedule I of Wildlife Protection Act, 1972. A preliminary field survey was conducted from March, 2017 to February, 2018 in the area of Lalpur Jheel near Dobhi village in district Hisar (Haryana), where a significant number of individuals of Blackbuck were observed by scan sampling method to record the group size and herd composition of Blackbuck. During the study period 24 periodic fortnightly visits were conducted and six different age classes of Blackbuck, namely, adult male(s), adult female(s), sub-adult male(s), sub-adult female(s), yearling male(s) and fawn(s) were recorded. In the present study, a total of 68 sightings of Blackbuck were observed and a minimum of one sighting (in 5<sup>th</sup> and 17<sup>th</sup> periodic visit) to a maximum of seven sightings (in 2<sup>nd</sup> periodic visit) per visit with a minimum of one

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## Lead Paper

**Dr. Anita Bhatnagar** obtained her B.Sc., M.Sc. and Ph.D from Bhopal University, Bhopal. She did her M.Sc. and Ph.D in Zoology. Her field of specialization is Fish, fisheries and Aquaculture. After Ph.D she joined CCS Haryana Agricultural University as post Doctoral fellow and worked as Research Associate, Pool Officer and DST Young Scientist. Thereafter, she joined Department of Zoology Kurukshetra University and at present working as Chairperson Department of Zoology. She has 136 publications to her credit, including 94 papers in International Journals, 20 papers in proceedings of seminars/symposia, 10 chapters in book, one authored book, one course manual, one edited proceedings and 09 popular articles. According to Google scholar the citation index of her publications is 1268, h- index is 17 and i-10 index is 30. She has completed 6 major research projects funded by Ministry of Science and Technology, Council of Scientific and Industrial Research, Department of Fisheries and University Grants Commission. She has many awards to her credit including Indian Science Congress Association's Young Scientist Award and Professor Narayan Singh Trophy of Jiwaji University Gwalior. She has guided the Research work of 11 Ph.D and 06 M.Phil students. She has attended about 50 national and International conferences/ Symposium and delivered more than 20 invited talks. She has organized 09 National seminars and two Refresher courses in Kurukshetra University as organizing Secretary/Co-ordinator/ member Organising Committee. She is on the panel of Experts of Department of Fisheries, Government of Haryana and has delivered several extension lectures to the fish farmers and during seminars/workshops of Department of Fisheries. For the past over 20 years she is working on different aspects of sustainable aquaculture. Her systematic studies has addressed issues pertaining to environmental safety and security in the aquaculture system by advocating the rational use of inputs by researching the optimal dosages and frequency of fertilization in aquaculture ponds. To further combat pollution, her research suggest the use of biofertilizers to reduce the use of costly inorganic fertilizers in order to promote organic farming, which is the only viable option to reduce heavy reliance on chemical fertilizers. Investigations on nutrition physiology has lead to the development of cost effective feed formulations for aquaculture using locally available ingredients with high digestibility and utility resulting in the drastic reduction in the release of metabolites in the form of nitrogen and phosphorus in the holding system. These findings will go a long way in ensuring nutritional security to the teeming millions.



Anita Bhatnagar

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## Microbial Technology for Sustainable Aquaculture

**Anita Bhatnagar**

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The aquaculture is gaining utmost importance providing opportunities for the production of wide varieties of aquatic foods including fish and shell fish. The growth and intensification of aquaculture has raised several issues that need to be addressed for the sustainability of this industry. To sustain the culture system for enhancing production without deteriorating the environment, there is a need to develop sustainable aquaculture technology. Here microbes and microbial technology play significant role in enhancing the aquaculture production. Our studies on these lines have revealed that *Azotobacter*, a free-living nitrogen fixer, *Azospirillum*, *Nitrosomonas* and *Nitrobacter* are the microbes which when inoculated in the aquatic system manage and optimize nutrient levels, which not only contain pollution but also improve the trophic status of the water body in terms of

## Chapter 6

# Industrial Wastewater Pollution and Advanced Treatment Techniques

**Smita Chaudhry**

*Kurukshetra University, India*

**Shivani Garg**

*Kurukshetra University, India*

### **ABSTRACT**

*Industry creates more pressure on water resources by wastewater discharge than the quantity used in production. The wastewater produced by industries may be either excessively acidic or alkaline or may contain high or low concentrations of colored matter, organic or toxic materials, and possibly pathogenic bacteria. It is necessary to pre-treat the wastes prior to release to the sewer or a full treatment is necessary when this is discharged directly to surface or ground waters and it must be within the effluent standard limits provided by the environmental protection organizations. The management and control of liquid wastes in the industry as well as the selection of the different possible treatments for the wastewater prior to its discharge to the sewer system was studied. These would protect the environment and also benefits from the waste materials can be gained. Opportunities for introducing pollution prevention measures for different types of pollutants produced by different industries are discussed in this chapter.*

### **BACKGROUND**

The main wastewater collector, the Cloaca Maxima, in Rome presumably follows the course of an old ditch which was used at about 500 BC as a collector for wastewater ((Lamprecht, 1988). By 1880, scientists began to understand pathogenic bacteria and their association with specific disease. For example, calcium chloride was used to treat faeces from typhoid patients before disposal to sewers (White, 1972). Frankland (1869) proposed ten parameters to analyses the river water quality. The first activated sludge wastewater treatment plant was taken into operation in 1932, Kyläsaari, Finland. The first modern treatment plant functioned properly built after the Second World War in 1957 in Tali. An Industrial ecology

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# Chapter 9

## Smart Irrigation Techniques for Water Resource Management

**Smita Chaudhry**  
*Kurukshetra University, India*

**Shivani Garg**  
*Kurukshetra University, India*

### **ABSTRACT**

*Rising temperatures and increased frequency of extreme events will have direct and negative impacts on natural resources. Water resources are limited on earth; hence, there is a need to manage the utilization techniques of water. The irrigation system improvement using the wireless network is a solution to accomplish water conservation goal as well as improvement in irrigation practices. Smart farming enhances the capacity of the agricultural systems to support food security. The need for adaptation and the potential for mitigation into sustainable agriculture development strategies can be incorporated into such system. The smart farming system includes different techniques of agricultural practices to conserve different resources including water. Solar powered smart irrigation systems are a part of the smart irrigation system. Smart irrigation system includes temperature, moisture, and humidity sensors system. Different smart irrigation systems which are used all over the world will be discussed in this chapter.*

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# UNIT 1 INTRODUCTION TO ENVIRONMENTAL MANAGEMENT

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## Structure

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- 1.1 Objectives
- 1.2 Definition and Scope
- 1.3 Goals of Environmental Management; Need for Environmental Management
  - 1.3.1 Approaches to Environmental Management
  - 1.3.2 Participants in Environmental Management
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  - 1.9.2 Climate Change
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- 1.11 Let Us Sum Up
- 1.12 Key Words

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# UNIT 2 ENVIRONMENTAL MANAGEMENT SYSTEM STANDARDS

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## Structure

- 2.0 Introduction
- 2.1 Objectives
- 2.2 Core Elements of Environmental Management System (EMS)
  - 2.2.1 Prerequisite Factors for EMS
- 2.3 Benefits and Limitations of EMS
- 2.4 Certification Body
- 2.5 Assessment of EMS
- 2.6 Documentation of EMS
- 2.7 EMS Standard: ISO 14000 Series
- 2.8 Let Us Sum Up
- 2.9 Key Words
- 2.10 References and Suggested Readings
- 2.11 Answers to Check Your Progress

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## 2.0 INTRODUCTION

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All organisations like companies, big and small institutions, industries etc. have some impact on environment. Environmental Management System (EMS) is similar to other management systems, like as those that manage quality or safety. It assesses an organization's business strengths and weaknesses, helps them to make out and manage significant environmental impacts, saves money and resources by increasing efficiency, ensures compliance with environmental laws and provides targets for improvements. As per United States Environmental Protection Agency (USEPA, 2017), an EMS is a set of processes and practices that facilitate an organization to reduce its environmental impacts and increase its operating efficiency. It is a framework that helps a company/organization to achieve its environmental objectives through regular review, evaluation, and improvement of its environmental performance. Regular planning, implementing, reviewing and improving the processes and actions in EMS will identify opportunities for improving and implementing the environmental performance of the organization. By getting EMS certification, the organization can show to its customers about the commitment in meeting environmental responsibilities. EMS does not dictate to achieve a particular level of environmental performance rather each organization's EMS is tailored or customised to its own individual objectives and targets. Ideally, an EMS supports resource sustainability, environmental protection, biodiversity conservation and ecologically sustainable development.

