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From the Director's Desk...



The Environmental Information System (ENVIS) has been providing a base for information dissemination issues related to State of Environment of Odisha. Publication of newsletter is one of the major components of the ENVIS Programme; other being information dissemination through web-enabled system and query services. The Centre has been responding to various queries on environmental issues.

We have discussed on various issues in our earlier publication. This issue covers subjects on "Algalization technology on bio-utilization of fly-ash" and "Environment & Health".

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Algalization technology on bio-utilization of fly-ash

Introduction

Thermal power emission constitute a major source of environmental pollution. Nearly 70% of the total amount of residue generated during combustion of coal in thermal power plants constitute the fly-ash. Fly-ash is a potential source of many macro and micro elements to the plants including many toxic metals. The alkaline nature of fly-ash has led to its use in amendments of agricultural soils. However, non judicious application of fly-ash to soil deteriorates soil quality as well as depresses crop growth. Fly-ash contain almost all the essential plant nutrients but it is deficient in nitrogen and available p.

Heavy metal contents of fly-ash are widespread pollutants of great environmental concerns as they are non-degradable and thus

persistent. It is well perceived that there is a permissible limit of each metal above which they are generally toxic and some are even hazards. Looking into the increased environmental awareness, treatment of fly-ash is of utmost importance. Use of algalization technique in the area of bio-sorption suggests to be an ideal alternate for decontaminations of





Cyanobacteria and other algal organism are being increasingly exposed to diverse kinds of environmental stresses, such as elevated concentrations of heavy metals, pesticides and other stresses. These organisms respond in a specific manner to each stress and many of them are endowed with a remarkable adaptive ability to survive and grow in stressful habitats.

metals. Bio-sorption offers advantages of low operating cost and has no nutrient requirements. Cyanobacteria offers the advantage of having a high percentage of cell wall material which shows excellent metal-binding properties. Cyanobacteria also called as blue-green algae, appeared on the earth in the Precambrian about 3.9 billion years and were the first oxygen evolving photosynthetic organisms. All land plants owe their origin to them as conceived by a process called endosymbiosis or phyletic primary ectocytobiosis which has been very well authenticated following complete sequencing of cyanobacterial genome and plastid genome of algae and higher plants. The paramount significance of cyanobacteria on the earth remains undiminished on a large number of them fin N₂ and play numerous other roles in stressed environment.



Not only bioabsorbption but also bioleaching by cyanobacteria has enabled more efficient removal of heavy metals. Bioleaching refers to the use of bacteria and cyanobacteria for the receiving of metal in the solution phase during oxidation. Mainly pure and mixed populations is used for better recovery of metal. These solutions are handled for maximum metal recovery and the said residue is discarded. These processes offers an economically feasible technology for efficient removal and recovery of metals from fly-ash. The processes of bio-sorption have many attractive feature including the selective removal of metals over a broad range of PH and temperature. Its rapid kinetics of adsorption and desorption and low capita and operational cost.

To overcome the major problem for safe disposal of fly-ash algalization technology can be used to reclaim these areas to develop a bioaesthetic environment for local inhabitants and to arrest fly-ash from rising into the atmosphere and also discharged into the river systems.

Environment and human health

The importance of environment on human health has been well recognised since the days of the industrial revolution. The industrial revolution era began in the late 18th and early 19th centuries first, it started in Britain and then spread to other nations. It was a revolutionary change as it led to an entirely new method of how work was done. There were now several factories with complex machines manufacturing all kinds of products under what is called mass production; large industrial cities with new jobs that caused people to move in large numbers looking for employment; the transportation system was revolutionized through use of steam-powered machines (fuelled by coal) giving rise to trains, steam ships and also the invention of cars. As factories and business enterprises grew in large numbers in a given location, this led to the rise and growth of cities as people moved from the rural areas into urban areas in search of jobs. The industrial revolution created an industrial society where the living conditions were much better than that of living in the rural society. There was an increase in the availability of food, clothing and shelter, healthcare, educational opportunities and better wages. The mass production of productions caused prices to drop, making products once only available to the rich to be now affordable to the poor. However, in spite of the

technological and socio-economic advancement during this era through mechanization of agriculture, factories and transportation system, it also gave rise to dreadful sanitary and public health conditions in which people had to live and work. The explosion in urban growth created unforeseen sanitary and public health problems that was a result of overcrowded cities. This dense population of people living in cities caused the widespread occurrence of diseases such as tuberculosis (TB) and cholera thus, creating epidemics especially among the poorer class. This small example beautifully illustrates the importance of caring for the environment in conjunction with rapid industrial development if human health has to be preserved.

