"Look at the sky. We are not alone. The whole universe is friendly to us and conspires only to give the best to those who dream and work. -A. P. J. Abdul Kalam"

THE 'SKY' IS THE LIMIT

Indian Ocean - The Indian Navy showcased its formidable maritime capabilities today with a spectacular display of multi-carrier operations and the coordinated deployment of more than 35 aircraft in the Arabian Sea. This demonstration of naval prowess underscores India's commitment to safeguarding its national interests, maintaining regional stability, and fostering cooperative partnerships in the maritime domain.

It also marks a significant milestone in Indian Navy's pursuit of enhancing maritime security and power-projection in the Indian Ocean, and beyond. The exercise involved seamless integration of two Aircraft Carriers INS Vikramaditya and the indigenously built INS Vikrant- along with a diverse fleet of ships, submarines and aircraft, showcasing India's technological expertise in the maritime domain.

INS Vikramaditya and INS Vikrant, centre-pieces of the exercise, serve as 'floating sovereign airfields', providing a launch platform for a wide array of aircraft, including MiG-29K fighter jets, MH60R, Kamov, Sea King, Chetak and ALH helicopters. These mobile bases can be positioned anywhere, allowing for increased mission flexibility, timely response to emerging threats and sustained air operations to safeguard our national interests across the globe. In addition, they provide our friends with an assurance that the Indian Navy is capable and ready to support our 'collective' security needs in the Region.

The successful demonstration of two-carrier battle group operations serves as a powerful testament to the pivotal role of sea-based air power in maintaining maritime superiority. As India continues to strengthen its security apparatus, significance of Aircraft Carriers will remain paramount in shaping the nation's defence strategy and promoting regional stability.

G20 Development Ministers' Meeting

The Union Minister of External Affairs Dr S. Jaishankar will chair the G20 Development Ministers' Meeting which is scheduled to be held between 11-13 June 2023 in Varanasi, Uttar Pradesh. Prime Minister, Narendra Modi will deliver a special video address at the beginning of the meeting, under the G20 Indian Presidency. The Varanasi Development Ministers' Meeting takes place amidst mounting developmental challenges that have been further aggravated by economic slowdown, debt distress, impacts of climate change, pollution and biodiversity loss, growing poverty and inequality, food and energy insecurity, cost-of-living crisis, global supply-chain disruptions, and geo-political conflicts and tensions. The G20 Development Ministerial meeting will be an opportunity to collectively agree on actions for accelerating achievement of the SDGs and foster synergies between the development, environment and climate agendas while avoiding costly trade-offs that hold back progress for the developing countries. The meeting follows the Voice of the Global South Summit that was hosted by India in January 2023, and the decisions taken at the Varanasi meeting will also contribute to the United Nations SDG Summit which will take place in September in New York. The Development Ministers' Meeting was preceded by the fourth and final Development Working Group (DWG) Meeting, which was held in Delhi from June 6-9.

The meeting will consist of two main sessions, one on "Multilateralism: Collective Actions for Accelerating Progress towards SDGs" and another on "Green Development: A LiFE (Lifestyle for Environment) Approach". The DWG, while building on the crucial work done by previous G20 presidencies, has carried forward its mandate of enhancing G20's contribution to accelerating progress towards SDGs and strengthening G20 long-term vision in this regard including by strengthening G20 efforts towards fostering sustainable, inclusive and resilient economic growth. A total of 200 delegates are expected to attend the meeting. Cultural programmes, exhibitions and excursions have also been organized to provide the delegates a glimpse into the rich culture and traditions of Varanasi, one of the oldest cities in the world.

ALGAE BY-PRODUCTS: THE FUTURE SAVIOR

■ **DR. WAHIED KHAWAR BALWAN**

You must have noticed a green slippery layer growing either on top or below ofdifferent water bodies like ponds, lakes, oceans, rivers and even insnow, it could be anywhere on Earth and wondered what is it? That green layer consists of a plant-like living organism called "algae".Till date approximately 1,65,290species of algae and there infraspecific names have been known. On the basis of their physical and ecological features they can be categorized into different forms. Majorly, theyvary in size and can be categorized into microalgae and macroalgae. Algae can be single cellular or multicellular, and are capable to produce their own food as well as manufacture a range of useful products by the process of photosynthesis.

