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Relationships Between the Hydrochemical Characteristics, Phytoplankton Chlorophyll and Phaeophytin in the Southwest Coast of India

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The relationship between the hydrochemical characteristics and phytoplankton chlorophyll in coastal pollution monitoring surveys, establishes a basis for understanding the trophic state of coastal waters in accordance with nutrient enrichment routing to progress in capture fishery. On the other hand, the zooplankton (including ichthyoplankton) grazing and its abundance can be understood from the quantification of detrital chlorophyll/phaeophytin. A collection of datasets for three years seasonal sampling (January 2008 to 2011) along Cochin and Mangalore (Southwest coast of India) was analyzed to find out the relationship between hydrochemical factors, chlorophyll *a* and phaeophytin contents. Principal component analysis (PCA) was used to analyze these ecological parameters interrelationship. In both the sampling sites, the nutrient factors statistically predict that nitrite is influenced by the concentration of chlorophyll *a* and its significant positive correlation to phaeophytin indicates the strength of micro zooplankton grazing. We infer that micro zooplankton grazing is an important factor in keeping a balanced coastal ecosystem at Cochin and Mangalore. The nutrient factors are totally utilized by the phytoplankton community. The PCA study confirms about assimilation of the dissolved inorganic nitrogen (DIN) in the form of NH_4^+ formed by the zooplankton excreta (detrital chlorophyll/phaeophytin) in Mangalore coastal waters.

Key words: *Chlorophyll, Phaeophytin, trophic state, hydrochemical characteristics, Arabian Sea*

Introduction

Variation in environmental factors caused by atmospheric forcing has led to fundamental differences in the pelagic marine ecosystem in terms of production[1-2]. The west coast of India (Arabian Sea) is a region of intense upwelling associated with southwest monsoon (May to September) whereas the east coast experiences only a weak upwelling associated with the northeast monsoon (October to January), resulting in marked differences in hydrographic regimes, productivity patterns and qualitative and quantitative composition of fisheries[3]. Productivity reasons explicated by the researchers concentrated in this region include the inflow of a network of rivers, backwaters, rocky shores and the intense upwelling associated with southwest monsoon influenced upon the improved nutrient composition[4]. Naturally occurring seasonal nutrient enrichment in the waters along the west coast resulted by the upwelling during the southwest monsoon period trigger high primary production and the stock of phytoplankton in terms of Chlorophyll *a*[5].

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Assessment of Groundwater Quality Using WQI for Selected Rural Area of Kopargaon, Ahmednagar, Maharashtra (India)

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Water Quality Index (WQI) has been calculated for different sources in pre monsoon and post-monsoon period (March 2012- September 2012) including dug wells, bore wells, hand pumps and production wells at Murshatpur, Chandgavhan and Hingani villages of Kopargaon Taluka, Ahmednagar, Maharashtra. Ground water was sampled at 16 locations for physiochemical analysis. For calculating the WQI, the following 10 parameters were considered: temperature, pH, alkalinity, dissolved oxygen, TDS, total hardness, Calcium, Magnesium, Chloride, Fluoride. WQI in pre-monsoon and post-monsoon ranged from 226.88 to 799.15 and 173.31 to 365.82 respectively. Water quality improved in post monsoon period. High values of Alkalinity, TDS, Hardness, Calcium and Magnesium were foundin groundwater. Moreover, low cost herbs treatment can bring the groundwater parameters, such as Alkalinity, Total Dissolved Solids, Total Hardness, Chloride, Calcium and Magnesium within permissible limits which make water potable for small community area.

ey words: *Groundwater quality, Water Quality Index, parameters*

troduction

Groundwater is the major source of water for inking, agricultural, and industrial activities. The eople are depending upon groundwater resources for rvival. Human health is threatened by the most of e agricultural activities[1]. Rapid industrialization pecially in developing countries like, India, has fected the availability and quality of groundwater ie to over exploitation and improper disposal of waste urban areas. Groundwater consists of about 20% of e world resources of fresh water and widely used r various purposes. Only about 1% of all of fresh ater is available from rivers, ponds, lakes[2]. Use of oundwater for various purposes mainly depends on its intrinsic quality of water, hence it is prime nportant to know the quality of water resources in e region. The physico-chemical contaminants that dversely affect the quality of groundwater are likely arise from a variety of sources, including land pplication of agricultural chemicals and organic astes, infiltration of irrigation water, septic tanks, nd infiltration of effluent from sewage treatment plants, ts, lagoons and ponds used for storage.

