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RESEARCH, INNOVATIONS AND EXTENSION

Key Indicator – 3.4

Research Publications and Awards

Metric No.: 3.4.4

Books/Chapters Published

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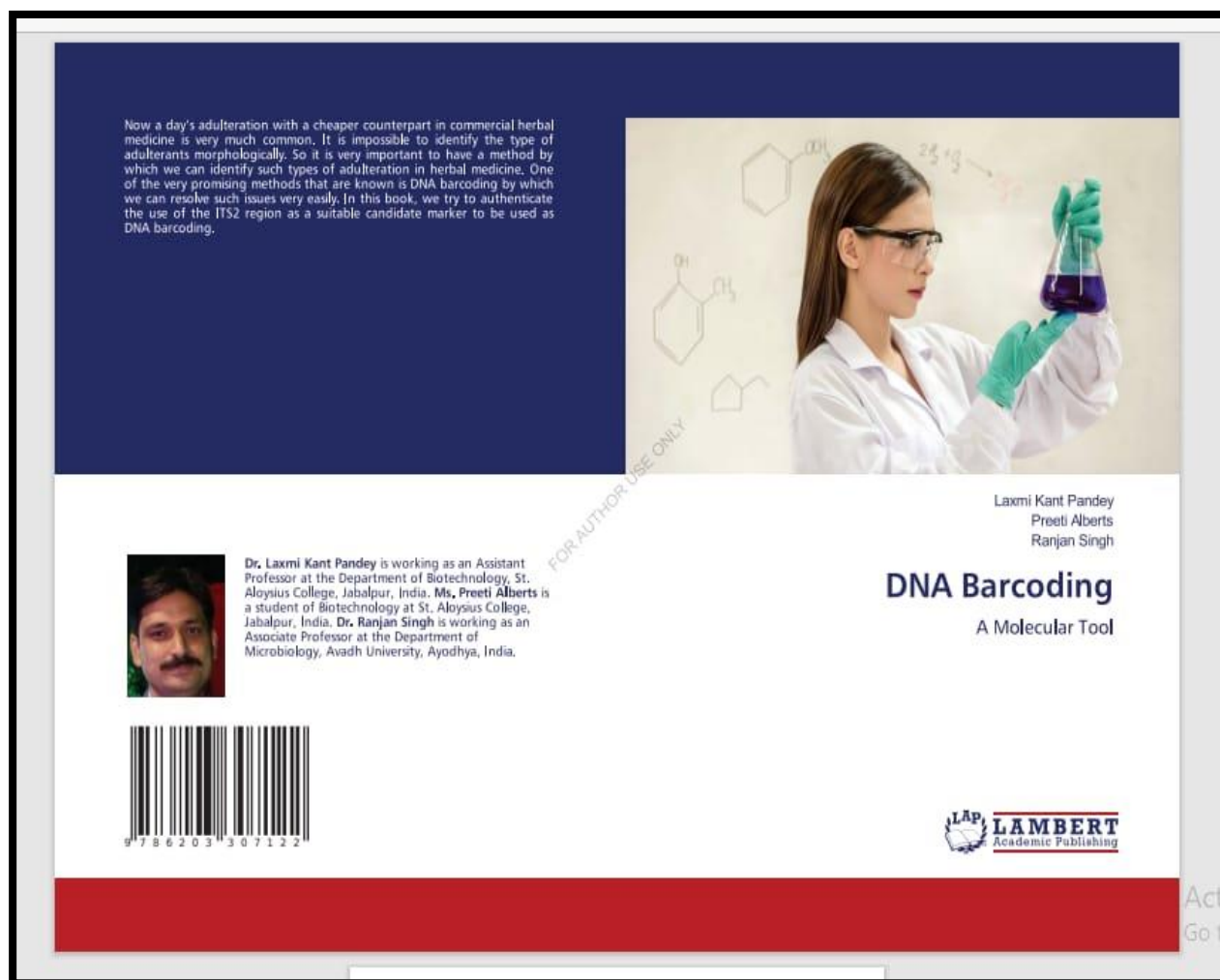
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Mita Darbari is the Dean of Physical Sciences, St. Aloysius College (Autonomous), Jabalpur. She has 34 years of teaching experience. Her areas of interest are Pythagorean Number Theory, Topology, Functional Analysis and Fuzzy Set Theory. She is a registered Research Guide in Mathematics. She has published 38 research papers and 01 book. She has successfully completed two UGC sponsored minor research projects.

Deliberation on Advances in Physical Mathematical and Computational Sciences

Deliberations on Advances in Physical, Mathematical and Computational Sciences

J.G. Valan Arasu
Mita Darbari

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229, Shastripuram, Agra-282007
Mobile : +91 9412458170
e-mail : shreevinayakpublication2009@gmail.com
info@vinayakpublishers.com
sales@vinayakpublishers.com
rajesh@vinayakpublishers.com
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ISBN : 978-93-67099-07-0
9 789387 899070

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Health and Hygiene During Covid-19 Pandemic

About
Editors



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Anjali D'souza Dean of Bioscience Faculty Controller of Examinations, St. Aloysius College (Autonomous) Jabalpur, Reaccredited A+ Grade by NAAC (CGPA) 3.68/4.00, College with Potential for Excellence (CPE) by UGC DST, FIST supported and College with DBT Star scheme Jabalpur, M.P. She has a Doctoral Degree in Chemistry. She is registered as a research guide in chemistry and chairperson BOS department of Chemistry and Pharmacy RDVV Jabalpur. She has published and presented 66 papers and edited 2 books. She has completed 3 minor research projects and organized a number of National Seminars and workshops.

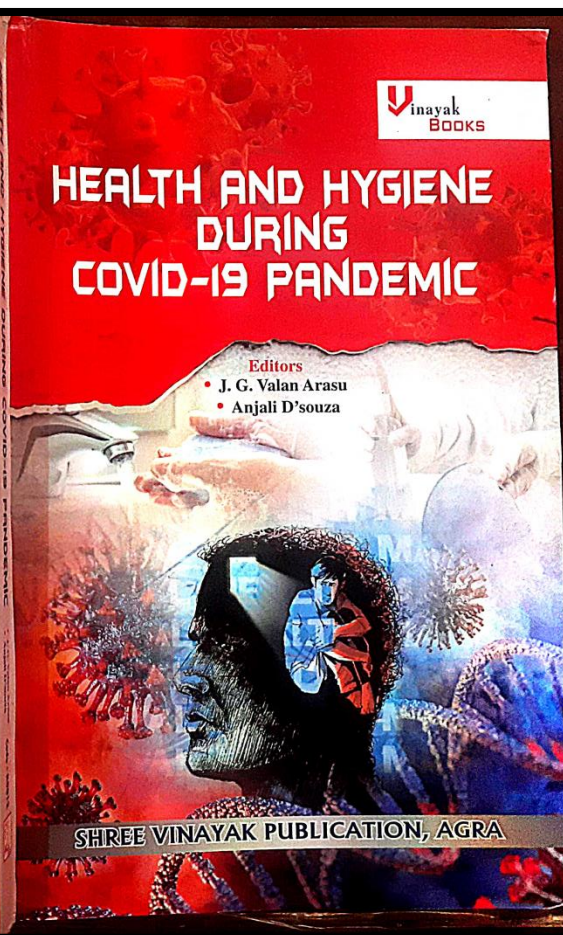


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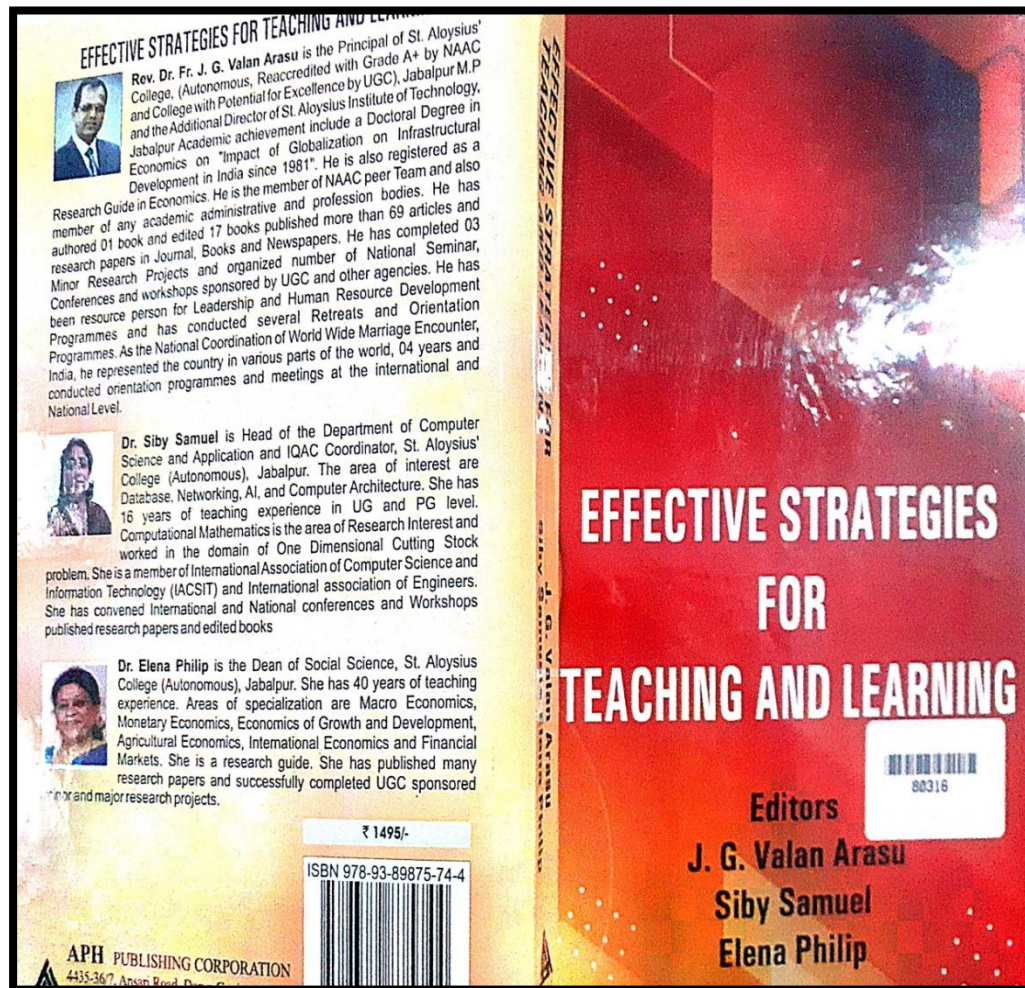
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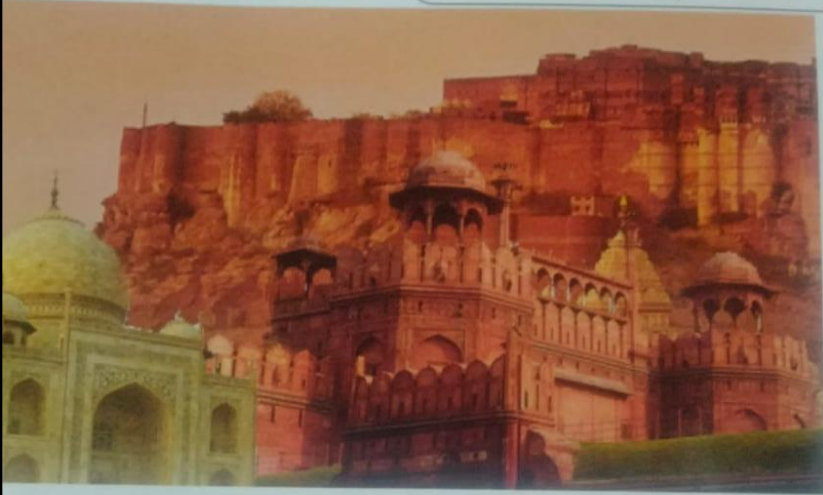
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Chapters in Book Health and Hygiene during COVID-19 Pandemic with