A properly designed EMS should follow the "Plan Do Check Act" cycle which is based on the principle of continuous improvement where:

# Fundamentals of Plastic Waste Management

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# Estimation, Recovery and Control of Greenhouse Gases Emissions from Municipal Solid Waste

Nisha Rani,\* Hardeep Rai Sharma\*\* and Asha Gupta\*\*\*

## ABSTRACT

Rapid population growth, expanding urbanization and changing life style causes a direct impact on municipal solid wastes (MSW) generation in almost all parts of the world. Due to lack of collection services, open dumping (illegal) and open burning of MSW is still practised in both rural and urban areas mainly in the least developed and developing countries. The improper and unscientific methods of municipal solid wastes (MSW) disposal especially open dumping and landfilling leads to hazards like groundwater contamination, soil pollution and air pollution due to greenhouse gases (GHG) emission. These GHG (mainly CO<sub>2</sub> and CH<sub>4</sub>) can trap heat in the atmosphere and lead to global warming and changing the Earth climate. Lack of attention, unavailability of suitable and feasible technologies and economic constraints causes huge amount of GHG emissions into the atmosphere. In addition, composting and recycling, respectively reduces GHG emissions by redirecting the disposal of materials from landfills that generate CH<sub>4</sub> and other GHGs and avoid environmental releases related with raw materials extraction and materials production. Similarly generating energy from waste incineration reduces GHG emissions by diverting MSW from landfills and displaces electricity produced by fossil fuel based power plants. The present chapter will discuss quantitative assessment of GHG from municipal solid waste landfilling and incineration and various options and techniques to reduce the greenhouse gas emission.

**Keywords:** *Municipal solid waste, landfilling, incineration, recycling, greenhouse gases*

## INTRODUCTION

Rapid industrialization, urbanization and growing population has lead to biggest problem of municipal solid waste in developing as well as in developed nations. This huge amount of waste generated results in socio-economic and environmental issues. According to

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# Community Awareness Towards Polyethylene Terephthalate (PET) Bottles Recycling: a case Study from Karnal City, Haryana

Hardeep Rai Sharma,\* Vasudev Sharma\*\* and Gurkamal Singh\*\*\*

## ABSTRACT

Recycling has a number of benefits as it saves natural resources and energy which leads to less production costs, generates income and jobs for the unemployed and poor besides reducing waste generation. It reduces environmental impacts, saves energy which is required for collection and transportation, the costs of landfilling, and helps in effective waste management. In order to assess the community awareness towards recycling PET bottles, a survey was conducted in April–May, 2015 to assess the different factors which can influence the recycling behaviour of PET bottles among individuals in Karnal city of Haryana. The data were collected by interviewing randomly selected 84 individuals using a self administered questionnaire. About 48 % respondents often practiced recycling PET bottles (mineral water and soft drinks bottles) by selling them to junk dealers (*Kabadi/raddi waala's*), 30 % individuals sometimes whereas 22 % respondents never practiced recycling. About 20–40 % respondents were unaware about recycling, and clean environment. About 61 % respondent showed their willingness to regular practice recycling if collection mechanism is approachable and nearby to their residents. PET recycling was lower than general recycling which was mainly due to large space required to store PET bottles. Some participants showed their willingness to carry PET bottles by themselves to junk dealer shops but hesitate to do so due to shabby conditions of junk shops. During the study it was observed that there were around 95 junk dealers, 8 bailing machines and 2 flake generators in Karnal city engaged in plastic recycling. According to respondents promotional schemes, bottles collection machines, buy back policy and incentives are some factors which can motivate people towards recycling PET bottles. In addition to create awareness among respondents, more effective strategies should be made and implemented so as to influence/motivate the individuals or communities to participate in plastic recycling. Resident Welfare Associations (RWAs),

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# Chapter 6

## Industrial Wastewater Pollution and Advanced Treatment Techniques

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*Kurukshetra University, India*

### **ABSTRACT**

*Industry creates more pressure on water resources by wastewater discharge than the quantity used in production. The wastewater produced by industries may be either excessively acidic or alkaline or may contain high or low concentrations of colored matter, organic or toxic materials, and possibly pathogenic bacteria. It is necessary to pre-treat the wastes prior to release to the sewer or a full treatment is necessary when this is discharged directly to surface or ground waters and it must be within the effluent standard limits provided by the environmental protection organizations. The management and control of liquid wastes in the industry as well as the selection of the different possible treatments for the wastewater prior to its discharge to the sewer system was studied. These would protect the environment and also benefits from the waste materials can be gained. Opportunities for introducing pollution prevention measures for different types of pollutants produced by different industries are discussed in this chapter.*

### **BACKGROUND**

The main wastewater collector, the Cloaca Maxima, in Rome presumably follows the course of an old ditch which was used at about 500 BC as a collector for wastewater ((Lamprecht, 1988). By 1880, scientists began to understand pathogenic bacteria and their association with specific disease. For example, calcium chloride was used to treat faeces from typhoid patients before disposal to sewers (White, 1972). Frankland (1869) proposed ten parameters to analyses the river water quality. The first activated sludge wastewater treatment plant was taken into operation in 1932, Kyläsaari, Finland. The first modern treatment plant functioned properly built after the Second World War in 1957 in Tali. An Industrial ecology

DOI: 10.4018/978-1-5225-5754-8.ch006

Dr. Pawan Kumar 'Bharti'

# **WATER AND WASTE WATER**

*ISSUES AND MANAGEMENT*



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## Bioremediation *Green Technology for Wastewater Treatment*

Shivani Garg<sup>\*1</sup>  
Sikander<sup>2</sup>

### ABSTRACT

Increased discharges of ineffectively treated wastewater are contributing to the further degradation of water quality in surface and groundwater. As water pollution critically affects water availability, it needs to be properly managed in order to mitigate the impacts of increasing water scarcity. According to an estimate of Central Pollution Control Board, 38354 million litres per day, produced in sewage but the available sewage treatment capacity is only of 11786 million litres per day (~30%), similarly, only 60% of industrial wastewater, mostly from large scale industries, is generated in major cities of India. So it is necessary to treat/recycle wastewater before discharge. Biological method is a natural way to treat wastewater. Bioremediation means elimination of pollutants from soil, groundwater, wastewater, air using microorganisms. Bioremediation requires fewer resources and less energy than conventional technology, and doesn't accumulate hazardous by-products as waste. The objective of the biological treatment or bioremediation of wastewater is to remove organic matter from the wastewater which is present in the soluble and colloidal form or to remove nutrients such as nitrogen and phosphorous from the wastewater. In the biological treatment methods, pollutants in wastewater can be resolved, detoxified, and separated by using mainly microorganisms. Biological processes like nitrification, denitrification, anaerobic biological treatment, activated sludge (aerobic treatment) are some

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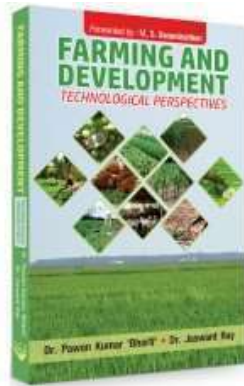
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## Thermal and mass-asymmetry effects on static density susceptibility of electron-hole bilayer

AIP Conference Proceedings 2093, 020045 (2019);  
<https://doi.org/10.1063/1.5097114>

Priya Arora<sup>1</sup> and R. K. Moudgil<sup>2,a)</sup>

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# Collective phonon thermal transport loss minimum and platinum nanowires

AIP Conference Proceedings 2093, 020029 (2019);  
doi.org/10.1063/1.5097098

Pr Singh<sup>1,2</sup>, Krishan Kumar<sup>2</sup>, Baljinder Singh<sup>3</sup>, and R. K. Moudgil<sup>1,a</sup>

Contributors

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ork, we have studied the effect of phonon scattering on linear



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Platinum nanowires modeled in the ladder topology. For this purpose, we have made use of the non-equilibrium Green's function approach as implemented in the Transiesta method. The requisite force constants are determined by the force field method using the General Utility Lattice Program (GULP). Our calculations show a significant reduction in the phonon transmission probability with increase in width  $w$  of the joint nano-structures. Moreover, the emergence of pronounced peaks in the transmission spectra reveals the presence of Fano resonances which are increased in number with increasing  $w$ . As a direct consequence of this,  $\kappa_{ph}$  is found to decrease dramatically with increase in width  $w$ , with the rate of decrease being quite large for the Al nanowire. Such joint nano-structures may therefore be useful to achieve high thermoelectric figure of merit.