According to WHO, about 80% of all the diseases in human beings are caused by water. The major problem with groundwater is that once contaminated, it is difficult to restore its quality. Hence, there is need and concern for protection and management of groundwater quality. National Sanitation Foundation (NSF) information system developed a water quality index calculator for assessing the water quality[9]. WQI is defined as a rating reflecting the composite influence of different water quality parameters. WQI is calculated from the point of view of the suitability of groundwater for human consumption[10].

The objective of the present work is to discuss the suitability of groundwater for human consumption based on computed water quality index values and to use low cost material for treatment to bring groundwater parameters, like Alkalinity, Total Dissolved Solids, Total Hardness, Chloride content, Calcium and Magnesium within permissible limits which make water potable for small community area.

In Kopargaon Taluka, most of the groundwater sources are contaminated due to intensive irrigation

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Microcystin Ecotypes of the Genus *Microcystis* Identified from Lake Ambazari at Nagpur (M.S.), India

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Early prediction of harmful algal blooms and toxic cyanobacteria is a worldwide thrust area as they pose a serious threat to health of humans, domestic animals and livestock. Toxic and non-toxic strains of cyanobacteria do not show any predictable morphological difference which makes characterisation of toxic species difficult. In view of this, present study aims at early prediction of toxic cyanobacteria in water resource, Lake Ambazari at Nagpur, known for occurrence of toxic cyanobacterial blooms (TCBs), using molecular tools. This was the first attempt towards gene-based detection of potential toxic cyanobacteria in water resources of Vidarbha region of Maharashtra. Molecular analysis of the Phycocyanine Intergenic Spacer (PC-IGS) and 16S rRNA region using polymerase chain reaction (PCR) detected cyanobacteria and *Microcystis* in studied lake water. Further analysis of plankton biomass using PCR primers for *mcy* genes identified shoreline distribution of MC synthetase genes, *mcy*B and *mcy*E, in 80% of the studied sites. *Microcystis aeruginosa* was revealed as dominant organism by microscopic examination of the water samples. The present investigation yielded a stepwise screening method for detection of toxic cyanobacteria where extraction of DNA by chloroform- isoamyl alcohol (CI) method using glassbead was found to be efficient and cost-effective among other DNA extraction methods.

Key words: *Lake Ambazari, toxic cyanobacteria, Microcystis, PCR, mcy genes, DNA extraction method*

1. Introduction

The occurrence of toxic cyanobacterial blooms have been a serious problem worldwide due to the fatalities caused by their toxins to livestock, pets, wild animals, aquatic animals, birds and humans. Microcystins (MCs), the most common cyanobacterial toxin[1] with a cyclic heptapeptide structure, are a group of extremely hepatotoxic compounds produced by the species of freshwater cyanobacterial genera *Microcystis, Anabaena, Oscillatoria, Nostoc, Hapalosiphon, Anabaenopsis* etc.[2,3]. More than 80 MC variants have been identified which are distinguished by cyclic peptide sequences, degree of methylation, and toxicity[4, 5]. As a potent tumor promoter, MCs possess high hepatotoxicity due to their inhibition of serine-threonine protein phosphatases 1 and 2A as a result of interaction of amino acid Adda with catalytic site of the enzyme[6] which can cause acute and chronic effects, including death of h and animals due to hepatocyte necrosis haemorrhage[7]. Many of the water bodies cyanobacterial blooms occur are used as raw resources for various uses including drinking Thus, there is a need to predict the forma toxic blooms to prevent their adverse impacts

Microcystins are synthesised non-ribos via thiotemplate mechanism, by a multie complex, called microcystin synthetase consisting of non-ribosomal peptide synth (NRPS), polyketide synthases (PKS) and ta enzymes[8, 9]. The *Microcystis* genes (*mcy*) co for MCS, are organised in a cluster of two

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Heavy Metals Under-Reporting in Water Environment Importance of Method Selection

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Owing to low-cost labour availability, the manufacturing sectors are moving from developed to less developed countries. Often, the less developed nations are less equipped (as well as aware) for reliable monitoring frameworks. Generally, the standard methods by US EPA are followed for monitoring heavy metal pollution in water environment. Since, the heavy metal determination is method dependent, accuracy and applicability of heavy metal detection were evaluated, which can improve the effectiveness of water management strategies. US EPA methods 3015A and 3005A were evaluated for their ability to detect heavy metals from aqueous phase. The detection was carried out using Flame Atomic Absorption Spectroscopy (FAAS) and Inductively Coupled Plasma Atomic Emission Spectroscopy (ICP-AES). The heavy metal recovery using different methods was significantly ($P<0.05$) different. Recovery of certain heavy metals (Pb, Mn, Cr, and Zn) was significantly low with some standard method. In view of the development of technological solutions for heavy metal pollution mitigation (for water environment), the results of this study offer valuable insights for designing the monitoring studies that can ensure correct determination of heavy metals. The consequences of under-reporting of heavy metals (such as Pb, Mn, Cr and Zn) are discussed in view of their toxicity potential and ecological and other risks.