ISBN NO. 978-93- 87109-07-0

Ab ut
Edit rs



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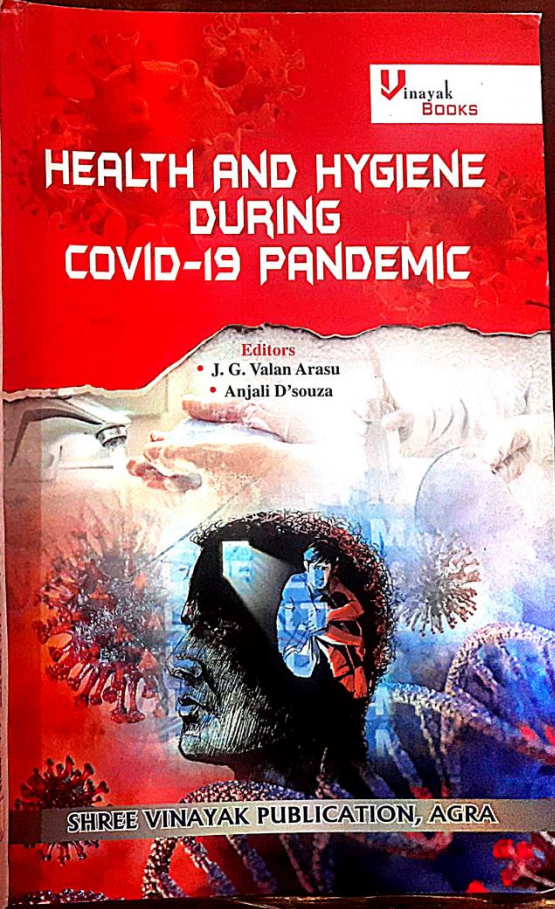
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1

A Fruit Remedy; For Urinary Tract Infection

Sarita Dubey
Anjali D'Souza

ABSTRACT

Different types of fruits have been used to determine the presence of D-mannose in them. Spectrophotometric method is used to Analysis in this study. D-mannose rich fruits are used in the treatment of **UTI (urinary tract infection)**. UTI is one of the major infections faced by the maximum Indian population and a tropical climate. According to urologist, it is one of the most common infections that may increase during monsoon season. D-Mannose is used for preventing UTIs and treating carbohydrate deficient glycoprotein syndrome, and inherited metabolic disorder. Rich amounts of D-mannose present in Cranberry is a good source however Cranberry is not found in India, so there are some fruits that contain D-Mannose. So the objective of the project is to find an alternative or a substitute fruit for cranberry such that it becomes easily accessible and affordable to common man.

Keywords : D-Mannose, urinary tract infection, fruits, Spectrophotometer.

Introduction

India is a home to an extraordinary variety of climatic regions, ranging from tropical in the south to temperate and alpine in the Himalayan north. The nation's climate is strongly influenced by the Himalayas and the Thar desert. India is situated in a subtropical region. Here we mostly face tropical climatic condition, that is, we have three types of climates almost in duration of three to four months each.

The three main climates in India are

- Summer
- Monsoon
- Winter

During monsoon there are outbreaks of many diseases which spread through contaminated food or water which are common during this period. Some of those diseases are **cholera, jaundice** etc .One of the major infection faced by the maximum Indian population is the UTI that is **Urinary Tract Infection** .Urologist say, it is one of the most common infection that may increase during monsoon season.



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Mathematics, Pythagoras, Health and Nature

Dr. (Mrs.) Mita Darbari
Miss Manasi Sahu

Introduction :

Whenever we think of Pythagoras; what comes to our mind is the famous *Pythagoras Theorem* of right angled triangle which has a wide range of applications including Einstein's general theory of relativity. The impact of this theorem was, or rather still is, so great that it outshines all the other contribution of this great teacher and founder of Pythagorean philosophy based on numbers. A recent research in November 2014 has used Pythagoras theorem to identify the point where patient's health begins to improve most effectively [1].

According to Bertrand Russell, Pythagoras was intellectually one of the most important men that ever lived [2].

Pythagoras, considered as the father of pure Mathematics, was the founder a scholarly community. Pythagoras who called himself "philosphos", literally "lover of wisdom", first used the term philosophy, the love of wisdom. His real aim was to reach the truth. He made significant contributions to our knowledge of mathematics, astronomy, and music. Pythagoras tried to answer the essential questions of our existence : What is the purpose of our being? What can we know? And what constitutes the good?

Brief Biography :

Pythagoras, the son of Mnesarchus, who was a seal engraver, and Pythais, was born in 575 B.C. on island of Samos. He spent his childhood in Samos. His father being a merchant had to travel widely and Pythagoras accompanied him. Pythagoras was a rare gifted child who showed wisdom in his childhood also. He got best possible education till the age of 18 in his island and then travelled for 40 years to Lesbos, Tyre (Lebanon), Egypt, Babylon(13 years as prisoner of war) Persia and India to study. He returned to Samos in 520 B.C. and went to Crete to study the system of laws. There he founded a School - Semi-circle, but had to leave Samos due to political unrest. Then he went to Southern Italy to establish his school of Pythagoras [3].



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3

Yoga As A Healthy Way of Life

Dr. Vishwas Patel
Dr. Tuhina Johri

"Yoga is not something that you do. Yoga is something that you become. It is not an act, it is a quality. If you cultivate your body, mind, emotions and energies to a certain level of maturity, a certain quality arises within you. That is yoga."

—Sadhguru

Health is the prime concern of yoga. The processes of industrialisation, modernisation and urbanisation have had a negative impact on the lifestyle of people. Science has changed the world into place of abundance. But on one hand, the unprecedented growth of knowledge and privileges of man have taken place and on the other, due to ever increasing ambitions, desires and competitions, impatience and maddening strains have also increased by leaps and bounds. Change is profoundly challenging. Yoga can reunite the body as well as transform the mind, heart and sentiments. It is basically a spiritual discipline based on a particularly subtle knowledge, which focuses on bringing harmony between the individual and universe, thought and act and spirit and God.

History :

Yoga is a comprehensive life philosophy that started its journey more than 500 years ago as ancient Indian sciences. It has originated from a worldwide desire towards achieving happiness and getting rid of miseries. It is considered the oldest system of personal growth in the world encircling body, mind and spirit. It signifies as a means of uniting the individual spirit with the universal spirit of God. According to Maharishi Patanjali, "Yoga is the suppression of modifications of the mind". The term Yoga has its verbal root as (Yuj) in Sanskrit. Yuj means joining, (Yujyate Anena iti yogah). Yoga is that which joins, What are the entities that are joined? In the traditional terminology it is joining of (JivAtmA) - the individual self with (Param AtmA) - the universal self. It is an expansion of the narrow constricted egoistic personality to an all pervasive, eternal and blissful state of reality. Yoga is one amongst the six systems of Vedic philosophy. It has originated from a universal desire towards attaining liberation from worldly sufferings and the primary focus of yoga practice is living with freedom in all aspects of life, health and harmony. Maharishi Patanjali, rightly called "The Father of Yoga" compiled and distinguished various features of Yoga systematically in his "Yoga Sutras".