In few years, what brings the most focus on these organisms is their short doubling time, due to which they are considered to be the fastest growing creature. They have an ability to fix the sunlight, atmospheric carbon dioxide and other essential nutrients to convert into biomass. This end product has attracted many researchers to extract their food and fuel capabilities. Algae as a food have been explored for different applications as in production of single cell proteins, pigments, bioactive substances, pharmaceuticals and cosmetics. In fuel industry,algae biofuels have been developed as a solution with clean, nature friendly, cost effective solutions over other fuels. The present overview has been prepared to throw a light on few applications of algae as food and fuel on commercial basis. Commercially algae are grown in large areas to use the economies of scale. Solazyme, Exxonmobil and Sapphire energy are some giants in this area who are trying to make fuel derived from algae commercially viable.

The growth of algae is dependent upon various factors like temperature, pH, irradianceand growth media. The most common growth media are Zarrouk's and BG11 as the product and biomass yield of algae is highest in these two media. The change of any one of the above conditions can improve or diminish the growth of algae and bioproducts obtained significantly. Hence, to make the product obtained from algae commercially viable, optimization of the growth conditions is of prime importance. After the growth of algal species in suitable media and conditions, the algae are harvested. This step is necessary because algae are cultured in liquidrich media. Around 20-30% of the total expenditure can be accounted for in the harvesting stage, which may also increase up to 50% depending on various cases. The small size of the algae, the media it is grown in, the similardensity of the microalgae and the frequent need for the harvesting techniques owing to the high growth rate of algae are the various challenges faced during harvesting. The harvesting technique is selected on the basis of the properties of the microalgae.

On the laboratory scale, the filtration method is used, which is followed by the centrifugation process corresponding to the dewatering phase (concentrating the algae slurry). The main focus after the harvesting phase should be on processing the biomass separated from the culture media because it can be spoiled in a few hours in the hot climate. In addition to this, it has also been stated the biomass may be subjected to degradation induced by the process itself and also by the enzymes present in the algal cells. An example for the same is the action of lipase contained in the cells which readily hydrolysed the cellular lipids into free fatty acids, which turns unsuitable for conversion into biodiesel. Some of the products obtained from algae are algae biofuel, pharmaceutical, natural colors etc.

ALGAL BIOFUEL

India has a population of 1.3 billion people and it is projected to be the world's most populous country, surpassing China by 2027. Also, it will be the 3rd largest economy by 2025. With the growing population and improving the standard of living, the energy needs in India will increase exponentially in the future. Hence, there is a need to find alternative sources of energy that are commercially viable to ensure energy security, with the limited reserves of fossil fuels getting depleted. Also, finding alternative sources of biofuels instead of importing them will save India billions of foreign exchange money. The economic viability of firstgeneration biofuels was questionable as they are derived from food materials like starch, sugar, vegetable oils etc., and hence risking food security. Similarly, the idea of using secondgeneration biofuels was rejected as it was obtained from waste biomass such as stalks of wheat/ corn and had low yields. Third generation biofuels are obtained from algae and overcome the problems like rising food prices and food shortages and also the problem of inconsistent feed of the earlier two generations of biofuels. The algae have a higher lipid production rate in comparison to terrestrial plants due to the simple cellular structure being more efficient in photosynthesis and the growth of algae being 10 times faster than plants. It is estimated that algae can produce 30 times more lipid per unit area as compared to terrestrial plants and can grow in a variety of conditions.Using algae for biofuel production also has other advantages like high carbon dioxide sequestration capacity due to which algal plants can be opened near polluting industries serving two purposes at the same time. With newer technologies being developed, wastewater can also be treated by using it to grow algae as it contains impurities in the form of organic material which can be used by algae as its food source. For the biofuel to be commercially viable, various researches have been completed and many are still undergoing to find the algal species with the highest lipid production and the suitable physiological conditions for it to grow.Botryococcusbraunii, Scenedesmus sp., Chlorella sp., Nannochloropsis sp. are some of the algal strains with the highest lipid content. The optimum conditions for their growth vary from 25 °C- 35°C in temperature, 8-12 hours of sunlight and 7-7.2 pH. After the growth and harvesting of algae, the extraction of biofuels is done. There are 3 ways in which it can be done. These are pressing oil from the algae by which up to 70% of the oil can be retrieved, chemical oil extraction using hexane solvents for extraction of 95% of the total biofuels and finally the most expensive and technologically advanced method supercritical oil extraction which uses carbon dioxide at critical temperature and pressure. 99.99% of oil can be extracted by this method. Hence, to meet the future energy demands and for a sustainable future, more ventures in this field are required along with support from the government in the form of incentives and policy interventions.