Key words: *Heavy metals, pollution, recovery, toxicity, risk*

Introduction

Due to its toxic properties, presence of heavy metals in water (above certain limits) is a serious global health concern for humans[1] as well as aquatic animals.[2-4] The bioavailability and subsequent toxicity of heavy metals are dependent upon the geochemical partitioning of the metals to sediment components[5] (referred to as metal speciation) [6,7]. .Therefore, adequate and accurate knowledge of heavy metal concentration in water environment (occurring naturally and those added through anthropogenic activities) has enormous importance for delineating effective heavy metal pollution mitigation policies.[8-10] In view of the currently available technologies for heavy metal detection, often, the validity and reliability of the results is questionable (especially for environmental samples such as water, soil and sediment). The importance of valid and reliable estimates of heavy metals is important, especially in the context of demotechnic growth of humans, which is responsible for immense contribution of heavy metal to different environmental compartments.[11,12] Although different types of industrial effluents (cause of pollution) contain hea its (heavy metal's) qualitative and qu distribution is often distinctly different (T However, the methods used for hea determination are often same and do not account the environmental and other c prevailing at the sampling sites.

Current heavy metal detection techni heavy metals as a group and are often i laboratory based (with respect to use of che equipments). It is obvious that the conditions at various areas are primarily responsible for q and quantitative variation of heavy metal concerned environment. Furthermore, the most hurdles in accurate detection of heavy metals a (inadequate) digestion and substandard reagen Also, the detection and quantification (espec levels) of heavy metals require highly s instrumental techniques.[14] Conventionally, hea concentration in aqueous samples has been e by numerous techniques; notable amongst th Atomic Absorption Spectroscopy (AAS), IC

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Particulate Pollution in Coal Mining Area of Jharia Coalfield

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Coal is the main source of energy in India. Among all coal mining area, Jharia Coalfield (JCF) occupies an important place in India's industrial and energy scenario by virtue of being the only storehouse of prime coking coal and important source of coal for the thermal power generation and is also referred as coal capital of India. The present study was conducted during 2008-2009 to assess the sources of particulate matter in coal mining area. This region covers several coal mining/industrial areas, residential, commercial and mixed use areas. In the present study, assessment of particulate pollution in coal mining area was done by trace metal analysis using EPM 2000 filter paper followed by acid digestion, extraction and analysis through Atomic Absorption Spectrophotometer (AAS). The annual average suspended particulate matter (SPM) and respirable particulate matter (PM_{10}) concentrations varied from 425-738 µg /$m^3$and 170-339 µg /m^3 respectively. This was followed by source profile study. The two approaches were adopted including principal factor analysis (Varimax rotated analysis) and Enrichment factor analysis to identify sources. The major sources of particulate matter were mainly from resuspended soil dust and earth crust, emissions from automobile exhaust, coal mining and associated activities, fugitive emissions, industries and oil combustion, etc.

Key words: *Particulate pollution, coal mining, Jharia*

Introduction

Jharia Coalfield is a coal mining, industrial and commercial area in the state of Jharkhand, Eastern India. Among all the developmental activities, coal mining is one of the core industries in India and plays a positive role in the economic development of the country[1]. Most major mining activities contribute directly or indirectly air pollution[2-3].Mining of coal opened new avenues for other related industries like thermal power plants, cement industries, refractories, brick kilns, steel and forging industries, coal briquettes, coke plants etc. Rate of population growth increased with the migration of people into this area in anticipation of employment and economic gains. This influx of population in turn caused various changes in the study area. Moreover, as industrial development and energy use grow, air pollution levels begin to rise rapidly. The particulate matter (PM) is an important criteria air pollutant. It comprises among variety of substances, inorganic and organi (containing polycyclic aromatic hydrocarbon or neutral sulphates and nitrates, fine soil dust of lead and other toxic trace heavy metals, and other fibres. PM_{10} (≤10 µm in diameter) however, penetrate deep into the lungs significant health risks[4-6]. Particulates in a emitted chiefly by human activities. The sources are fuel combustion, motor vehicle m industrial processes and open burning of Besides, opencast mining operations involvi heavy earth moving machinery for extra transporting coal release substantial quantiti particulate and gaseous pollutants directly atmosphere. Particulate matter (SPM and P several environmental effects and plays a s role in modifying or changing climate, hy cycles, chemistry of the atmosphere, biogeo cycles, visibility reduction, affecting radiatio