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7

Determination of Carbohydrate and Sugar Contained Analysis of Vegetables and Fruits

A.K. Mishra, P. Nayak
D. Verma, and S. Likhitkar

Abstract

Carbohydrate are an essential source of energy for the body to perform normal functions. Having a diet that does not contain carbohydrate can lead to muscle breakdown ketosis and dehydration. Carbohydrates are the most abundant constituents in fruits and vegetables, representing 50% to 70% of the total dry weight. Carbohydrate functions include, among others, the storage of energy reserves and the make-up of much of the structural framework of cells. In many products, monosaccharides comprise a major portion of the total sugars. Glucose, and Fructose are the predominant forms of simple sugar found, specially, in fruits. Sucrose, the primary transport form of carbohydrate in most plants, is a disaccharide yielding glucose and fructose upon hydrolysis. Glucose, Fructose and Sucrose are water-soluble and together they comprise most of the sugars associated with the sweet taste of fruits and vegetables. The relative proportions of glucose and fructose vary from fruit to fruit and, to a lower extent, in the same fruit according to maturity. In the present study spectrophotometric method is described for the determination of the amount the available carbohydrate in vegetable foods. Results are given for analysis of vegetables and fruits such as are used in feeding diabetic patients. It is shown that a large proportion of the available carbohydrate occurs in a soluble form. The maximum contain in glucose is found in Grapes, custard apple, and Sapodilla (cheeku) sample.

Keywords : Carbohydrate, Glucose, Sugar.

Introduction

Carbohydrate are most abundant class of organic compounds found in living organisms. Carbohydrates are a major source of metabolic energy, both for plants and animals. A diet that does not contain carbohydrate can lead to muscle breakdown, ketosis and dehydration. This can be prevented by 50 to 100 gms of carbohydrate per day. In the present work quantitative





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Obesity in Children : An Alarming Health Issue

M. Lal, D. Nandi
S. Shah and A. Chhatri

Abstract :

The prevalence of obesity is increasing globally with near half a billion of the world's population now considered to be overweight or obese. In today's society, health promotion is key to saving health care cost. The aim of this literature review is to explore key findings from national and International research relating to obesity, and the interrelationship between obesity, physical activity and nutrition and other determinants. Lifestyle diseases are ailments that are primarily Based on the day to day habits of people. Habits that detract people from activity and push them towards a sedentary routine can cause a number of health issues that can lead to chronic non- communicable diseases that can have near life-threatening consequences. Protective factors against obesity are considered to be : regular physical activity, a high intake of dietary non-starch polysaccharides/fibre. A broad range of strategies are recommended to reduce obesity prevalence including : influencing the food supply to make healthy choices easier; reducing the marketing of energy dense foods and beverages to children; influencing urban environments and transport systems to promote physical activity; developing community-wide programmes in multiple settings; increased communications about healthy eating and physical activity; and improved health services to promote and manage currently overweight or obese children. This paper review attempts to describe the prevailing lifestyle issue

Introduction

The rise of childhood obesity has placed the health of an entire generation at risk.

Tom Vilsack.

Lifestyle diseases characterize those diseases whose occurrence is primarily based on the daily habits of people and are a result of an inappropriate relationship of people with their environment. The main factors contributing to lifestyle diseases include bad food habits, physical inactivity, wrong body posture, and disturbed biological clock. Lifestyle diseases include atherosclerosis, heart disease, and stroke; obesity and type 2 diabetes; and



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11 Preparation of Biodegradable Sanitary Napkin : Forging Segment of Women Health and Hygiene

Juhi Sharma
Radhika Kurm
Aradhna Patel

Abstract

Menstruation and menstrual practices still face many social, cultural, and religious restrictions which are a big barrier in the path of menstrual hygiene management. In many parts of the country especially in rural areas girls are not prepared and aware about menstruation so they face many difficulties and challenges at home, schools, and work places. While reviewing literature, we found that little, inaccurate or incomplete knowledge about menstruation is a great hindrance in the path of personal and menstrual hygiene management. Girls and women have very less or no knowledge about reproductive tract infections caused due to ignorance of personal hygiene during menstruation time. In rural areas, women do not have access to sanitary products or they know very little about the types and method of using them or are unable to afford such products due to high cost. So, they mostly rely on reusable cloths which they wash and use again. Needs and requirements of the adolescent girls and women are ignored despite the fact that there are major developments in the area of water and sanitation. Women manage menstruation differently when they are at home or outside; at homes, they dispose of menstrual products as domestic wastes and in public toilets and they flush them in the toilets without knowing the consequences of choking. So, there should be a need to educate and make them aware about the environmental pollution and health hazards associated with them. Implementation of modern techniques like incineration can help to reduce the waste. Also, awareness should be created to emphasize the use of reusable sanitary products or the natural sanitary products made from materials like banana fibre, bamboo fibre, sea sponges, water hyacinth.

Introduction

Menstruation wastes are the wastes that are generated by a female in her reproductive years. These wastes are produced during menstruation commonly known as menses, periods, or monthly bleeding cycle. The menstrual flow varies from female to female and may be more or less at the beginning of menses or may change throughout the cycle. Women have developed their own personal strategies to handle this period of time. Globally, these strategies



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Vital Nutrients for Women Health : A Study Relating Science and Religion

Roshni Choubey
Radha Gupta
Rashmi Thakur

Abstract

Nutrition is an age old science that deals with the food and its role in building health. Nutrients play an important role in making health of an individual and hence it is important to emphasize the role of nutrition amongst the society in order to improve the health status all around the globe. This research paper deals with the information available in old scriptures (religion) regarding the health issues and also gives special attention towards women health which in turn could improve the generations.

Key words : Nutrition, religion, Health.

Introduction

Nutrition is an age-old science, which finds mention even in our ancient scriptures. One such scripture is the Bhagavad Gita, a divine song, narrating the conversation between Lord Krishna and Arjuna. The Gita constitutes the principal teachings of the Lord, and contains advice on every aspect of life. This scripture contains instructions on nutrition and health as well, which are as relevant today as they were centuries ago (Bharti K et al., 2019).

Nutrition is the set of integrated processes by which cells, tissues, organs and the whole body acquire the energy and nutrients for normal structure and function, which is achieved at body level through dietary supply, and the capacity of the body to transform the substrates and cofactors necessary for metabolism. Good nutrition is not simply the absence of nutrient deficiencies but defining the appropriate intake for growth and development across the life course, including immune development and function. Nutritional status has been shown to play a key role in relation to important physiological processes such as mucosal integrity and barrier function (eg respiratory, gastrointestinal), cognitive function and immune response, as well as immune disorders, chronic inflammation, frailty, sarcopenia and ageing, and cognitive decline. Nutritional status can also affect resilience, susceptibility and response to therapy – for example, body mass index (BMI) and obesity can affect the body's response to antiviral drugs. It is not surprising, therefore, that poor



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14

Workplace Stress Management to Enhance Productivity

R. Chouhan

Introduction

Stress is a common experience of people in this drastically changing world. It is a fact of everyday life. Mild stress is helpful to improve productivity and induce a person to perform better in various aspects of life. Stress can be useful when you need to focus on or finish a big task. However, excessive stress adversely affects the mental and physical health of a person. Constant stress can make a person to get sick more often and can also lead to long-term health problems such as heart disease, high blood pressure, back problems, and depression. Stress can be defined as emotional and physical strain caused by our response to pressure from the outside world. Stress can come from any situation or thought that makes you feel frustrated, angry, or anxious. Day to day problems, work related pressures and unrealistic expectations of others are some of the causes of stress. Everyone sees situations differently and has different coping skills. Many people feel that they have very little resources or skills to deal with the high levels of stress they are experiencing. When something happens to us, we automatically evaluate the situation mentally. We decide if it is threatening to us, how we need to deal with the situation, and what skills we can use.

How we perceive a stress provoking event and how we react to it determines its impact on our health. We may be motivated and re-energized by the events in our lives, or we may see some as "stressful" and respond in a manner that may have a negative effect on our physical, mental and social well-being. If we always respond in a negative way, our health and personal life may suffer. By understanding ourselves and our reaction to stress-provoking situations, we can learn to handle stress more effectively. In the most accurate meaning, stress management is not about learning how to avoid or escape the pressures and turbulence of modern living but it is about learning to understand how the body reacts to these pressures and learning how to develop skills which enhance the capacity to adjustment with such situations. The overall purpose of this paper is to gain a better understanding of the phenomenon of stress in workplace and also to suggest the solutions to overcome it effectively.



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15

Impact of Sustainable Sanitation on Social Economic Development of India

Dr. Elena Philip
Vidushi Raj

Abstract

Sustainable sanitation is an approach that considers sanitation holistically. It recognizes that human excreta and wastewater are not waste product, but a valuable resource (Sustainable Sanitation and Water Management, SSWM). Improved and sustainable access to sanitation has a great impact on socio economic development of a country. Sustainable Sanitation is not a technology, but an approach. Sustainable sanitation is to recognize that solid waste and wastewater are not wastes, but resources that are valuable and can be reused and recycled. The main objective of sanitation is to provide a healthy and clean environment thereby breaking the cycle of disease. Now-a-days sustainable sanitation is identified as a key driver for economic and sustainable development in general. One of the reasons for the slow progress in developing countries is that policy makers and the general public have not fully understood the importance of the improved sanitation sustainability. In India too, the Central and State governments tend to overlook improved sanitation as a necessary condition of socio economic development or source of improved welfare, and cost benefit analysis has not been commonly used to justify increasing spending on sanitation programs. Both policy makers and the general public have not been presented with comprehensive evidence on the socio economic impact that sanitation has on the economy, the environment and welfare of the population. Researchers have extensively documented the health impacts of poor sanitation but less is known about its economic consequences. Despite widespread recognition of the human and social handicaps that poor sanitation places on developing countries, the considerable economic losses arising from inadequate sanitation are not well recognized, since they are not counted properly. The poor in India suffer substantial harm to their lives, health and scarce financial resources because of inadequate sanitation. Poorer families tend to lose wages and spend precious resources treating illnesses. Children in poorer households are again, the segment that is most affected. Sustainability of sanitation is a key challenge as well as a scope to improve sanitation facilities in India. The Government should use more technical tools and expertise to develop a sustainable



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Mother and Child Health Welfare Schemes in India

Dr. Manju Maria Solomon

Ms. Tanya Talwar

Mother and child health are extremely important for the development of a country. From the moment a child is born, both the mother and child need a lot of attention and care. If the mother is healthy, she will be able to take care of her child. Apart from this, a certain amount of financial expenditure is crucial to ensuring a child's good health. Such financial aid is provided by the government to some extent to the underprivileged. To disburse such funds, numerous schemes have been started by the government. These schemes have had various ramifications so far.