PHARMACEUTICALS

The market of pharmaceuticals and nutraceuticals runs in billions and is continuously growing. Algae are a rich source of bioactive substances, and a variety of medicinal products made from algae have a high market value, but industrialization is still in its infant stage. The pharmaceutical product obtained from algae includes antivirals, antimicrobials, antifungal, therapeutic proteins and drugs. Bioactive compounds are physiologically active compounds that have tremendous uses in the functional properties of the human body. There has been a recent increase in the number of researches being carried out to identify new commercially viable bioactive compounds because of their numerous health benefits. There have been numerous researches on bioactive compounds obtained from various algal strains like Chlorella vulgaris, Dunaliellasalina, Botryococcusbraunii. These researches have led to the identification of their antibacterial, antifungal and antiviral activities. Spirulina, one of the most extensively studied blue-green algae, has shown tremendous opportunities in the treatment of HIV, Hyperlipidemia, obesity, cancer and general improvement to the immune response in renal protections against heavy metals. Nostoc is other blue-greenalga that has found applications in medicine for its anti-inflammatory and anti-microbial properties, as well as a food supplement due to its high protein, fatty acid and vitamin content. Intensive research has been carried out only on a handful of microalgal species. Additional studies into these bioactive substances are needed to confirm their beneficial effects on humans as well as their overall consequences on the environment and animals when released. Hence, there is a need to realize the untapped potential of algae in the field of pharmaceuticals and capitalize on tremendous global market opportunities.

DIRECT USES OF ALGAE

Algal biomass, like algal by-products, also finds its usage in a number of fields. Algal Biomass has been used for direct human consumption since ancient times as recorded in Chinese literature dating back to 2500 years. Due to its high protein content, as well as vitamins and phenolics;Spirulina platensis is gaining worldwide interest as a food supplement.Many nutrients remain in the biomass after the recovery of oil from algae. Algal species include several chemicals that encourage blooming, left or stem growth, and germination, hence this left biomass can be employed as a biofertilizer. Other applications include paper fibers, carrageenan as emulsifying and stabilizing agents in various foods, aquaculture feed, and so on.

SOURCE OF NATURAL COLORS

Colorants are added to food items, drinks and cosmetics to make them look more attractive, natural and fresh. Colorants can be derived from either natural sources or synthetic sources. Synthetic dyes are obtained from petroleum products whereas natural sources include plants and microalgae. Although the use of synthetic colorant is used more than the natural ones because of their high yield compared to natural sources, there has been a gradual shift in the recent years towards the natural sources. Synthetic colorants are banned in various countries because of their unsafe nature and associated health risks. Some commonly used synthetic colorants are known carcinogens, allergens and irritants. Production of colors from microalgae has many advantages over synthetic sources like cheaper, easily extractable, no lack of raw material and seasonal variation. Carotenoids and phycobiliproteins are major pigments of the microalgae which may be used as a color. Carotenoids are color compounds that are lipid-soluble and are found in higher plants and algae and also non-photosynthetic organisms like fungi and bacteria. More than 600 carotenoids are known and ?-carotene, which acts as Provitamin-A is one of them. Various researchers have found ?-carotene to be anti-carcinogenic and prevent the risk of heart diseases. Dunaliella, Chlorella zofingiensis are some of the suitable candidates for carotenoids production. Phycobiliproteins are water-soluble photosynthetic pigments and their major producers which are exploited for commercial uses are cyanobacteriumArthrospiraSpirulina and the rhodophytePorphyridium. Like other byproducts, the amount of Phycobiliproteins produced also depends upon the intensity and quality of light. The number of phycobiliproteins produced by Spirulina varies from 11-12.7% at different light intensities. These phycobiliproteins are used in food as natural dyes, cosmetics, and biomedical research as fluorescentdyes.

CONCLUSION

Algae by-products are promising sources of biofuels, pharmaceuticals, food additives, cosmetics and numerous other substances. Although the number of by-products produced by algae and their uses is vast, there is still some room for improvement for better commercial exploitation of algae and minimizing the negative effects on the environment. Hence, there is a need to spend more on R&D for targeted research on algae for better yield of by-products to make them commercially viable in these multibillion-dollar industries for a better and sustainable future.