Even at the present day and age, multiple lines of evidence suggest that environmental problems can have a substantial impact on human health. Unsafe water supply, sanitation and hygiene are responsible for 3% of all deaths worldwide. But the poorest developing countries are the worst affected; 99% of these deaths occur in developing countries and 90% of those dying are children. At the global level, air pollution is estimated to be responsible each year for approximately 800 000 premature deaths, or 1.4% of all deaths worldwide. This burden of disease is most important in



developing countries, causing an estimated 39% of years of life lost in south-east Asia (eg, China, Malaysia, Viet Nam) and 20% in other Asian countries (eg, India, Bangladesh).

There are potential risks to environment and health from improper handling of solid wastes, one of the biggest and most pertinent environmental health related issue in our country. Direct health risks concern mainly the workers in this field, who need to be protected, as far as possible, from contact with wastes. There are also specific risks in handling wastes from hospitals and clinics. For the general public, the main risks to health are indirect and arise from the breeding of disease vectors, primarily flies and rats.

The organic fraction of municipal solid waste is an important component, not only because it constitutes a sizeable fraction of the solid waste stream, but also because of its potentially adverse impact upon public health and environmental quality. A major adverse impact is due to its attraction of rodents and vector insects for which it provides food and shelter. Houseflies may be important in the transmission of enteric infections, particularly those responsible for infantile diarrhoea and dysentery. Disease transmission by houseflies is greatest where inadequate refuse storage, collection and disposal (leading to increased breeding) is accompanied by inadequate sanitation. Further, rubbish may contaminate groundwater with nitrates, heavy metals and other chemicals. Incineration of wastes may pollute the air with particulates and oxides of sulphur and nitrogen. The slag and ashes from incinerators may result in chemicals that are rich in heavy metals and other potentially toxic substances.

These impacts are not confined merely to the disposal site. On the contrary, they pervade

the area surrounding the site and wherever the wastes are generated, spread or accumulated. Unless an organic waste is appropriately managed, its adverse impact will continue until it has fully decomposed or otherwise stabilised. Uncontrolled or poorly managed intermediate decomposition products can contaminate air, water and soil resources. Infrequent collection and rapid decomposition of wastes provide an attractive feeding and breeding site for flies, rats and other scavengers. Human and animal faecal matter or hospital wastes are often mixed with the refuse. Vectors and pathogens multiply. Domestic and on occasion industrial, solid wastes are disposed of in open spaces within residential areas. Collection and disposal of refuse can consume up to 50% of a municipal operating budget. In many otherwise good systems, only 50-70% of the refuse is regularly collected. The problem is organisational rather than technical. Refuse disposal is often a non-profit making business and thus is treated as an unwanted side-effect of development. Attention should be paid to storage, collection, transport, and intermediate transfer to bulk transport and final disposal.

The United Nations Environment Programme has been celebrating World Environment Day on June 5 every year since 1973 to raise awareness about the need for all of us to save the environment. The date was chosen because the UN Conference on the Human Environment began in Stockholm on June 5, 1972. Representatives of 113 countries, 19 inter-governmental agencies and more than 400 inter-governmental and non-governmental organisations congregated in Sweden's capital for this purpose. A declaration containing 26 principles about the environment and development was passed at the meeting and an action plan with 109 recommendations was also drawn up.

Five Human Visions of a Relationship with Natural Systems

There are basically only five options for a continuing, human societal relationship with the environment.