The paper will delve in detail about the various schemes. It will evaluate the effects and outcomes of the implementation of the same. This assessment shall be followed by certain suggestions for effective implementation of the same. The country shall make humungous progress the day mother and child health make it to the topmost priority-level of the government and thus, it is a need of the hour to educate and aware to society regarding Mother and child.

Introduction

Any developing country can't prosper if the basic needs of a large section of Women and Children are not met sufficiently, meeting the adequate standards. Maternal Health is an important aspect for the development of any country in terms of increasing equity & reducing poverty. The survival and well-being of mothers is not only important in their own right but are also central to solving large broader, economic, social and developmental challenges.

Since Independence, the focus of all schemes and works has been industrial and economic progress seconded only by development in the health of the people. We have come a long way since the pre-Independence era of plagues and other epidemics, but the war is not over yet. We have started the war and the foremost soldiers in the war are the mothers and their babies and children. For the country to progress, mother and child health has to be kept above all else. This has been kept in mind and we have made significant progress in this regard.



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18

A Study on Stress Management : with Special Reference to Educated Unemployed

Dr. (Ms.) Hephzibah Beula John

Abstract:

Stress reason out due to various external and internal factors, it makes a periphery around a person. Can't see it or taste it, but chances are good at your workplace-the colourless, odourless toxin of stress. With the increase in technology and the stress factor has peeped into the life of every human being, it has been now a noticeable feat. The stress at education, jobs, peers, families, and also the feeling of inability has been the reasons for increased stress levels. This paper presents the versatile approach to stress experienced by the educated unemployed, in form of literature review and research model. A descriptive survey search was adopted on the basis of random sampling to draw out information from 200 respondents. The findings suggest that symptoms of somatization, depression, and anxiety were significantly greater in the educated unemployed than employed. The physical and behavioural consequences that result due to stress were listed. The study will be able to give a glimpse of the various factors responsible for the stress creation and the techniques used to minimize it.

Keywords : Stress Management, Educated Unemployment, Reasons of Stress, Consequences of Stress, Prevention of Stress, Coping With Stress.

Introduction:

Life in today's scenario has become a lot more complex than it earlier was. Modern lifestyle of individuals is growing unavoidable of stress. In present living, days are full of targets, demands, time bounds, deadlines, and frustrations. For people, now stress has taken commonplace in their routine live. Although stress is good up to some limit, where under some pressure you can work effectively and efficiently. But non-stop stress imbalances the mental and physical health. Body and mind are always running in emergency mode.

You can't see it or taste it, but chances are good at your workplace-the colourless, odourless toxin of stress. Managing stress is vital for ensuring better results and success in professional life. Stress Management is one of the most important agendas for the top management. Stress is contributing many greater problems and has been coming out through stomach and inter-



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19

Lifestyle Disease in the Context of Present Scenario

Dr. Anthonima K. Robin

Abstract:

Lifestyle means the way people use to live with corresponding to the environment and diseases are serious injury or illness due to the same. Lifestyle diseases are the result of improper relationships of people with the environment. Lifestyle diseases causes are related to the activities which lead to environmental degradation, growth and development. India is native to 1.2 billion people and is the most populous nation in the world. The impact of growing non-communicable diseases on this highly populated nation has had profound effects on the mortality rates. our modern lifestyle is typically deskbound, tending towards untimely working hours, inadequate rest and unhealthy food habits. A sedentary lifestyle ensures that we fall prey to lifestyle diseases. This review article highlights the present condition of lifestyle diseases in India.

Introduction:

Lifestyle means the way people use to live with corresponding to the environment and diseases are serious injury or illness due to the same. Lifestyle diseases are the result of improper relationships of people with the environment. A report jointly prepared by the World Health Organization (WHO) and the World Economic Forum said that India will raise the accumulated loss of \$ 230 billion by 2015 due to unhealthy lifestyles and defective diet. It is very important global economic issue and challenge because it determines the standard of living and improves productivity as raise in incomes which ultimately implies good global health. Somewhere lifestyle diseases depends totally upon the income or the level of living standard but sometimes the higher living standards peoples becomes the victim lifestyle diseases includes some bad addictions or habits like taking drugs, alcohol, Technology addiction. In India, the situation is quite alarming. The disease profile is changing rapidly. The World health organization (WHO) has identified India as one of the nations that is going to have most of the lifestyle disorders in the near future. Nowadays, not only are lifestyle disorders becoming more common, but they are also affecting younger population.



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Role of Yoga on the Students in India : An Over View

Dr. Renu Markande

Abstract :

The article focuses on assessing facts of a study on effects of yoga and academic achievement of high school students'. Transcendental meditation reduces stress and improves academic performance mentally causes increased alertness, and the practice of yoga brings improvement in competitive performance. It is inferred from the present investigation that all the high school students have average level of effect of yoga with respect to all the background variables under study. It was proved that students under consideration scored higher grades and had lower stress level as compared to the other students who do not practice yoga.

Keywords : Yoga; Academic Achievement; Meditation.

Introduction:

Yoga is an ancient art which was originated in India around six thousand years ago. Earlier people were used to of practicing yoga and meditation in their daily lives to live healthy and strong whole life. However the practice of yoga was declining day by day in such a crowded and hectic environment. Yoga is very safe and can be safely practiced by anyone anytime even by children also to take it's all the benefits. Yoga is a practice to bring body parts together to make a balance of body, mind and soul.

Review of Literature

Earlier it was practiced by the yogis to meditate them In July, 2013 article in Forbes Magazine revealed how yoga increases student retention rates in public schools by teaching healthy coping mechanisms against stress. With the national dropout rate between 25% and 35% (and as high as 50% among inner city school), mindfulness techniques give students the capacity to cope with stress and provide a sense of self-empowerment, helping students to overcome obstacles that may have seemed impossible before.

In 2007, two doctors from Purdue University and the University of Indiana conducted a study relating to student achievements rates after



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Prevention of Innumerable Disease from Alkaline Water

Meeta Agrawal

Abstract :

When we speak, about the birth of a child, it is always challenging. It is not an easy task to bring a new soul on the earth; as such another may have to pay her power and her strength for the birth. In the same way water allow less pain and less suffering and nurture one belief in one self and give us life. So this study is aimed at assessing and to explore knowledge on alkaline water which we should use in our daily life prevent from different diseases.

Keywords Alkaline Water, pHValue, Various Disease, Fresh Water

Introduction :

No one can survive without water after all, water is the basis necessity of life to live. Most human activities involve use of water in one way or the other. It may be noted that man's equally habitation and civilization sprang up along the bank of rivers. Although the surface of planet is nearly, 71% of water and only 3% of water is fresh of these 3% about 75% is tied up in glacier and polar ice-beds, 24% in ground water and only 1% is available in the form of fresh water in rivers, lakes and ponds suitable for human consumption. Due to increasingly industrialization on one hand, demands of water supply have been increasingly tremendously moreover considerable part of this limited. Whereas quality of water is polluted by sewage, industrial waste and a wide range of synthetic chemical. Fresh water which is limited and precious and vital resources needs to be protected conserved and wisely used by man. In the ancient time period the sage carry of Kamandal, which is made up of pumpkin and Bottle-Gourd which is very natural and alkaline based.

Study on Alkaline water

Dr. Ottowarburg Chemist, Nobel prize winner

"All normal cells have an absolute requirement for oxygen, but cancer cells can live without oxygen a rule without expectation cancerous tissues are acidic whereas healthy tissues are alkaline".



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23

Bio-Cosmetics

Radhika Khatri
Himesh Namdeo
Shikha Bansal

Abstract :

Introduction : The term cosmetic was originated from the Greek word "kosm tikos" which means possessing the power, arrange, and skill in decorating. The creation of cosmetics forms a continuous narrative completely during the antiquity of man as they evolved. The man in ancient times 3000BC applied colors for decoration to draw the animals that he preferred to hunt and also the man endured attacks from the competitor by coloring his skin and enhanced his body for protection and to stimulate fear in an enemy (whether man or animal). The origin of cosmetics was linked with hunting, fighting, religion, and superstition and later linked with medication. Herbal Cosmetics, hereinafter mentioned as Products, are formulated, utilizing several permissible cosmetic components to form the base in which one or more herbal ingredients are utilized to produce defined cosmetic benefits only, shall be called as "Herbal Cosmetics".

The skin diseases and infections are general amid all age groups and can occur due to exposure towards microorganisms, chemical agents, organic poisons existing in the atmosphere, and further to some degree due to malnutrition. The exclusive factor they had to rely on was the knowledge of nature gathered in the Ayurveda. The science of Ayurveda had employed many herbs and verdures to produce cosmetics for beautification and protection from external effects. The natural content in the botanicals does not generate any side effects on the human body; rather, it supplements the body with nutrients and other beneficial minerals.