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<https://doi.org/10.2217/1743588075681>



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## ER Gated light particle spectra at various energies to study the entrance channel effect due to mass asymmetry

H. Arora<sup>1,\*</sup>, B.R. Behera<sup>1</sup>, K. Rani<sup>1</sup>, Shruti<sup>1</sup>, M. Kumar<sup>2</sup>, Amit<sup>1</sup>, C. Sharma<sup>1</sup>, Subodh<sup>1</sup>, D. Arora<sup>2</sup>, A. Kaur<sup>1</sup>, S. Singh<sup>1</sup>, N. Saneesh<sup>2</sup>, Varinderjit Singh<sup>3</sup>, A. Jhingan<sup>2</sup>, K.S. Golda<sup>2</sup>, H. Singh<sup>4</sup>, P. Sugathan<sup>2</sup> and Gulzar Singh<sup>1</sup>

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### Introduction

The fusion hindrance effect for the mass symmetric systems having energy less than 10 MeV/nucleon has been extensively studied in the past [1]. The relevance of this effect has been observed at energies much above barrier hitherto and it is suggested hypothetically that it should be absent at near barrier energies. But no study has been performed so far to either prove or disprove the same. Considering the limited data present in this domain, a comprehensive study was proposed and recently carried out at Inter University Accelerator Center (IUAC), New Delhi.

For this study, systems selected are  $^{16}\text{O}+^{64}\text{Zn}$  (mass asymmetric) and  $^{32}\text{S}+^{48}\text{Ti}$  (mass symmetric), both populating the same  $^{80}\text{Sr}$  evaporation residue (ER). Both these systems have been broadly studied before at above barrier energies, which showed that for mass symmetric systems the experimentally observed particle spectra could be explained only by the inclusion of dynamical effects [2,3]. But contrary to that when the cross sections for these systems were experimentally measured, the observations were reproduced theoretically by Time Dependent Hartree-Fock calculations [4] without including the contribution due to dynamical effects.

In the present case, both the systems were studied at various energy points at near as well as above barrier energies, by either matching the excitation energy ( $E^*$ ) or the maximum angular

momentum ( $l$ ) values. For  $^{16}\text{O}+^{64}\text{Zn}$ , the energy points selected are 45 MeV, 59 MeV and 89 MeV; whereas for  $^{32}\text{S}+^{48}\text{Ti}$  the energy points are 85 MeV, 94 MeV and 125 MeV.

### Experimental Details

The experiment for the same was performed using the General Purpose Scattering Chamber (GPSC) at IUAC. For this experiment, a special MWPC/ER (Multi-Wire Proportional Counter/Evaporation Residue) detector was designed with three electrode geometry, which was kept at highly forward angles to detect the ERs obtained. The active region of this detector was  $2^\circ-10^\circ$ , which is good enough for our experimental requirements, as the probability of ERs being

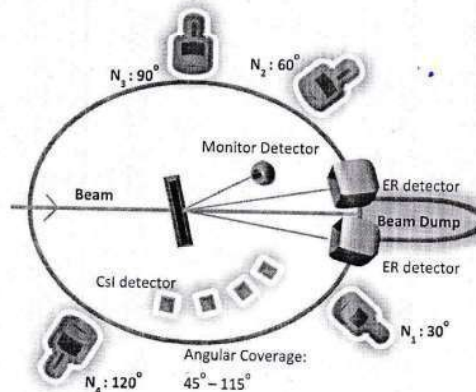


Fig. 1 Experimental Setup  
The ERs formed is maximum in that region only. The ERs detected will be used to obtain the exclusive

### Fission mass width systematics in $A \sim 200$ region.

Kavita<sup>1</sup>, and Hardev Singh<sup>1\*</sup>

<sup>1</sup>Department of Physics, Kurukshetra University, Kurukshetra - 136119, INDIA.

Studies of fusion-fission (FF) reactions involving heavy ion projectiles and heavy targets provides a lot of information on the fission reaction mechanism and has been a topic of great interest in recent years. Synthesis of super heavy elements (SHEs) is extremely challenging because the formation of SHEs is strongly hindered by non-equilibrium processes such as fast-fission, quasifission (QF), and pre-equilibrium fission etc [1]. The competition between QF and compound nucleus (CN) formation determines the probability of evaporation residue survival, which is crucial in understanding the dynamics of FF for heavy and SHEs production. Variation of the width of the fragment mass distribution with excitation energies is considered to be a valuable probe for studying QF [2, 3]. In this work, our aim is to explore the nature of non compound processes by comparing our recent results of the systematic study of variation of fragment mass width with existing data in literature, in mass  $\sim 200$  region.

Recently, we have measured the mass distributions of isotopes of Pt (<sup>188,190</sup>Pt), populated through the fusion reactions <sup>28</sup>Si + <sup>160</sup>Gd and <sup>12</sup>C + <sup>178</sup>Hf, respectively, at energies around and above the Coulomb barrier [4]. The fragment mass distributions for both the Pt isotopes were found to be single peaked and no appreciable change in the mass symmetry was observed throughout the measured excitation energy range, for both the reactions. However, relatively broader mass distributions observed in the fission of <sup>188</sup>Pt in the studied energy domain indicates the presence of fission events originating from a non-equilibrated source as well. This signifies that the mass equilibrium has not been

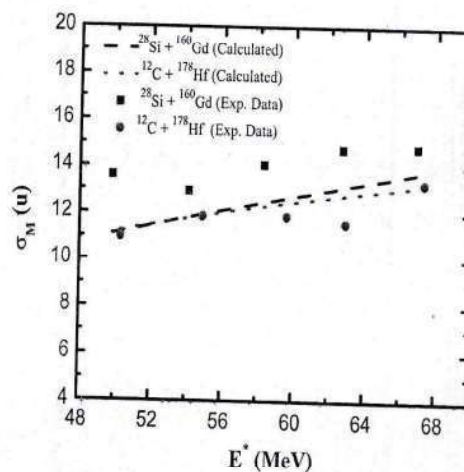


FIG. 1: Variation of the experimental fragment mass width ( $\sigma_m$ ) values for the two reactions with excitation energy. The calculated values are shown by the dotted and dashed lines.

fully achieved in the <sup>28</sup>Si + <sup>160</sup>Gd system as compared to the <sup>12</sup>C + <sup>178</sup>Hf system. Fig. 1 shows the experimental and calculated  $\sigma_m$  as a function of CN excitation energy for the two systems. Similar type of study by Chaudhuri et al. [6], claimed that the width of mass ratio distributions increases monotonically with excitation energy and there was absence of any deviation from the statistical model predicted width [8] of the mass distribution at all energies for the reactions <sup>16</sup>F + <sup>181</sup>Ta and <sup>16</sup>O + <sup>184</sup>W. Hence, their findings claims that QF is not significantly present in either of the two reactions. Moreover, Ramachandran et al. [5], investigated the role of shell effects in this mass region, through the fission fragment mass distribution measurements for the

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## Fragment mass distributions from the statistical decay of $^{200}\text{Pb}$

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Fragment mass distribution study in the relatively neutron deficient Hg-Pb region is considered very important to look for possible anomalies in the mass distribution data [1]. The unexpected observation of quasi-fission (QF) in the fission of certain nuclei in the said region has led to the renewed interest to further explore similar reactions using mass distribution as a probe [2]. QF represents the decay of excited composite system before achieving the full equilibration and relatively broader mass distributions for select reactions in the studied energy domain signify the presence of QF. Considering the theoretical interpretation of the QF process, we still lack any comprehensive model which could predict and describe the properties of the said process. The statistical model calculations of the width of the mass distribution are carried out assuming the saddle point temperature ( $T$ ) and mean square angular momentum ( $\langle j^2 \rangle$ ) dependence of the variance of the fragment mass distribution having a functional form [3]

$$\sigma_m(u) = \sqrt{\alpha T + \beta \langle j^2 \rangle} \quad (1)$$

where,  $\alpha$  and  $\beta$  are fitting constants. The saddle-point temperature is calculated using the formalism of Knyazheva et al [5] and mean square angular momentum is estimated using couple channel code CCFULL [6]. In the present calculations, we have compared the experimental fragment mass distributions from the fission of  $^{200}\text{Pb}$  populated using  $^{16}\text{O} + ^{184}\text{W}$  and  $^{19}\text{F} + ^{181}\text{Ta}$  reactions [2], with the simulated decay of the same nucleus using statistical model code gemini [4] over the matching excitation energy range. Fig. 1