- (1) Return to "pristine" or pre-industrial ecological conditions. This seems highly improbable because of the massive ecological disruptions caused by human society.
- (2) Conserve or protect specific species (rare, endangered, or threatened) such as the American eagle through massive undertakings. Many endangered species cannot be preserved if their habitat is lost except, of course, in zoos and other special facilities. In addition, the focus on individual species and the maintenance of conditions favourable to them conflicts in part with the recognition that ecosystems are dynamic and that species are continually changing. This puts emphasis on one level of biological organization, the species, against a much higher level of biological organization, the ecosystem. To a certain degree, these are harmonious; however, preserving conditions favourable to a species may mean frequent interference with normal ecosystem dynamics.
- (3) Establish truly wild areas. This is very similar to returning to pristine conditions, but is more inclusive for certain areas of a natural system. These areas should be large enough to be self-maintaining in the sense that no human management is necessary. This, again, seems unlikely given the present state of the economy, etc. However, a student in my course in restoration ecology at Rocky Mountain Biological Laboratory, Tashi Wangchukin, tells me that when the World Bank offered to build a hydroelectric dam in Bhutan, the local villagers decided that the water accumulating behind the dam would flood habitat occupied by the greater-one-horn rhino, Asiatic elephant, Bengal tiger, golden langur, pygmy hog, hispid hare, and others. This would reduce the gross national happiness (GNH), which was more important to them than their gross national product (GNP) that the hydroelectric dam would increase. Perhaps this is the result of thousands of years of Buddhist tradition, which holds that material possessions and the acquisition thereof are one of the major causes of human pain and discontent. In any case, it is not unthinkable that societal values might encourage the establishment of wild areas at some future date.
- (4) Manage ecosystems to provide specific amenities and services. At the present time, this appears to be the most likely relationship that would meet general public approval. However, establishing specifics will be exceedingly difficult. These are illustrative only, with the expectation that a much more detailed set of values can be developed as this approach is considered further.
- (5) Continue present activities unchanged even though this means further loss of amenities and even possibly threats to human health and well-being as a result of deterioration. This option has been included to emphasize that failure to choose among the first four will inevitably result in this option being "chosen" by default. While everyone might deplore this scenario as an option, it is the one that historically has been chosen. It would be unprofessional not to consider what will happen if no decision is made to alter societal relationships with the environment.

What some dailies report:

1. **Prakruti Mitra & Prakruti Bandhu Award**

Forest & Environment Department, Government of Odisha has declared Prakruti Mitra awards to voluntary organizations/ educational institutions and Prakruti Bandhu awards to individuals working in the field of environment for outstanding contribution in promotion of environment awareness, environment conservation & protection in the State Odisha in 314 blocks of the state.

Source: The Samaja, 24 Dec., 2012

2. **Bear Safari Inaugurated at Nandankanan Zoological Park**

Shri Bijayshree Routray, Hon'ble Minister, Forest and Environment, Odisha inaugurated Bear Safari at Nandankanan Zoo on the occasion of Foundation Day 29 December, 2012. The Safari is surrounded with a boundary wall of 828m. length and 3m. height. The northern boundary of the safari has been earmarked with a moat (over a length of 164m and a depth of 2.5m.). The road network inside the safari spreads over a length of 505m. This Bear Safari is the third in the country next to Nehru Zoological Park, Hyderabad and Bannerghata Biological Park, Bengaluru.

Source: <http://www.nandankanan.org>

3. **Odisha Government bans on the manufacture, sale and use of gutkha**

The Odisha Government on 01.01.2013 announced a State-wide ban on the manufacture, sale and use of gutkha and chewing tobacco containing nicotine. This was announced by the Health and Family Welfare Minister Damodar Rout & he told that "I appeal to people to co-operate with the State Government to make Odisha a tobacco-free State".

Source: <http://www.orissadiary.com>

4. **8,77,322 birds visited Chilika, 2 new bird species spotted**

The latest count of bird in Chilika Lake, the total 8,77,322 birds gathered in Chilika lake and spotted 2 new bird species in the lake. 110 surveyors were deployed for the census from 7 am to 5 pm on 06.01.13. Two new birds - Goliath Heron and Mallard were found at the blue lagoon.

Source: Sambad, 7 January 2013

5. **1649 crocodiles counted in Bhitarkanika**

The latest census of the estuarine crocodiles in Bhitarkanika, one of India's biggest habitats for the saltwater species, has put their number at 1649. Last year figure was 1646. The following is the detail classification.

Size Class	2011	2012
Hatchlings	489	486
Yearlings	320	356
Juvenile	423	395
Sub-Adults	154	128
Adults	260	284

Source: The New Indian Express, 11 January 2013

6. **152 Irrawaddy Dolphins counted in Chilika Lake**

The latest count of Irrawaddy dolphins in the brackish water lagoon has been estimated at 152 which is 4.6 percent rise over the last enumeration of 145. The following is the detail classification.

Sectors	Adults	Sub-adults	Calves/ Neonatals	Total
Central	23	5	7	35
Southern	25	4	6	35
Outer	63	6	5	74
Northern	7	1	-	8
Total	118	16	18	152

Source: The New Indian Express, 22 January 2013



A mass rally on the occasion of Energy Conservation Day on 14th December 2012 by Eco-club students.

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