Ingredients are stated to have various uses in cosmetics, most commonly as skin-conditioning agents. Several ingredients are reported to perform as antioxidants, flavoring agents, and/or colorants. The research showed that numerous of the plants used for improving beauty was also implemented for remedial exercises.

The use of plant components ranged from roots, shoots, leaves, stems, barks, seeds, flowers, fruits and in some instances the whole plant.



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Bio Pesticides as a Potential Alternative for Pesticides : A Review

Ansari T.
Dwivedi S.
Khan S.
Dr. Lawrance S.

Abstract :

The use of a wide range of Chemicals to destroy Pests and Weeds is an important aspect of Agricultural practice in both developed and developing countries. Though, this has increased crop yield and reduced postharvest losses, the expanded use of such Pesticides expectedly results in residues in foods, which has led to widespread concern over the potential adverse effects of these Chemicals on Human Health. Population, likely to receive a Pesticide dose, is at a plausible risk of developing Chronic effects such as Cancer, adverse Reproductive outcome and Immunological effects. The Pesticides currently in use include a wide variety of Chemicals, with highly acute toxicity. Despite the harmful implications involved in the use of synthetic Chemicals, their use is extensive which increases social pressure to replace them gradually with other alternatives that are soft to Humans. This has led to the development of compounds based on the models of Naturally occurring active ingredients of Biological Origin, having various Biological activities known as "Bio Pesticides". Bio Pesticides are a broad array of microbial pesticides, bio chemicals derived from micro-organisms, phytochemicals and other natural sources, and processes involve the genetic modification of plants to express genes encoding Insecticidal Toxins. The use of Bio Pesticides for pest control today is an evolving field in Pest Management.

This Review Paper attempts to describe several aspects of problems associated with Pesticides and their potential replacement with Bio Pesticides as an Alternative.

Keywords : Pesticides, Toxicity, Phytochemicals, Bio Pesticides, Alternatives.

Introduction

Modern agribusiness includes extensive use of pesticides in their activity and it is absolutely clear that in near future the use of Pesticides will be increased. This is due to growing consumption of food at global scale. But, food production faces different problems. For example, new approaches to



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Pollution of Drinking Water And its Effects on Health : Review

Kehkasha Siddiqui
Chanda Shah
Shruti Mishra
Dr. Sutapa Roy

Abstract :

Water pollution in India is a major health hazard. More than 70% of the fresh water in liquid form of our country is converted into being unfit for consumption. Not only India, but other countries are also suffering from the same problem. Various sources of pollution such as sewage discharge, industrial effluents and agricultural runoff and their potential has been studied in mass.

In today's scenario, industrialization and urbanization and increasing population are rising day by day. Common pollutants include human or animal waste; disease-producing organisms; radioactive materials; toxic metals such as lead or mercury; agricultural chemicals such as pesticides, herbicides, or fertilizers; acid rain; and high-temperature water discharged from power plants.

The drinking water is also polluted by waste produced by nuclear reactors. Water disinfection is also a way of polluting water when chlorine is added in large amounts rather than the expected amount during water treatment. As a result, this reduces the water quality and also its turbidity. Industrial wastes contain pollutants like asbestos, lead and mercury which is responsible for water pollution. The primary source of lead in most drinking water source is the piping used within a distribution system. Acid Rain lowers the pH level of water in streams, rivers, lakes, creating adverse effects. Acidic water will also more readily absorb aluminum leached from soil runoff, and the combination of aluminum and acidic water is especially harmful to many aquatic species.

In India pesticides which are used to destroy insects and germs, also becomes the reason of water pollution and is hazardous to the human health. Chemical fertilizers are also the source of water pollution which affects the health of human being. Polluted water is the main cause of a number of diseases.



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Iodine, a Critically Important Nutrient in Daily Diet

Dr. Manju Gupta
Vedanta Tiwari
Subham Sarangi
Soumya Jain
Rituparna Thakurta

Abstract :

Iodine, a trace element, is an important micronutrient required by humans of all age groups. Iodine is an essential component of thyroid hormones which regulate many important biochemical processes. Proper intake of iodine is essential in all stages of life, in a pregnant lady, a lactating mother, foetus, infant and right up to an old age. The deficiency or the excess of iodine can result into serious health problems such as goitre, cretinism, hypothyroidism, hyperthyroidism, still births, abortion, and brain damage, mental retardation, hearing and speech impairments in newborns. Iodine is therefore particularly important for pregnant women, new mothers and infants, as it regulates baby's metabolism, and proper development of skeletal and central nervous system. The primary source of iodine in humans is through dietary intake of table salt. One teaspoonful of iodine is needed for an entire lifespan of 70 years, with a daily requirement of 150 µg/day, which is provided to the body majorly through means of table salt.

In this paper a very simple method for naked eye detection of iodate in table salt samples, is explained which is quick and convenient.

Chromatographic strips were prepared by dipping the strips in a solution of 10% potassium iodide, 10% oxalic acid and 5% starch. The strips were dried on a TLC plate. Later different salt samples were taken, and to check the homogeneity of iodate in the salt packet, number of divisions were drawn on the packet. Further a small quantity of salt was drawn from each division and dissolved in minimum quantity of water. By using a capillary tube, a drop of this salt solution was put on the prepared strip, and the developed colour was compared with Cornell Starch-Iodine index (20% to 100%) to detect the percentage iodate present in the salt sample.

Keywords : Iodate; Table salt; Naked eye detection.

Introduction :

Food and nutrition security at the individual and population levels is a fundamental right. Nutrition security ensures optimal actualization of human



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Feminism and Feminine Mental health : A Psychoanalytical Study of the Novels of Shashi Deshpande

Mary Raymer
Sona Sharma

Abstract :

It is a known fact that women are neither inferior nor superior human beings, but one-half of the human race. Women (and men as well) should not be straitjacketed into roles that wrap their personalities, but should have options available to them. When nature was conferring gifts on humans, it did not differentiate between them for the single purpose of procreation. Lack of opportunities and inferior status for no reasonable cause can have deleterious effect on feminine psychic health. This paper attempts examining the feminist perspectives of Indian families, with an insight into Shashi Deshpande's novels, *The Dark Holds No Terrors* and *That Long Silence*, that munch upon the spiritual and emotional well-being of the female protagonists. Subjugation and subordination of women are the flagpoles that show the trumpeting of feminist theories across the world. India, is no new in this regard. The development of sexual sadism in the male chauvinistic society as seen in the first novel and then the loneliness and acute depression seen in the second are analysed from the viewpoint that affects female health and lifestyle in this country. Also, Shashi Deshpande's views on her feminist approaches in her novels are hereby dealt with.

Keywords : Feminism, mental health, psychoanalysis, familial problems.

Introduction :

The term 'feminism' originated from the Latin word femina which means 'woman'. Feminism in some context refers to the advocacy of women's rights, status and power at par with men on the grounds of 'equality of sexes'. In other words, it relates to the belief that woman should have the same social, economic and political rights as men. Simone De Beauvoir came out with a bold manifesto for a frontal attack on the patriarchal hegemony in our society. In her famous piece of work *The Second Sex*, she has like a intense non-conformist, hit hard at the male dominated customs and conventions, art and culture, philosophy and religion which have always



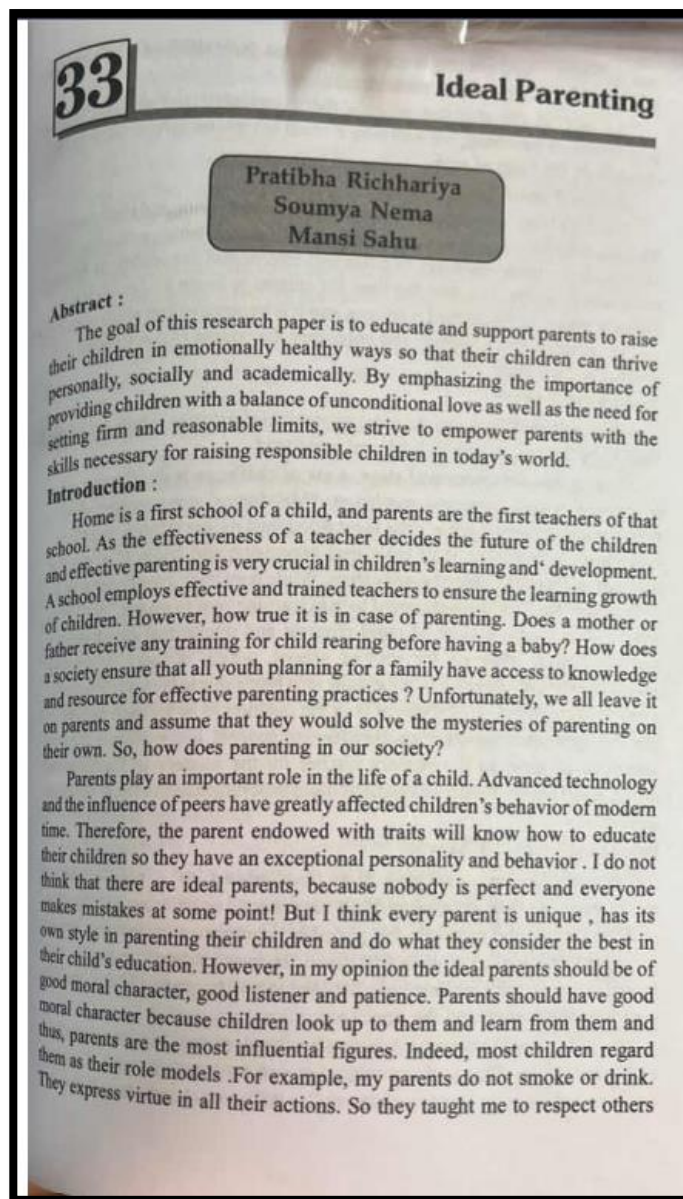
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A Report on Awareness About Government Schemes in Rural Areas

Pratibha Richhariya
Varsha Dubey
Pooja

Abstract :

The research attempts to understand the level of awareness about various government welfare schemes among rural population. In the first stage, the level of literacy in the villages was judged using simple survey method. After assessing the level of literacy, various questions were asked to the people of the particular village about various schemes they were benefitted with. It was found that the people in the rural areas lack awareness about these ongoing schemes. Ultimately, reasons for failure of such big schemes were extracted and analyzed. There were initiatives taken to improve the level of awareness among the rural people through which they were made aware of Government schemes like Jan-Dhan Yojana etc.