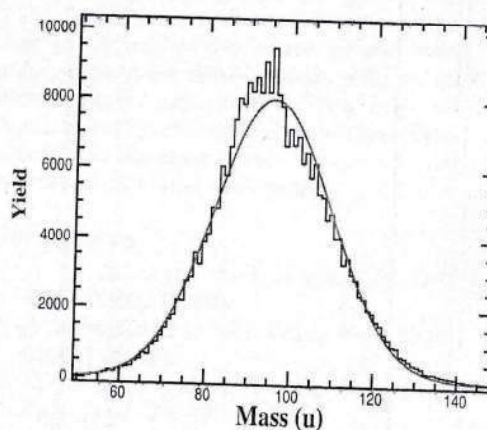


FIG. 1: Mass distribution (black histogram) from the fission of  $^{200}\text{Pb}$  at  $E^* = 75$  MeV. Red line represents the gaussian fit.

shows the calculated fragment mass distribution at 75 MeV of excitation energy. The distribution obtained is single peaked and is well reproducible by a single gaussian.

The calculated variance of fragment mass distributions from the statistical decay of excited  $^{200}\text{Pb}$  compound system along with the data obtained from the experimentally studied excitation energy range for the reaction  $^{19}\text{F} + ^{181}\text{Ta}$ , is shown in Fig. 2. Though the data shown in figure 2 is from one of the two studied reactions, but, experimental variance obtained from the other reaction also has nearly matching behaviour. As shown by A. Chaudhury et al., the smooth slope of the experimental data, as obtained from the linear fit, for both the reactions, does not show presence of any non-compound processes. Moreover, width of the

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## Modifications in optical parameters of PVA by embedded Au-Ag core-shell nanoparticles

AIP Conference Proceedings 2093, 020006 (2019); <https://doi.org/10.1063/1.5097075>

Ravi Kumar<sup>1,a)</sup>, Meena<sup>1</sup>, Rajiv Kumar<sup>2</sup>, Annu Sharma<sup>1,b)</sup>, and Sanjeev Aggarwal<sup>1</sup>

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#### ABSTRACT

Owing to the unique optical properties, core-shell nanoparticles are receiving increasing attention from the scientific community and have widespread applications in high-resolution optical imaging, enhanced light absorption in photovoltaic and photocatalysis etc. The present research work reports the synthesis of Au-Ag core-shell nanoparticles based nanocomposites with polyvinyl alcohol (PVA) as the host matrix. Morphological analysis of the prepared nanocomposites was carried out using high resolution transmission electron microscopy (HRTEM). Further UV-visible absorption spectroscopy was utilized to study the optical properties such as absorption coefficient ( $\alpha$ ), optical energy gap ( $E_g$ ) and Urbach's energy ( $E_u$ ) of thus synthesized Au-Ag core-shell PVA nanocomposite.

## Effect of incorporation of synthesized Fe @ Ag core-shell nanoparticles on optical parameters of polyvinyl alcohol

AIP Conference Proceedings 2093, 020017 (2019); <https://doi.org/10.1063/1.5097086>

Durgesh<sup>1</sup>, Annu Sharma<sup>1,a)</sup>, Sanjeev Aggarwal<sup>1</sup>, and Rajiv Kumar<sup>2</sup>

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### ABSTRACT

The present research work reports the fabrication of polyvinyl alcohol (PVA) based core shell nanocomposite films by assimilation of various concentrations of Fe @ Ag core shell nanoparticles in PVA matrix. Ex-situ chemical reduction approach was used for synthesis of core shell nanoparticles in which sodium borohydride (NaBH<sub>4</sub>) and tri-sodium citrate were used as a reducing and capping agent respectively and subsequently Fe @ Ag-PVA nanocomposite films were fabricated via solution casting method. These nanocomposite films were further characterized to examine the effect of varying concentration of core shell nanoparticles on PVA matrix by using UV-Visible spectrophotometer so as to study the absorbance behavior and to calculate the electrical conductivity of core shell nanocomposite. Morphological studies of the Fe @ Ag-PVA nanocomposite films were carried out using Transmission electron microscopy

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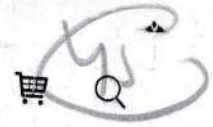
## High flux Ar<sup>+</sup> sputtering induced structural disorder and amorphization in Si (111)

AIP Conference Proceedings 2093, 020013 (2019);  
<https://doi.org/10.1063/1.5097082>

Divya Gupta<sup>1,a</sup>, Meetika Goyal<sup>1</sup>, Rahul Singhal<sup>2</sup>, Annu Sharma<sup>1</sup>, and Sanjeev Aggarwal<sup>1,b</sup>

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## Argand plot and conduction mechanism study of $N^+$ implanted CR-39 polymer

AIP Conference Proceedings 2093, 020015 (2019);  
<https://doi.org/10.1063/1.5097084>

Mahak Chawla<sup>1,a</sup>, Divya Gupta<sup>1</sup>, Nidhi Shekhawat<sup>2</sup>, Annu Sharma<sup>1</sup>, and Sanjeev Aggarwal<sup>1,b</sup>

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## Optical characterization of Ag-glass nanocomposites using Mie theory

AIP Conference Proceedings 2093, 020004 (2019); <https://doi.org/10.1063/1.5097073>

Sonal<sup>1</sup>, Annu Sharma<sup>1,a)</sup>, and Sanjeev Aggarwal<sup>1</sup>

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### ABSTRACT

The effect of Ar<sup>+</sup> irradiation at normal and oblique incidence on silver (Ag) in ion-exchanged glasses was investigated using field emission scanning electron microscopy (FESEM) and UV-Visible absorption spectroscopy. The appearance of surface plasmon resonance (SPR) peaks at 414 nm and 427 nm for the samples synthesised at normal and oblique incidence, respectively revealed the formation of Ag nanoparticles. The results obtained experimentally through UV-Visible absorption were related to the theoretical results using Mie theory. Theoretical calculations show the appearance of a sharp surface plasmon resonance (SPR) peak corresponding to silver nanoparticles on the other hand experimental results reveal the presence of slightly broader SPR peak. Such a discrepancy between the theoretical and experimental results may be attributed to the wider size distribution of silver nanoparticles and/or due to the dielectric constant of the surrounding matrix.

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## Refractive index and dielectric measurements of B<sup>+</sup> implanted PET in the mid-infrared region

AIP Conference Proceedings 2093, 020014 (2019);  
<https://doi.org/10.1063/1.5097083>

Ambika Sharma<sup>1,2,a)</sup>, Divya Gupta<sup>1</sup>, Mahak Chawla<sup>1</sup>, Rimpi Kumari<sup>1</sup>, Nidhi Shekhawat<sup>1</sup>,  
Annu Sharma<sup>1</sup>, and Sanjeev Aggarwal<sup>1,b)</sup>

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### ABSTRACT

Refractive index and dielectric measurements of B<sup>+</sup> implanted PET in the mid-infrared region

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## Oblique argon ion irradiation induced optical and structural modifications of polycarbonate polymer

AIP Conference Proceedings 2093, 020007 (2019);

<https://doi.org/10.1063/1.5097076>Rimpi Kumari<sup>1,a)</sup>, Divya Gupta<sup>1</sup>, Ambika Sharma<sup>1,2</sup>, Manu Bura<sup>1</sup>, Mahak Chawla<sup>1</sup>, Annu Sharma<sup>1</sup>, and Sanjeev Aggarwal<sup>1,b)</sup>

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ABSTRACT

## Effect of bio-degradable dielectric matrix on SPR peak of Ag nanoparticles

AIP Conference Proceedings 2093, 020003 (2019); <https://doi.org/10.1063/1.5097072>Meena<sup>1</sup>, Annu Sharma<sup>1,a)</sup>, Sita Ram<sup>2</sup>, and Pawan K. Sharma<sup>2</sup>[View Affiliations](#)[View Contributors](#)

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### ABSTRACT

In the present research work, Ag nanoparticles were synthesized via chemical reduction approach and subsequently Ag-chitosan as well as Ag-starch nanocomposite films were fabricated by solution casting method. The effect of chitosan and starch matrices on the surface plasmon resonance (SPR) peak of Ag nanoparticles was analyzed using UV-visible spectroscopy and the results were compared with Mie theory. SPR peak shifts towards longer wavelengths when Ag nanoparticles are incorporated in chitosan as well as in starch matrix. This red shift in SPR peak position has been explained on the basis of Mie theory.