'Any Error in this Manuscript is silent testimony of the fact that it was a Human effort'

**(Senior Assistant Professor & Head
Department of Zoology
Govt. Degree College Kilhotran, Doda).**

Child Psychology: Not Childish, Need to Understand in Deep

■ **DR. RAJKUMAR SINGH**

Child psychology is a branch of psychology that focuses on the study of children's development, behavior, and mental processes. It involves understanding how children think, feel, and interact with the world around them.Child psychologists examine various aspects of child development, including cognitive, social, emotional, and physical development. They explore topics such as language acquisition, moral development, peer relationships, attachment, and the impact of family dynamics on a child's well-being.Child psychologists use a variety of research methods and techniques to assess and understand children's behaviour and psychological functioning. In the light of this they conduct observations, interviews, and standardized assessments to gather information about a child's strengths, challenges, and overall psychological well-being.It is crucial for parents, educators, and professionals working with children. It helps in identifying and addressing developmental issues, promoting positive mental health, and supporting children's overall well-being. Effective interventions and strategies can be implemented based on the knowledge gained from child psychology.In addition, children face various challenges and milestones throughout their development, such as language acquisition, motor skill development, puberty, and identity formation. Understanding these developmental stages helps in assessing and supporting children's progress.However, in general, each child is unique, and their psychology is influenced by a combination of genetic, environmental, and individual factors.

Initiation of child psychology

Child psychology has its roots in the early 20th century when researchers and theorists began to focus specifically on understanding the development and psychology of children and among all Sigmund Freud's psychoanalytic theory, developed in the late 19th and early 20th centuries, included a focus on childhood experiences and their influence on adult development. His work highlighted the significance of early experiences and the unconscious mind in shaping personality.Secondly, Jean Piaget's cognitive development theory, formulated in the 1920s and 1930s, who emphasised the role of cognitive processes in children's intellectual development. He proposed that children progress through distinct stages of cognitive development, characterized by different ways of thinking and understanding the world.In line, another theory is Lev Vygotsky's sociocultural theory, developed in the 1930s, which underlined the importance of social interaction and cultural context in children's development. Further, the attachment theory of John Bowlby's work in the 1950s and 1960s explored the importance of early emotional bonds between children and their caregivers. His research highlighted the significance of secure attachment relationships for healthy social and emotional development in children. In addition to these, researchers and psychologists have developed various tools and assessments to track children's development and identify potential delays or challenges. These include standardized tests, observational methods, and developmental checklists that help professionals monitor and evaluate children's progress across different domains.Over the decades and centuries child psychology has continued to evolve and expanded by incorporating new theories, research methodologies, and interdisciplinary perspectives.

Themes of child psychology

Child psychology encompasses several key themes that are central to understanding the development and behaviour of children which include: a. Developmental stages: Child psychologists recognize that children go through distinct stages of development. These stages are characterized by specific milestones and changes in cognitive, social, emotional, and physical abilities. b. Nature and nurture: Child psychology examines the interplay between genetic and environmental influences on child development. It explores how biological factors, such as genetics and brain development, interact with environmental factors, such as family, peers, culture, and experiences, to shape children's development. c. Cognitive development: Children's thinking, problem-solving abilities, memory, and language skills undergo significant changes as they grow. Child psychologists study cognitive development to understand how children acquire knowledge, develop reasoning abilities, and make sense of the world around them. d. Social and emotional development: Child psychology investigates how children develop social skills, empathy, emotional regulation, and self-concept. It explores the role of social interactions, peer relationships, and family dynamics in shaping children's social and emotional well-being. e. Individual differences: Child psychologists recognize that children have unique temperaments, strengths, and challenges. They study individual differences in areas such as intelligence, personality, temperament, and learning styles to understand how these factors influence children's development and behaviour. f. Risk and resilience: Child psychology examines factors that contribute to children's resilience in the face of adversity and risk factors that can impact their development. It explores protective factors, such as supportive relationships and access to resources, that promote resilience and positive outcomes in children facing challenging circumstances.

Significance of child psychology

Child psychology holds significant importance in understanding and promoting the well-being and development of children: a. Understanding child development: Child psychology provides insights into how children grow, learn, and change. It helps in understanding the milestones and stages of development, enabling parents, educators, and professionals to create age-appropriate environments and tailor interventions to support children's optimal growth. b. Early identification and intervention: Child psychologists play a crucial role in identifying and addressing developmental delays, behavioural issues, and psychological challenges in children. Early identification and intervention can lead to more effective support and prevent potential long-term difficulties. c. Promoting mental health: Child psychology contributes to the promotion of positive mental health in children. It focuses on nurturing children's emotional well-being, teaching coping skills, and fostering resilience. d. Enhancing educational outcomes: Understanding how children learn, think, and process information is essential for educators. Child psychology provides insights into effective teaching strategies, individual learning styles, and factors that influence academic achievement. e. Supporting parent-child relationships: Child psychologists assist parents in understanding their child's behaviour, emotions, and development. They provide guidance on effective parenting strategies, positive discipline techniques, and enhancing parent-child relationships. This support helps parents foster healthy attachments, communication, and overall positive family dynamics. f. Informing policy and advocacy: Child psychology research and findings play a vital role in shaping policies and practices that impact children's well-being. It provides evidence for advocating for improvements in education, mental health services, child welfare, and other areas that influence children's lives. g. Preventing and addressing trauma: Child psychologists are instrumental in assessing and treating children who have experienced trauma, abuse, or adverse childhood experiences. They help children process their experiences, develop coping mechanisms, and heal from trauma, reducing the long-term negative impact on their development.h. Enhancing child-rearing practices: Child psychology provides evidence-based information and guidance for parents, caregivers, and professionals involved in child care. It promotes the use of positive discipline techniques, nurturing environments, and effective communication strategies that support children's emotional and social development.By understanding child psychology, society can better support children's well-being, foster their development, and create environments that enable them to thrive emotionally, socially, and academically.