Introduction :

The aim of the survey was to measure the awareness among the rural population about the schemes started by the government for their welfare with Special Emphasis on literacy rate. Indian Government at all levels, announces many welfare schemes for the rural population of the society from time to time, but still the population in the rural areas suffer from problem like illiteracy, poverty, lack of sanitation facilities, health issues, gender discrimination etc. Ultimately, these schemes result in a fiasco. There had been many efforts both from the government side as well as public side for better implementation of these schemes. Our aim was to survey such villages in the outskirts of Jabalpur where people are deprived of these benefits which are meant for their upliftment. During the month January 2019, the students of St. Aloysius college conducted a survey. In order that the students achieved their goal, three clearly defined objectives were outlined, namely :

1. To develop and initiate the proper implementation of government schemes started for the welfare of rural population.
2. To spread awareness about the schemes.
3. To find out the reasons behind improper implementation.

From the above listed objectives were derived a number of specified tasks, which would be the focus for the achievement of the goal. The information was collected from individuals at the household level.



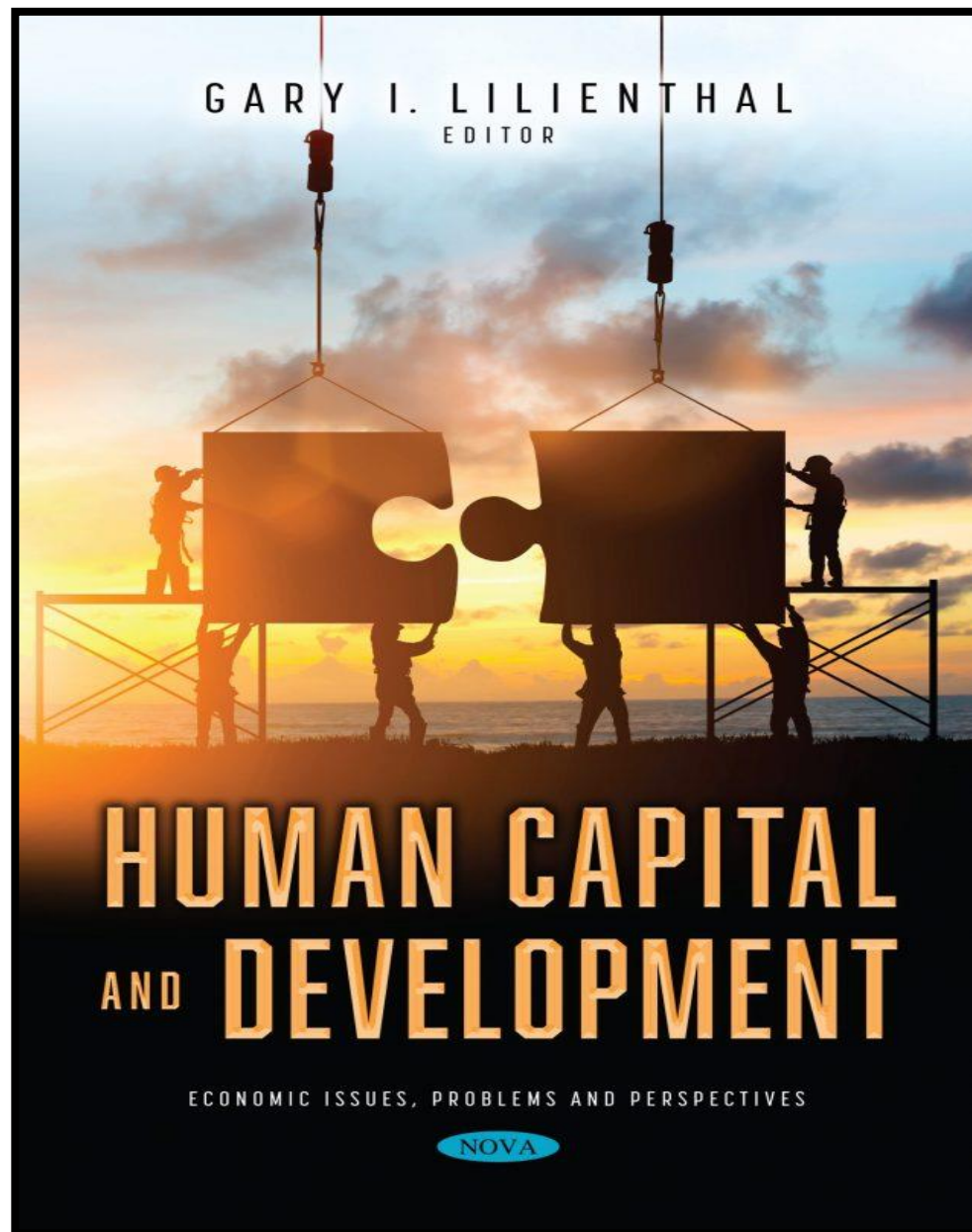
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Dr. Fr. Vazhan Arasu

Chapter HUMAN PROGRESS MEASURED BY THE HUMAN DEVELOPMENT INDEX:
THE CAPABILITIES APPROACH ADVOCATING STATE PROTECTION OF
FREEDOMS

Gary I. Lilienthal¹, PhD and J. G. Valan Arasu², PhD ¹Department of Intellectual Property Law, Tashkent State University of Law, Tashkent, Uzbekistan²Department of the Principal, St. Aloysius College, Jabalpur, India

ABSTRACT- Patrick had declared that humanity was moving towards war upon its own planet, endangering both human prosperity and survival. Thirty years ago, the first UNDP Human Development Report finally stated that Gross Domestic Product (GDP), per capita, was an inadequate measure for human progress. It introduced the Human Development Index (HDI), newly ranking countries also on their quality of education and health. The objective of this research will be to analyse critically the general scholarship of human development. The so-called capability approach to human development, underlying the HDI, is a normative treatment of welfare, concentrating on actual capabilities of people to achieve their own state of well-being, instead of only their freedom or right to it. It was devised in the 1980s to counter welfare economics. Sen and Nussbaum brought together many ideas, previously ignored by the traditional economics of welfare. The capability approach is therefore about what people are capable of doing. The research question is: how has the so-called capabilities approach to human development affected the scholarship of human development, towards curbing the catastrophic excesses of market behaviour? Argument sets out to sustain the proposition that the capabilities approach has focussed the scholarship on crisis, market behaviour, slavery and lacks in equity, as human development retardants, thus advocating early state protection of freedoms of human opportunity. While the research is doctrinal, it also takes the form of a critical investigation into the state of the scholarship, and is therefore a critical literature review. Human development is a dynamic conjunction of a range of cultural, historical, biological and ideological processes. It includes the capabilities of freely maintaining social networks, creative self-expression and developing practical reason. Human development would tend to defray human capital in the hands of the market behaviour of an employer. Newer studies of human development show it to be non-hierarchical, irreducible, incommensurable and hence constituting basic kinds of human ends, suggesting it mitigates against enslavement. Human development takes place according to the affects and relations of those idiosyncratic encounters that affect the body with joy, enhancing its capacity for action. Poverty, inequality and unequal power relationships, as capabilities killers, arguably all consequences of market behaviour, are therefore retardants of human development.

Keywords: human progress, human development index, capability approach, state protection of freedoms, market behaviour



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**THE DOMESTICATION OF HUMAN BEINGS
WITH THEIR OWN EXTERNALISED
METAREPRESENTATIONS: DRAWING
HUMAN CAPITAL FROM ENCULTURATION**

Gary I. Lilienthal¹, PhD and Ashu Jain², PhD

¹Department of Intellectual Property Law,
Tashkent State University of Law, Tashkent, Uzbekistan

²Department of Commerce, St. Aloysius College
Jabalpur, India

ABSTRACT

When humans moved to taming cats, dogs, cattle and sheep, they might have maintained a tradition of taming themselves. Domestication circumscribes a whole range of genetic changes, arising as a species bred to be less aggressive and much friendlier. Modern humans are also more cooperative and less aggressive than human ancestors. The objective of this research is to critically examine human domestication as it might be employed to create human capital for others. The research question asks



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8. The Pandemic Dimensions Of Supply Chain Management - Uplifting The Previously Existing Scenarios

Dr. Mrs. Preeti Jain

Assistant Professor, Department Of Commerce, St. Aloysius
(Autonomous) College, Jabalpur (M.P.)

Navista Amjad

B.Com, B.Ed. (III SEM) St. Aloysius (Autonomous) College,
Jabalpur (M.P.)

Abstract:

The coronavirus (COVID-19) outbreak shows that pandemics and epidemics can bring about devastations on supply chains (SC) around the globe. The COVID-19 pandemic paralyzed the world and exposed the perilous importance of supply chain management. The extensive scope of disruption, enormous spillover of effects across countries and industries, and extreme fluctuations in demand and supply that occurred during the COVID-19 pandemic illustrate that pandemics are qualitatively different from typical disruptions and that optimization of resource allocation and distribution emerged as the most popular topic. As such, this pandemic require supply chain managers to take a fresh look towards the supply chain phenomena and foster transiliency i.e., the ability to simultaneously restore some processes and change often radically others. We have tried to show, no new but, the existing phenomenon of green marketing and rural entrepreneurship as a new aid in the management of the supply chain by enlightening its relevance with the changes that can be brought about.