### REFERENCES

## Study of decay of $^{260}\text{Sg}^*$ formed in $^{51}\text{V} + ^{209}\text{Bi}$ and $^{52}\text{Cr} + ^{208}\text{Pb}$ fusion reactions using GSKI Skyrme Force

Niyti<sup>1</sup>, Aman Deep<sup>2,\*</sup>, Rajpal Singh<sup>1</sup>, Rajesh Kharab<sup>2</sup>, and Sahila Chopra<sup>3</sup>

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### Introduction

The study of superheavy nuclei ( $Z > 100$ ) is exciting area of research in nuclear physics. There are many unanswered questions such as, "how many elements can exist in nature?" and whether it is possible to extend the number of elements by shell stabilization beyond the limit of macroscopic stability? The superheavy nucleus can be synthesized by cold fusion ( $E^* = 10-20$  MeV) and hot ( $E^* = 30-40$  MeV) fusion reactions. Theoretically, both of these "cold and "hot fusion reactions refer to cold fusion which corresponds to the lowest interaction barrier and largest interaction radius, i.e., to a noncompact, elongated nuclear shape [1]. In the present work, we have studied the excitation functions (EFs) of  $^{260}\text{Sg}^*$ , formed in fusion reactions  $^{51}\text{V} + ^{209}\text{Bi}$  [2] and  $^{52}\text{Cr} + ^{208}\text{Pb}$  [4], based on Dynamical Cluster-decay Model (DCM) [1]. For the nuclear interaction potentials, we use the Skyrme energy density functional (SEDF) based on semi-classical extended Thomas Fermi (ETF) approach under frozen density approximation. The Skyrme force used is the new GSKI [3] force for our calculation for cross section and comparison with the experimental data taken from [2, 4]. Here, only the EFs for the production of  $^{260}\text{Sg}^*$  isotope via 2n decay channel from the  $^{260}\text{Sg}^*$  compound nucleus are studied at  $E^* = 20$  to 26 MeV for two incoming channel, including quadrupole deformations  $\beta_{2i}$  and "cold-optimum" orientations  $\theta_i$ . The calculations are made within the DCM where the neck-length  $\Delta R$  is the only param-

eter representing the relative separation distance between two fragments and/or clusters  $A_i$  ( $i=1,2$ ) which assimilates the neck formation effects.

### Methodology

The nucleus-nucleus interaction potential in SEDF, based on ETF method, is defined as

$$V_N(R) = E(R) - E(\infty) = \int H(\vec{r}) d\vec{r} - \left[ \int H_1(\vec{r}) d\vec{r} + \int H_2(\vec{r}) d\vec{r} \right] \quad (1)$$

where  $H$  is the Skyrme Hamiltonian density, a function of nuclear, kinetic-energy, and spin-orbit densities, the latter two themselves being the functions of the nucleon/ nuclear density, written in terms of, so-called, the Skyrme force parameters, obtained by fitting to ground-state properties of various nuclei. There are many such forces, both old and new, and here we have chosen new GSKI Skyrme[3] force for our calculation. The radius vectors for axially symmetric deformed nuclei are

$$R_i(\alpha_i, T) = R_{0i}(T) \left[ 1 + \sum_{\lambda} \beta_{\lambda i} Y_{\lambda}^{(0)}(\alpha_i) \right], \quad (2)$$

with T-dependent equivalent spherical nuclear radii  $R_{0i}(T) = R_{0i}(T=0)(1 + 0.0007T^2)$  [5] for the nuclear proximity pocket formula, and  $R_{0i}(T) = R_{0i}(T=0)(1 + 0.0005T^2)$  [6] for SEDF, where  $R_{0i}(T=0) = [1.28A_i^{1/3} - 0.76 + 0.8A_i^{-1/3}]$ .

Finally, the compound nucleus temperature  $T$  (in MeV) is given by

$$E^* = E_{c.m.} + Q_{in} = (A/10)T^2 - T. \quad (3)$$

Adding to  $V_N$ , the Coulomb and angular momentum  $\ell$ -dependent potentials  $V_C$  and

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## Charge exchange reactions induced by $^3\text{He}$ on medium and heavy mass targets at 140AMeV and 115AMeV beam energies

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Charge exchange reactions of type  $(^3\text{He}, t)/(p, n)$  and  $(t, ^3\text{He})/(n, p)$  wherein a proton (neutron) transforms into a neutron (proton), eventually changes the isospin,  $\Delta T=1$ , of the reactants has been proved a dependable means to analyze the spin-isospin excitation in nuclei [1-6]. Thus these reactions have been studied intensively around the globe experimentally as well as theoretically [7-12]. Most of these studies were primarily focused to extract Gamow-Teller (GT) and Fermi transition strengths. Specifically the GT ( $\Delta T=1, \Delta S=1, \Delta J=1$  with  $\Delta L=0$ ) and Fermi ( $\Delta T=1, \Delta S=0$  and  $\Delta L=0$ ) transition have attracted more attention, because an approximate proportionality relation between the cross section at zero degree and the corresponding strength for these transition exist i.e

$$\frac{d\sigma}{d\Omega}(q=0) = \hat{\sigma}_{GT} B(GT) \quad \text{and}$$

$$\frac{d\sigma}{d\Omega}(q=0) = \hat{\sigma}_F B(F) \quad (1)$$

With  $\hat{\sigma}_{GT}$  and  $\hat{\sigma}_F$  represents the unit cross sections at zero degree angle for Gamow-Teller and Fermi transitions while  $B(GT)$  and  $B(F)$  are the corresponding transition strengths respectively. In the limit of vanishing momentum transfer the transition strengths, deduced from charge exchange reactions (with  $\Delta T_z = -1(\beta^-)$  and  $\Delta T_z = 1(\beta^+)$ ) may be connected directly to the weak nuclear transition strength in excitation energy region which otherwise remains inaccessible through ordinary  $\beta$ -decay (see fig. 1). Further, the deduced values for  $B(GT)$  and  $B(F)$  serve as major ingredients in the calculation of late stellar evolution and neutrino-driven nucleosynthesis wherein weak interactions play critical role [5,6]. Therefore here we present the results of  $(^3\text{He}, t)$  charge-exchange reaction at 140AMeV and 115AMeV beam energies on  $^{18}\text{O}$ ,  $^{26}\text{Mg}$ ,  $^{58}\text{Ni}$  and  $^{118,120}\text{Sn}$  targets, within the theoretical

framework of plane wave and distorted wave impulse approximations using computer code DCP2.

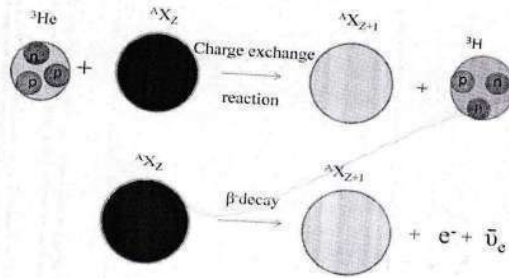


Fig. 1 (color online) Charge exchange reaction  $(^3\text{He}, t)$  and  $\beta^-$  decay.