(Youth Motivator, presently Professor of Political Science and Dean, Student's Welfare (DSW), at B.N. Mandal University, Madhepura, Bihar).

YOUR COLUMN

Towards The Path Of Tobacco Death Is No Longer

Dear editor,

Tobacco is one of the most notoriously abused drug substances among the rural and urban populations in the developing world. According the Central Tobacco Research Institute (CTRI) India, the origin of Tobacco cultivation is located in the Peruvian/Ecuadoraen Andes. Estimates for its first date of cultivation range from 5000-3000 BC.

According to one source, tobacco was in existence in Asia even during the 12th century, when it was not known elsewhere. It was not only used as an intoxicant but also as a cure for all kinds of ills and paying homage to deities.

However, it was Christopher Columbus who discovered the narcotic qualities of tobacco by accident in the course of his American voyage in 1492. On landing in the Islands of Tobago, Columbus and his men were taken by surprise to find the natives either sniffing a powdered dry leaf with evident pleasure or smoking roughly made roll of dried-up leaves. On trying these themselves, Columbus and his men were satisfied with the intoxicant produced. They took along with them some quantity of dried leaves as well as that of the seeds and that was how tobacco got introduced into Europe. Tobacco is said to have been introduced into India in the beginning of 17th century. Tobacco, as elsewhere in the world, has thrived in spite of considerable neglect and social disapproval in India. Currently it is an important commercial crop of the country earning around 6000 crores foreign exchange and 20000 crores excise revenue. Further, it is providing livelihood security to 45 million people including farmers, farm laborers, tendu leaf puckers, bidi rollers, traders etc. Tobacco cultivation in India was introduced by Portuguese in 1605.Initially tobacco was grown in Kaira and Mehsana districts of Gujarat and later spread to other areas of the country. Although the ill - effects of tobacco are well known, it's addictive nature (due to nicotine) does not allow a person to give up the consumption of tobacco. According to the Indian Council of Medical Research (ICMR), tobacco contributes to 30% of all cancers amongst men and women of our country. Mouth cancer followed by lung cancer is the commonest cancer in men. 42% of male and 18% of female deaths are attributed to tobacco-related cancers in India. 69 of the 4800 chemicals found in tobacco cause cancer. As per the statistics, tobacco is responsible for one death every second.

Tobacco either smoked or smokeless is a silent, relentless killer that is responsible for the ill health of not only the consumer but also the family due to second - hand - smoke, especially for young children and pregnant women, and loss of life at a younger age. Besides lung and mouth cancer, tobacco causes cancer of the voice box (larynx), oesophagus (food - pipe), bladder, kidney, stomach, pancreas and colon. A pledge to stop tobacco use either as cigarette/ bidi or as smokeless tobacco can reduce the total burdens of cancers by 30% and save many young lives.

Smoking causes lung cancer. It increases heart rate and blood pressure. It can cause heart attack and stroke. It slows down the blood flow cutting off oxygen to feet and hands. Carbon monoxide present in smoke decreases the oxygen supply to muscles and brain making these organs stressed. Statistical data revealed by World Health Organization (WHO) indicates that the tobacco epidemic is one of the biggest public health threats, killing more than 7 million people a year. Cigarettes are smoked by over 1.1 billion people globally. More than 7 million of those deaths are the result of direct tobacco use while around 890,000 deaths are the result of non-smokers being exposed to second-hand smoke.

The World Health Organization (WHO) estimates that nearly 7,000,000 deaths are attributed to direct tobacco use, while approximately 1,200,000 non-smokers exposed to second hand cigarette smoke die every year. Accordingly, tobacco use is a major threat to the public health infrastructure; therefore, proper cessation interventions must be put in place to curb tobacco abuse and ease economic and social burdens caused by the tobacco epidemic. Saying no to tobacco is saying yes to life. Let us save lives around us by making them aware of threats tobacco poses to all of us.

by: Mool Raj.