Keywords:

Supply Chain, Supply Chain Management, Green Marketing, Rural Entrepreneurship, Importance Of SCM.

Introduction:

A rare disaster, a corona virus pandemic, has resulted in a tragically large number of human lives being lost. As countries implement necessary



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New Normal and COVID-19

Impact on Education, Economic, Business
strategies, and Management of the Supply Channel

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Consequences of COVID 19 on Business and Entrepreneurship: a case study of Jabalpur District of MP, India

Ashu Jain*

Introduction

"An entrepreneur need not necessarily mean one who is running a commercial business, but also one who is adventurous". -Sadguru Jaggi Vasudev, founder of the Isha Foundation

The word 'entrepreneur' is derived from French word 'Entreprendre' means to undertake certain activities. Generally, any person starting a new project or trying a new opportunity is a novel scope for doing business. An entrepreneur is a person who accepts commercial risks and accepts new monetary ventures. Someone who inductees and actively operates an entrepreneurial venture. The story of the Indian entrepreneurship is fills with inconsistencies. During the pre-colonial and colonial era, the entrepreneur was seen more as a trader-money lender merchant, bound rigidly by caste associations and religious, cultural and social forces ranging from the philosophy of fate to the system of joint family. Entrepreneurship as the present era understands was definitely not forthcoming from this social segment. Political & economic factors had an extensive effect on the commercial spirit. India, after independence, could claim to have created a conducive environment for blowout of entrepreneurship. It is in this broad backdrop that the later evolution and growth of Indian entrepreneurship has to be located. The COVID-19 pandemic has posed unprecedented challenges for the startup ecosystem of India. The Government of India has joined hands with various stakeholders to offer support to startups. We are trying to combat the pandemic using innovative solutions created by entrepreneurs, we are conducting webinars to offer strategic mentorship to startups, we are helping incubators go virtual. This section offers information and resources for startups, incubators, investors, and mentors to find their footing in these uncertain times.

- * M.Com, M.B.A., (HR) Ph.D.Coordinator, Department of Tax Procedure & Assistant Professor, Dept. of Commerce, St. Aloysius College (Autonomous) Jabalpur, M.P, India, Email- jainashu676@gmail.com, Mobile- +919479641344



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भारत में बहुभाषिकता तथा हिंदी भाषा की चुनौतियां एवं समाधान

डॉ. सरिता गोयल

सारांश

भारत देश विभिन्नताओं का देश है। यह विभिन्नता भौगोलिक होने के साथ-साथ भाषाई तथा सांस्कृतिक भी है। बहुभाषिकता का शाब्दिक अर्थ अनेक भाषाओं का जानकार होना है। किसी देश में बहुभाषिकता उस राष्ट्र में विविध भाषाओं के प्रयुक्त होने की स्थिति है। भारत एक बहुभाषी देश है। भाषा बौद्धिक और भावनात्मक अभिव्यक्ति का साधन है साथ ही यह संस्कृति, वैज्ञानिक ज्ञान और वैश्विक दृष्टिकोण के अंतरप्रजात्मक संप्रेषण की वाहक है। भारतीय संविधान की आठवीं अनुसूची के अनुसार देश में 22 प्रमुख भाषाएं हैं। भाषाई जनगणना के अनुसार भारत में मातृ भाषाओं के रूप में 19500 से अधिक भाषाएं और शैलियां बोली जाती हैं। 121 भाषाएं ऐसी हैं जिनका प्रयोग करने वाले शायद कम से कम 10000 के आसपास देशवासियों हैं। चिंता कि बात यह है कि हमारे देश की 196 भाषाएं आज संकटग्रस्त श्रेणी में हैं। हमें उन्हें नष्ट होने से बचाने के प्रयास करना चाहिए। महान भारतीय कवि दंडी ने कहा था कि 'भाषाओं का प्रकाश छिन जाने पर हम अंधी दुनिया में भटकते रह जाएंगे'। संपूर्ण राष्ट्र को एक सूत्र में बांधे रखने के लिए भारत में सर्वाधिक बोली जाने वाली हिंदी भाषा को राजभाषा का दर्जा देते हुए देशभर में इसके फटन-फाटन की व्यवस्था पर जोर दिया गया है किंतु अनेक सामाजिक, राजनैतिक कारणों से राजभाषा हिंदी को व्यावहारिक रूप में उसका वास्तविक दर्जा ना मिलने के कारण इसका नकारात्मक प्रभाव हिंदी भाषा के फटन-फाटन पर भी पड़ा है। आज देश के विद्यालयों, महाविद्यालयों में हिंदी भाषा विभिन्न चुनौतियों से जूझ रही है। भाषाई विघ्नता व बहुभाषिकता ने हमारी आज तक बचने के बजाय भाषाई समस्या को जन्म दिया है। प्रस्तुत शोध पत्र में भारत में बहुभाषिकता तथा हिंदी भाषा की चुनौतियां एवं समाधान को जानने का प्रयास किया गया है।

कुंजी शब्द - बहुभाषिकता, हिंदी भाषा, मातृभाषा, राजभाषा।

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कार्यालयीन हिंदी के रोजगारमूलक विविध क्षेत्रों की भाषा शैली

डॉ. कैरोलिन सैनी

डॉ. शिवेन्द्र वर्मा का कहना है कि प्रयोजनमूलक हिंदी से तात्पर्य विषयबद्ध और एक परिस्थितिबद्ध हिंदी भाषा रूप से है।

प्रयोजनमूलक हिंदी संकल्पना और प्रयोग।

डॉ. भोलानाथ तिवारी का वर्गीकरण डॉ. तिवारी ने प्रयोजनमूलक हिंदी के मुख्य रूप से सात भेद बताए हैं इनके भेदों और उपभेदों का संकेत करते हुए वर्गीकरण इस प्रकार किया है-

1. बोलचालीय हिंदी
2. व्यापारी हिंदी
3. कार्यालयी हिंदी
4. वैज्ञानिक तथा तकनीकी हिंदी -
5. फैक्टरी लुहारी मिल आदि
6. समाजी हिंदी सामाजिक कार्यकर्ताओं द्वारा व्यक्त होने वाली हिंदी।
7. साहित्यिक हिंदी - कविता, कला साहित्य की विभिन्न विधाओं की भाषा
8. प्रशासनिक हिंदी - प्रशासनिक कार्यों के लिए प्रयुक्त भाषा।
9. जनसंचार पत्रकारिता, आकाशवाणी, दूरदर्शन की भाषा यदि भाषा है तो भाषा विचारों की अभिव्यक्ति इसका पहला प्रयोजन है।

इस देश में एक ही राष्ट्रभाषा, राजभाषा, मातृभाषा तथा संपर्क भाषा आदि ढेरों संकल्पनाओं को हिंदी भाषा साकार करते ही जा रही है जो शासन की प्रकृति के अनुरूप राजभाषा कार्यालयीन या कामकाजी भाषा के नितान्त योग्य है। जो इस देश के बहुसंख्यकों की भाषा है जो जन-जन की भाषा है। जो अनेक प्रांतों की मुख्य भाषा है। कामकाजी भाषा लिखने पढ़ने तथा समझने की दृष्टि से बेहद सरल है, जिसने उत्कृष्ट साहित्य का आधार बनाया तथा जिसमें वैज्ञानिक तकनीकी तथा मीडिया आदि से संबंधित सभी विषयों को अभिव्यक्त करने की अपूर्व क्षमता है। हिंदी के विकास के लिए अलग से प्रयत्न शुरू हुए।

यद्यपि पहले भी इस दिशा में यदा कदा प्रयास किए हुए हैं। हिंदी के प्रयोजनमूलकता की स्वीकृति आज के युग की महती आवश्यकता है, जिसने हिंदी के अध्ययन के लिए एक नई दिशा प्रदान की है। फैक्टरियों, मिलों, बैंकों, उद्योग, प्रतिष्ठानों न्यायालयों तथा सरकारी अर्द्धसरकारी, निजी कार्यालय

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विज्ञापन की प्रभावी भाषा हिंदी

डॉ. प्रीति जैन

आज विज्ञापन हमारे जीवन का अहम हिस्सा बन चुका है। विज्ञापन का कार्य तथा उपयोगिता व्यावसायिक लाभ से ही संबन्धित है। भारत में सबसे ज्यादा लोगों द्वारा बोली तथा समझी जाने वाली भाषा हिंदी ही है। विज्ञापन के लिए भी सबसे महत्वपूर्ण हिंदी भाषा ही है। विज्ञापन के विषय अथवा उत्पादित वस्तुओं के गुण तथा उसकी प्रस्तुति के आधार पर उसकी आन्तरिक एवं बाहरी आवश्यकताओं के अनुरूप भाषा की जरूरत होती है। आज हिंदी विज्ञापन की आवश्यकता के अनुरूप नया रूप ग्रहण कर रही है। विज्ञापन के अनुसार हिंदी भाषा में नित-नये प्रयोग हो रहे हैं। इससे भाषा का विकास हो रहा है और हिंदी मात्र पुस्तकों की भाषा न होकर नए समय और समाज की जीवंत भाषा बनती जा रही है। प्रस्तुत शोधपत्र में विज्ञापन की प्रभावी भाषा बनती हिंदी पर प्रकाश डाला गया है। साथ ही विज्ञापन भाषा के गुण एवं विज्ञापन भाषा के उपकरणों की व्याख्या की गयी है।