In the impulse approximation the differential cross section for inelastic charge exchange reaction of type  $A(a, b)B$  may be conveniently expressed as [9,13]

$$\frac{d\sigma}{d\Omega} = \frac{\mu_a \mu_b}{(2\pi\hbar^2)^2} \frac{k_b}{k_a} \left| \sum_{i=D, E} \sum_{k, l, l_i} \alpha_{j, s, v_i}^{l_i s_i l_i k l_i} T_i^{l_i s_i l_i k l_i m_i} \right|^2 \quad (2)$$

The symbols appeared in above eq are having their usual meanings and are discussed in details in Ref. [9,13]. Now using eqs. (1) and (2) the unit cross sections corresponding to GT transition have been calculated for above said targets and results obtained are presented in fig. (2). Here for each projectile target combination five different calculations have been made at 140AMeV energy case (I) plane-wave (PW) calculation without recoil and exchange contribution to the reaction and termed as Direct (PW) case (II) plane-wave (PW) calculation with inclusion of exchange contribution and is denoted with total (PW) case (III) plane-wave (PW with recoil) here we consider recoil effects in the plane-wave and also include the exchange terms (Total



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## A theoretical modeling of the Cu(In, Ga)Se<sub>2</sub> solar cell

AIP Conference Proceedings 2093, 020018 (2019); <https://doi.org/10.1063/1.5097087>

Gagandeep<sup>1,a)</sup>, M. Singh<sup>2</sup>, R. Kumar<sup>1,b)</sup>, and F. Chand<sup>3</sup>

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    - Diode model
    - Solar cells
    - Electric currents
    - Programming languages
    - Minerals

### ABSTRACT

The recent research work in solar cell based on chalcopyrite Cu (In, Ga) Se<sub>2</sub>(CIGS) materials have more potential to enhance the efficiency of solar cells. In this theoretical work, we studied the working conditions of CIGS solar cell. The CIGS solar cells can be considered as single diode model. We implemented the diode equations in MATLAB software. From these equations, we calculate current density-voltage (J-V) and power-voltage (P-V) characteristics under the illumination condition of AM 1.5G. We investigate the efficiency ( $\eta$ ) changes for various values of series resistance ( $R_s$ ) and parallel resistance ( $R_p$ ). The efficiency and fill factor of CIGS solar cell under optimized values of  $R_s=0.5 \Omega$ ,  $R_p=20 \text{ K}\Omega$  are 21.86% and 0.8014 respectively. It is seen that our theoretical results are in good matching with the other research studies.

**STABILITY**  
**SHelter**  
**AGE**  
**ENCOURAGE**  
**COMMITMENT**  
**COMPASSION**  
**HUMANE TEACHER**  
**EMPOWER**  
**BUILD**  
**TOGETHER**  
**SOLUTIONS**  
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**LOVE**  
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**VOICE**  
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**HELP HAND**  
**SENSE OF LIVES**  
**CREATIVE**  
**PROBES**  
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**TENDERNESS**  
**HELP HAND**

# HUMANE TEACHERS ATTRIBUTES AND TRENDS

Editors : R. C. Patel & Sujata Srivastava



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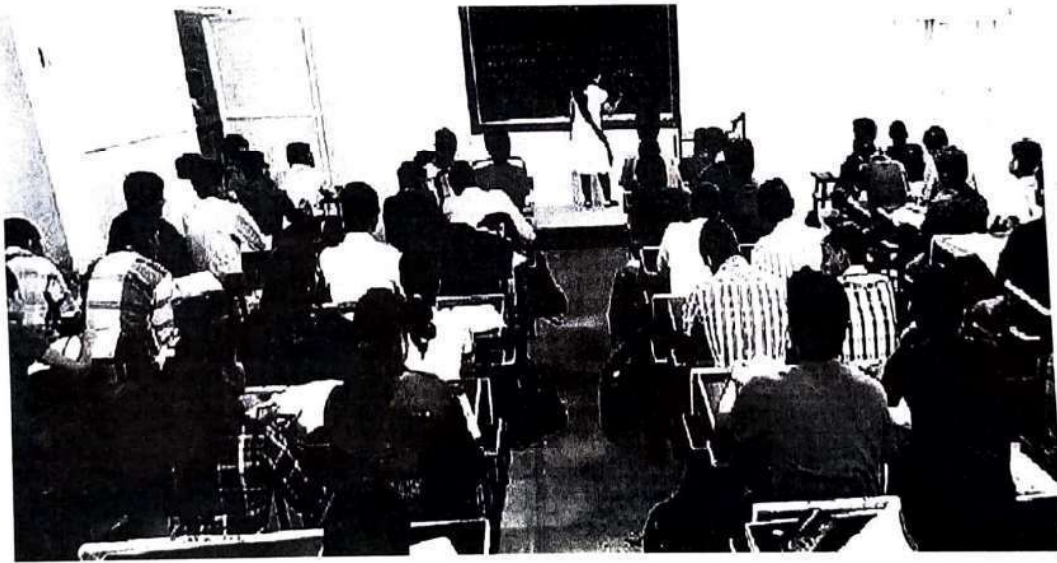
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# TEACHER PERFORMANCE ASSESSMENT IN EDUCATION

*Editors*  
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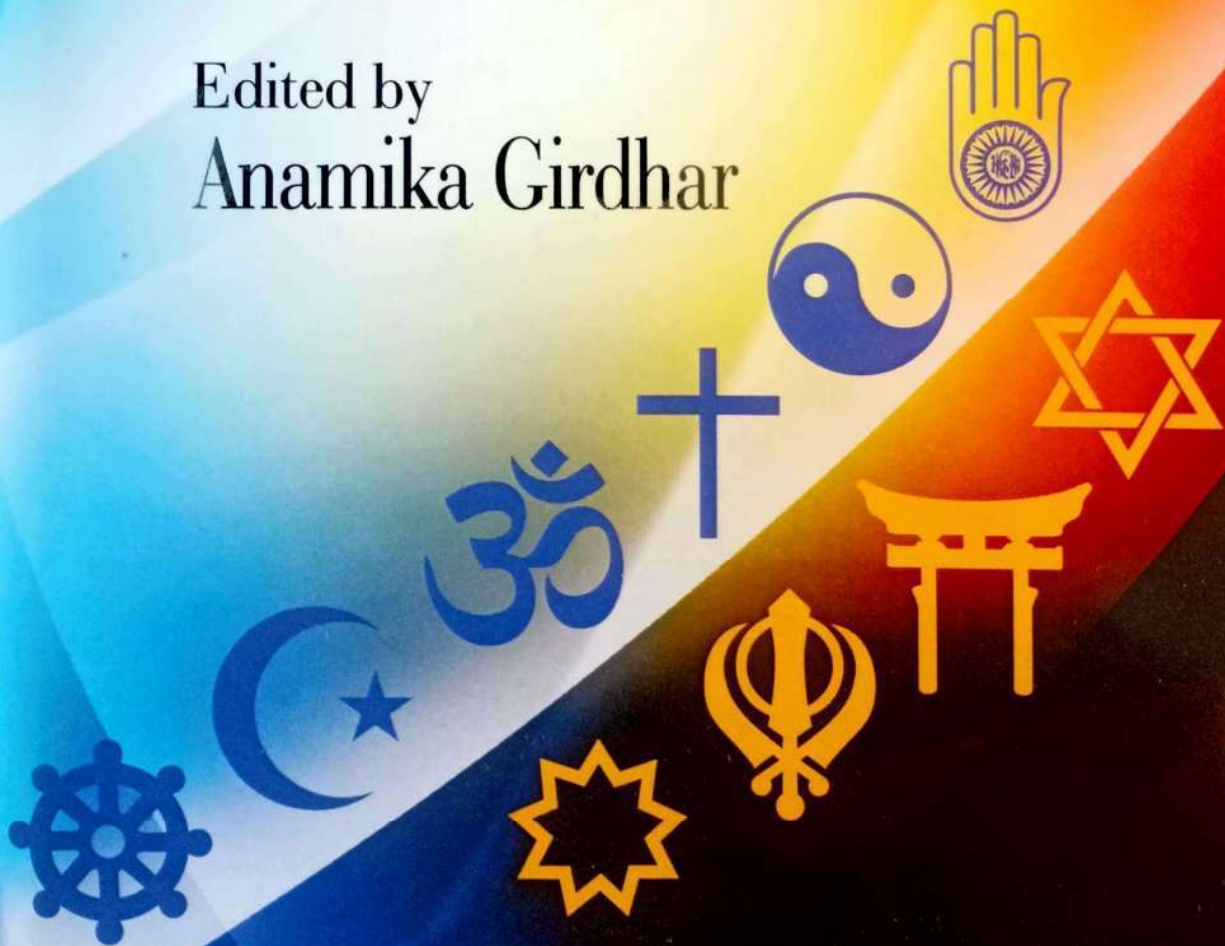
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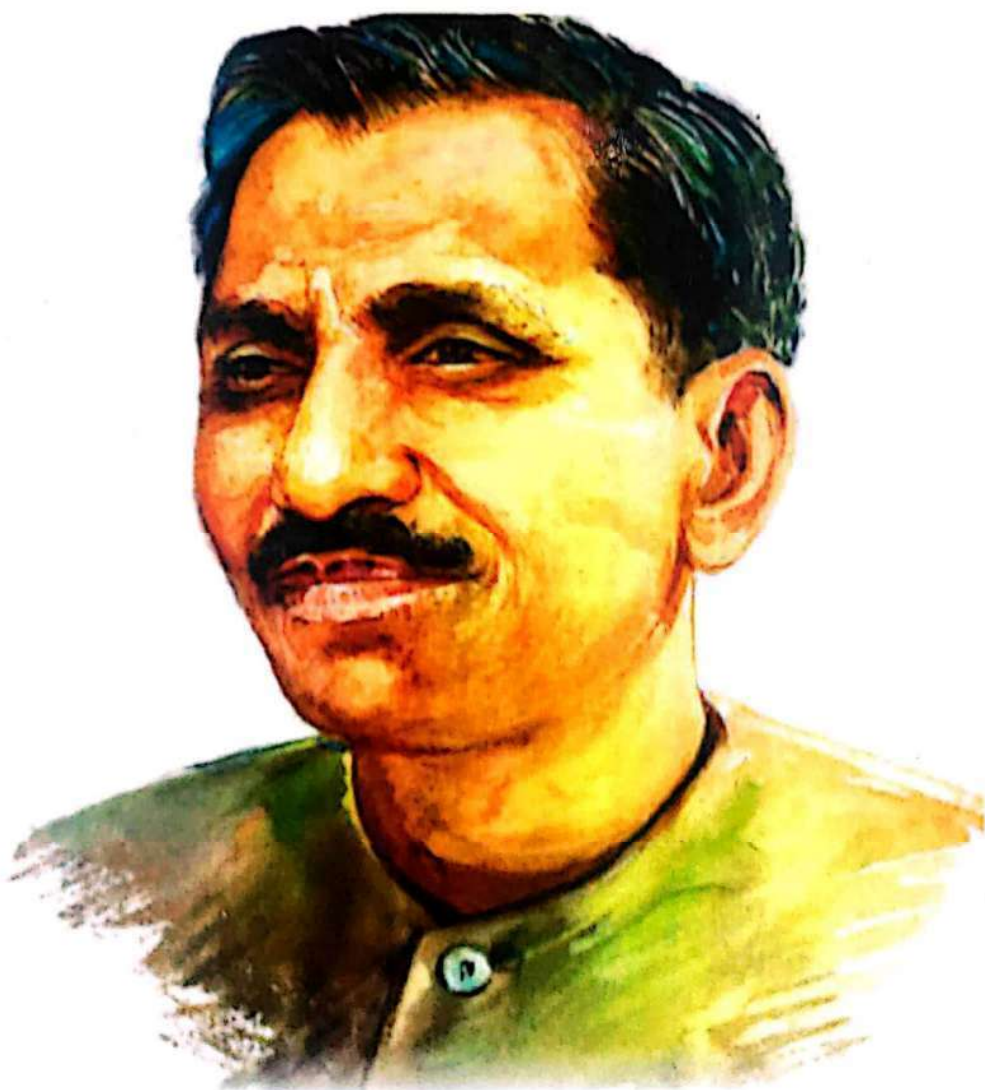
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# भाजपा के गांधी

पंडित दीनदयाल उपाध्याय



The image features a black silhouette of a person in a yoga pose, likely the Bhujangasana (Cobra) pose, set against a vibrant background of a sunset or sunrise. The sky transitions from a deep orange at the bottom to a bright yellow at the top. The person's right arm is extended downwards, and their left hand is resting on the floor. The overall composition is simple and evocative, representing the theme of yoga and health.

# हस्त्रियाणवी योगसूत्र

आचार्य शीलक राम

एक वैज्ञानिक संत  
स्वामी विवेकानन्द

आचार्य शीलक राम





# जागो हिन्दू

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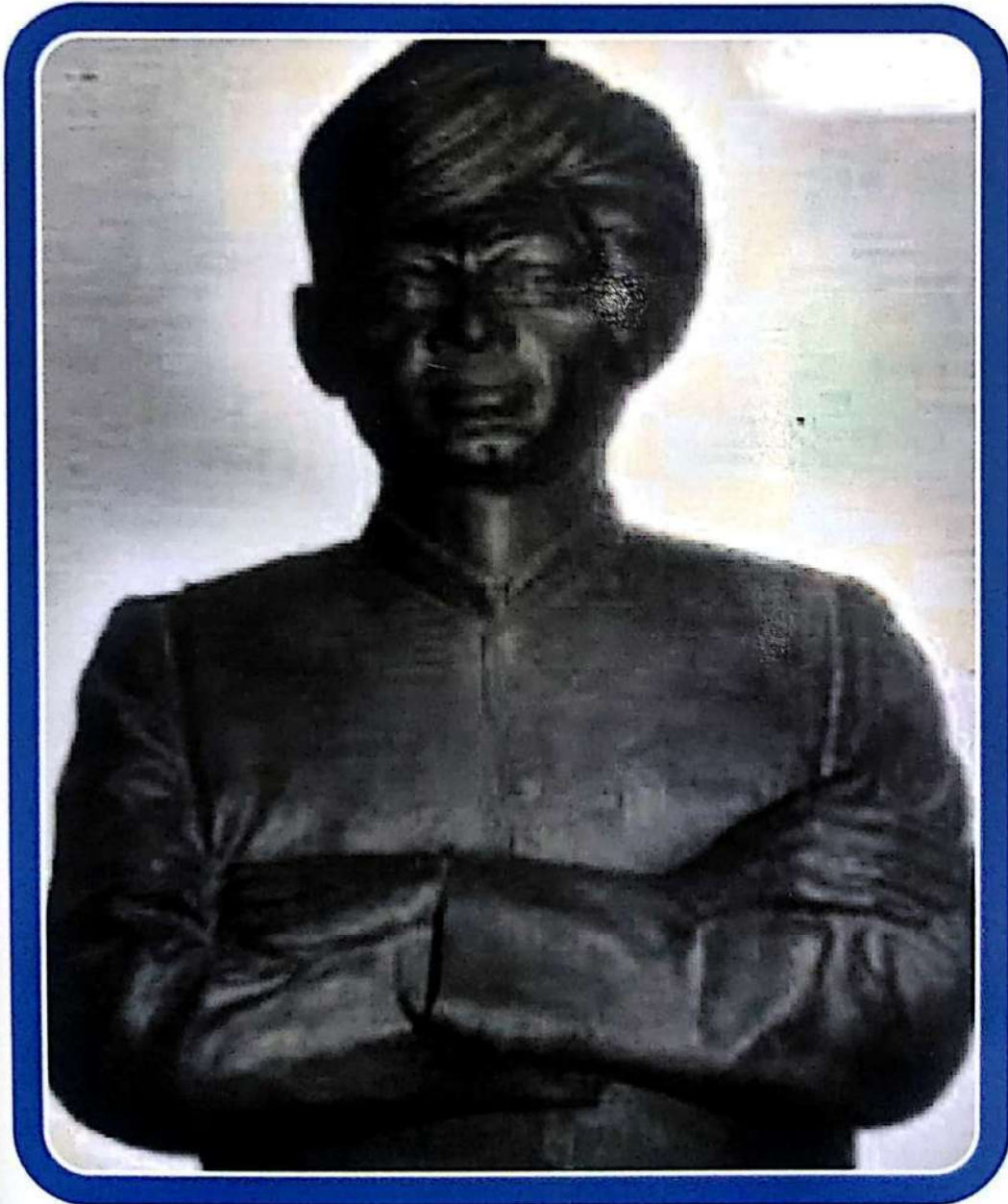
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हरियाणवी लोक-कवि

पं. लखमीचन्द का 'समाज दर्शन'

(Social Philosophy of Pt. Lakhmichand)

(तथ्य, भ्रम एवं समाधान)



आचार्य शीलक राम

# मैं श्रीकृष्ण बोल रहा हूँ...

श्रीमद् भगवद् गीता

राष्ट्र भाष्य

(भाग- 1)

भूमिका



नष्टो मोहः स्मृतिर्लब्धा त्वप्रसादान्मयाच्युत ।

स्थितोऽस्मि गतसंन्दहः करिष्ये वचन तव ॥ गीता, 18/73

अर्थात् हे प्रण से न डिगने वाले श्रीकृष्ण! तुम्हारे प्रसाद से मेरा मोह नष्ट हो गया और मुझे स्मृति की प्राप्ति हो गई है। मैं संदेह रहित हो गया हूँ। आपके उपदेशानुसार युद्ध करूँगा।