कुंजी शब्द- विज्ञापन, भाषा, साहित्यिक भाषा, विज्ञापन के भाषा गुण, उपकरण

प्रस्तावना

राष्ट्रभाषा एवं विश्वभाषा हिंदी का व्यापक प्रयोग, विज्ञापन जगत की आज अनिवार्य आवश्यकता बन गया है। हिंदी के बिना हिन्दुस्तान में जन-जन तक पहुँचना संभव नहीं है। शब्द भण्डार, व्याकरण और साहित्य सभी दृष्टियों से अत्यन्त समृद्ध, प्राचीन भाषा हिंदी का आज के इस अर्धप्रधान युग में महत्वपूर्ण स्थान है। विज्ञापन जनसंपर्क की सर्वश्रेष्ठ विधा है। विज्ञापन किसी उत्पाद या सेवा की छवि-निर्माण में सहायक होता है। विज्ञापन वही सफल माना जाता है जो ग्राहक के मन में आकर्षण तथा वस्तु को खरीदने की अदम्य आकांक्षा तथा भावना जगा देता है। विज्ञापन की सफलता के लिए उसकी भाषा रोचक, स्पष्ट, सरल तथा आम बोलचाल की भाषा-जैसी हो, ताकि सामान्यजन एवं सम्बन्धित

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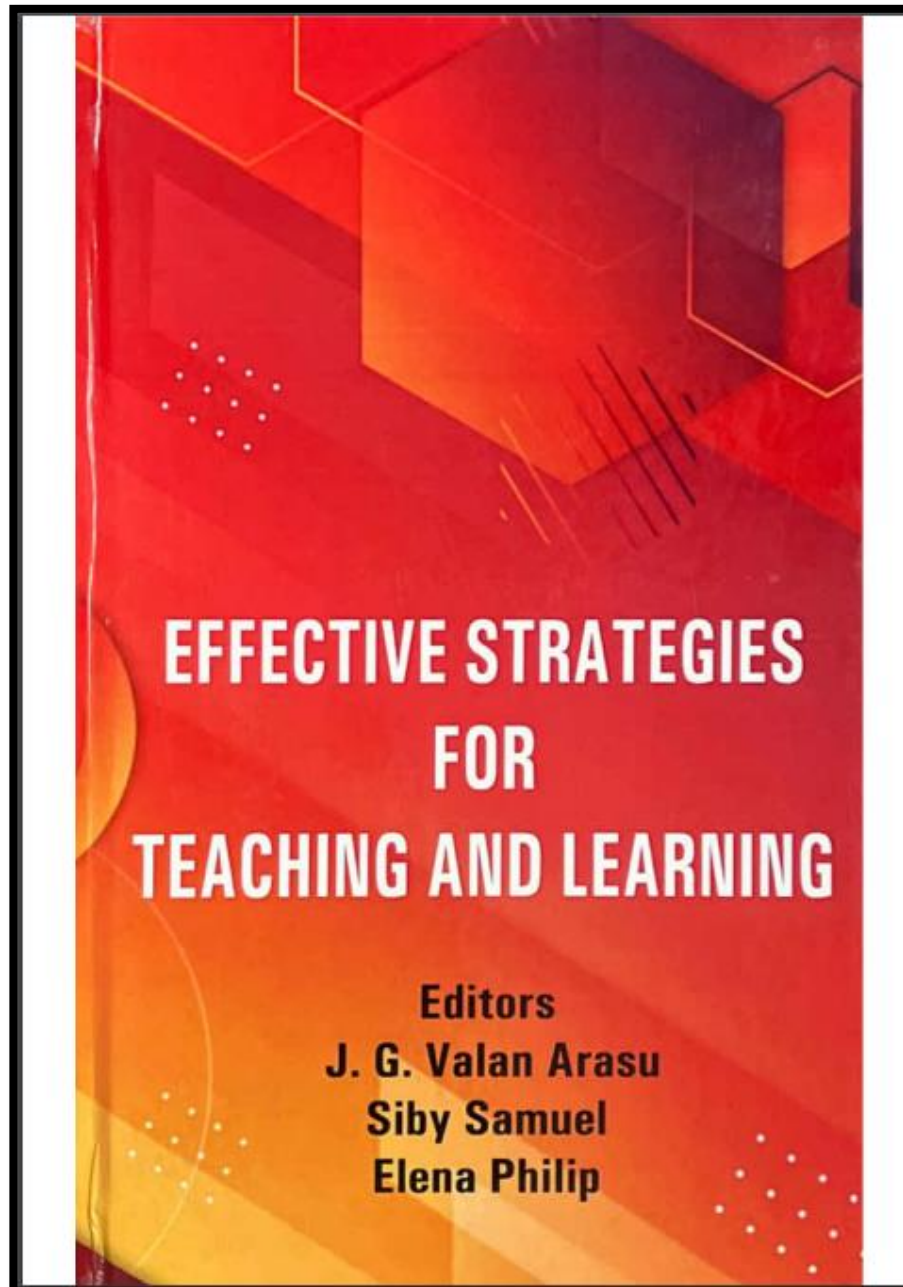
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ISBN NO. 978-93-89875-74-6



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FOR
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Quantitative and Qualitative Indicators: Fostering Quality Teaching and Learning in Higher Education

Dr. Elena Philip and Dr. Anjali D'Souza**

INTRODUCTION

Higher education systems and institutions worldwide have undergone extensive reform and change with the agenda of improving quality. A significant feature of this has been the drive to produce systematic evidence of effectiveness and efficiency (Doyle, 2006; Guthrie & Neumann, 2007; Hayford, 2003). Higher education institutions have progressively implemented more systematic, formalized quality assurance processes, recognizing this as a way to achieve greater efficiency and accountability within their organization (Burke & Minassians, 2001). The development of quality assurance processes has occurred in concert with the establishment by governments of quality models and organizations designed to audit and review university performance across state and national boundaries. Institutional and national quality models and performance indicators are considered vital components in raising the standard of higher education, with organizations such as the World Trade Organization (WTO) assisting developing countries to introduce performance indicators and quality assurance at institutional and national levels (Marginson & Van der Wende, 2007). At the international level,

*St. Aloysius' College (Autonomous) Jabalpur, M.P.

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Impact of Innovative Teaching Methods on Learning Outcomes

Dr. Rupali Ahluwalia, Dr. Nidhi Khurana* and
Dr. Komal Rawat**

ABSTRACT

Innovative teaching methods change our way of life, ways of communication, way of thinking, feelings, social skills and social behavior. Today, teachers are likely to manifest a high degree of professional competence, and therefore to be able to manage their classes in such a way that students derive the maximum benefit. For the innovative teaching method, the teacher employs various means to involve the students to get interested in the process of learning. Unlike the traditional class room that is locked at the end of the day, innovative method allows the students to access educational resources from anywhere at any time. The innovative teaching impacts the learning outcome of students. The objective of the paper is to identify various innovative teaching methods and to analyses its implementation other than routine classroom teaching and to offer suggestions on the basis of findings.

Keywords: Innovative Teaching Methods, Quality in Education, Learning Outcome.

*Dept. of Commerce, St. Aloysius' College (Autonomous), Jabalpur.

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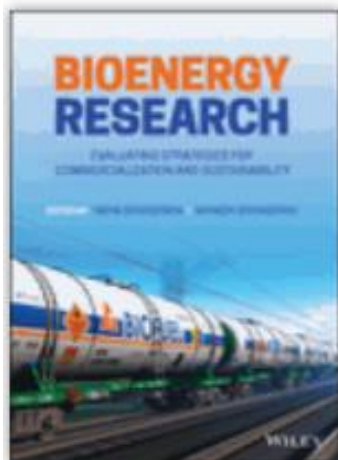
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Bioenergy Research: Evaluating Strategies for Commercialization and Sustainability

Editor(s): Neha Srivastava, Manish Srivastava

First published: 26 April 2021

Print ISBN: 9781119772095 | Online ISBN: 9781119772125

| DOI: 10.1002/9781119772125

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Chapter 3

Biohydrogen Production from Cellulosic Waste Biomass

Enosh Phillips

Book Editor(s): Neha Srivastava, Manish Srivastava

First published: 27 April 2021 | <https://doi.org/10.1002/9781119772125.ch3> | Citations: 1

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Summary

Hydrogen is the most abundant element present on earth. It is a promising fuel of the future, as its production is the solution for environmental problems developed due to the use of fossil-based fuel. Sir William Robert Groove of Wales is credited for the invention of the first hydrogen-based fuel cell. In terms of energy content, H₂ has the maximum energy value as compared to methane, ethanol, and methanol, as well as other biofuels. The energy value of H₂ is 142 KJ g⁻¹. Thus, it can be used for direct combustion in internal combustion engines and as fuel in fuel cells. Cellulose is found abundantly in nature and is synthesized by a wide range of living organisms, from bacteria to trees. It is a polymer, composed of D-anhydroglucose rings joined together by β-1,4 glycosidic oxygen linkages. It can be used for hydrogen production. Billions of tons of cellulosic waste are produced every year and if enacted properly, they then can be used for efficient bio-H₂ production. The biological approach for biohydrogen production is much more acceptable than conventional methods like thermochemical and electrochemical, as the former requires less energy input and is environmentally friendly. Pretreatment plays a vital role in bio-H₂ production along with temperature and pH. Wheat and rice bran, straw, de-oiled jatropha, and rice bran leaves can all be used for hydrogen production. From cellulosic waste, an estimated amount of 3–4.5 mol of H₂/glucose molecule is reported. Bio-H₂ is the future fuel and much of its production depends on finding cellulosic waste, as it is easy to collect and is inexpensive, decreasing the production cost and supporting its use to replace fossil fuel.