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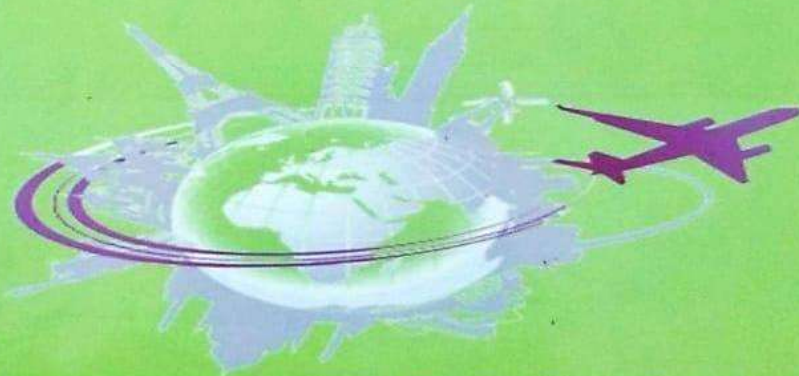
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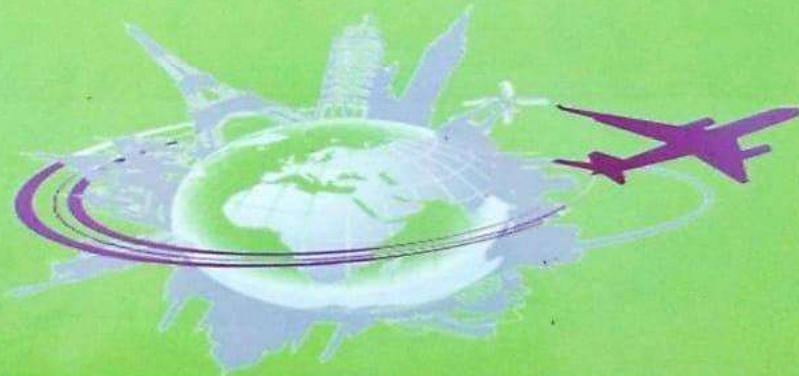
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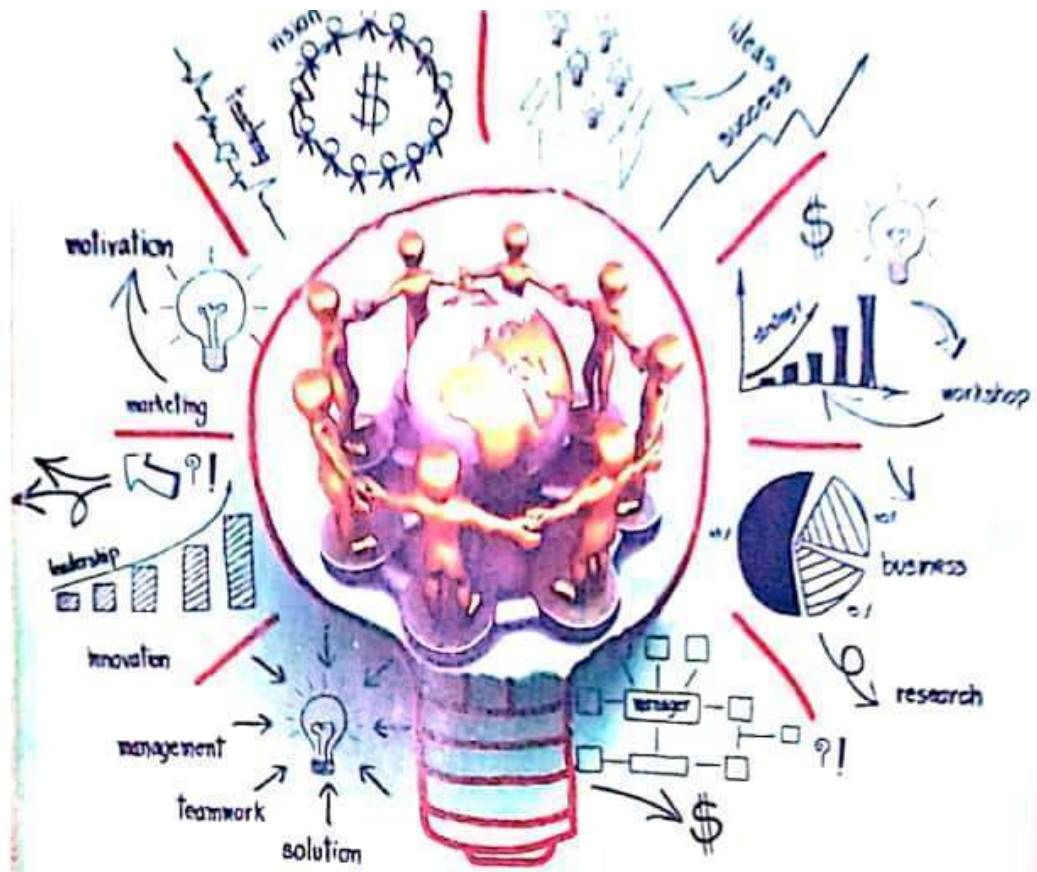
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# Business Management and Social Innovation

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Vikas Kumar  
Supriya Dalal  
Mohit Rewari  
Manisha Mani



# ROLE OF AGRICULTURE IN RURAL ECONOMY DEVELOPMENT OF HARYANA

*Ajay Kumar<sup>1</sup>, Nirmala Chaudhary<sup>2</sup> and Rajesh Kumar<sup>3</sup>*

## ABSTRACT

*India is an agriculture country and agriculture is the backbone of over Indian economy. Agriculture and its allied activity act as main source of livelihood for more than 60% of rural population of India. Agriculture play key role in rural development of Haryana. Haryana is a play a leading contribution in agriculture production and milk. Agricultural raw material provide base for other different production sector it also provides food supply for the urban population. The objective of this paper is to find out the role of agriculture in rural economic development of Haryana. A descriptive study based on the secondary data was conducted for the time period from 2013-14 to 2017-18. Data was taken from different government official websites. Data of the study was analyzed with the help of descriptive statistics. It was conclude that agricultural play significant role in the rural economy development of Haryana. Agriculture contribution in GDP was 2.4 and total 17.6% in Haryana in 2017-18.*

**Keywords:** *Agricultural, Rural economic, Development, Production and Livelihood*

---

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# Ambedkar's Vision of Socio-Economic Transformation



**Editors**

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# Ambedkar's Vision of Socio-Economic Transformation



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# Chapter 24

## Role of Rotifers in Water Quality Assessment

Pooja Devi<sup>1\*</sup> and Anita Bhatnagar<sup>2</sup>

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### Abstract

Aquatic ecosystems both 'lentic as well as lotic' are natural resources to satisfy agricultural, industrial, domestic, recreational or aesthetic needs of humans. Lentic waters are the vital and vulnerable freshwater systems that are critical for the sustenance of all life. At present, world's water resources are under pressure and are in danger due to various kinds of anthropogenic activities. These activities are responsible for altering the water quality and such change in water quality exerts immense influence on the flora and fauna of an aquatic ecosystem. The water quality assessment is very important for implementation of the monitoring and remediation programs to minimize the risk promoted by hazardous substances in aquatic ecosystems. Biological diversity is mainly governed by plankton distribution of any aquatic ecosystem. The study of planktons is a very fundamental tool for the water quality assessment and productivity of an aquatic body that contributes for the understanding of lentic water bodies since they are strongly affected by environmental conditions and respond quickly to changes in water quality. In freshwater systems, zooplankton organisms form an important group, as most of them eat and incorporate the primary producers, the algae into their bodies and make themselves available to be eaten by higher organisms in food chain. Among zooplanktons, rotifers significantly contribute to the zooplankton richness and also play an important link between the nanoplankton and carnivorous zooplanktons, inhabiting a wide range of habitat in aquatic ecosystem. Role of rotifers is very important in the trophodynamics, ecological energetics, cycling of nutrients and aquaculture productivity due to extremely high reproductive rate. So, the study of the rotifer communities of the site can be an important tool in constructing this inventory an important benchmark for evaluating future regional environment. During study of rotifers in religious water bodies of Haryana, appearance of various pollution tolerant taxa viz., *Brachionus calyciflorus*, *Brachionus* spp., *Filinia* sp., *Asplanachana* sp. and *Keratella testudo* after the rituals indicated the polluted

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