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Fischer-Tropsch Using Carbon Dioxide An Environment-friendly Approach

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Development of environment-friendly technologies such as CO_2 conversion to value added products is a growing area. The time and efforts spent for the development of new technology can be reduced by comparing it with an analogous already commercialised technology and evaluating it to fit the existing set-up. This study encourages the environmental technologist to look for such alternatives. This study focuses on the first step to commercialise CO_2 hydrogenation in the existing Fischer Tropsch plants by a comparison of CO and CO_2 hydrogenation reactions for alkane and alcohol production using the basic thermodynamic aspects such as Gibbs free energy of reactions, feasibility temperatures, feed mole ratios and reaction enthalpy. This basic study suggests that the thermodynamics of CO_2 hydrogenation is similar to the CO hydrogenation and it can be evaluated in detail for catalyst development and commercialization in the existing Fischer Tropsch plants.

Key words: *Fischer-Tropsch, CO_2 utilization, liquid fuels, thermodynamic limits, CO_2 hydrogenation*

Introduction

Environment-friendly technologies focus on ducing environmental pollution and emerging widely l over the world. The most dangerous environmental ollutant is CO_2. CO_2 emissions from industries are ainly blamed for climate change and global warming henomenon. Hence development of environment iendly technologies to reduce CO_2 emissions as well s enhance CO_2 utilization (CO_2 conversion to useful roducts) are emerging areas for global research. Many ew emerging processes like chemical looping ombustion (CLC) can produce a pure CO_2 stream for equestration. But CO_2 sequestration by compressing re CO_2 into earth's crust is not a very safe alternative ccording to some researchers although Riemer et al. ave suggested that storage of CO_2 in deep aquifers, eans or in exhausted oil and gas fields would be latively inexpensive[1]. Alternatively, the idea of CO_2 ilization is picking up at a very brisk rate. Some of e important CO_2 utilization studies using photocatalytic ute[2-5] and electrocatalytic route[6-9] have been reported literature. Some researchers have used biochemical ute to convert CO_2 to useful products[10-12]. Catalytic ocesses have also been used for CO_2 conversion to lue added products[13-18]. Research studies of CO_2 ilization using ionic liquids[19], reaction with other emicals[20], non-thermal plasmas[21] and micro reduction chniques[22] have also been reported.

Direct conversion of CO_2 by hydrogenation to value added products is more beneficial strategy for CO_2 utilization. Some important CO_2 hydrogenation studies have been summarized below:

1.1 CO_2 hydrogenation

Arakawa et al. have presented a review of recent research work in catalytic hydrogenation of CO_2 to various kinds of valuable chemicals and fuels[23]. Arakawa et al. have studied the selective catalytic CO_2 hydrogenation over promoted copper catalyst to produce methanol of 79% selectivity at 7 MPa and 250°C[24]. Toyir et al. have used gallium-promoted copper-based catalysts for CO_2 hydrogenation to produce methanol with 99% selectivity[25]. Raudaskoski et al. have studied the CO_2 hydrogenation to methanol over copper-based zirconia-containing catalysts[26]. Nam et al. experimentally studied the catalytic hydrogenation of CO_2 into hydrocarbons (C2 - C4 alkenes) over zinc promoted iron catalysts[27]. Sakurai et al. have experimentally studied the CO_2 and CO hydrogenation over gold supported titanium, iron and zinc oxides between 150 – 400°C and found that methanol was produced more readily from CO_2 than from CO[28]. Takeishi et al. have compared the CO_2 and CO hydrogenation on Raney ruthenium catalysts under 1.1 and 2.1 MPa pressure in an autoclave in presence of water at 353 and 433K[29]. Kusama et al. have

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Traffic Noise Prediction Model for Aurangabad City

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The traffic noise models developed by various researchers were used first to calculate L_{Aeq} from the collected traffic data and observed $L_{Aeq.\,h}$ values were used to find other parameters describing related statistics. It is observed that these models do not properly represent the noise conditions studied. A model is developed based upon the present work which gives better correlation between observed $L_{Aeq.\,h}$ and calculated $L_{Aeq.\,h}$ values for city traffic. These studies were carried out in the Aurangabad City of Maharashtra (India).

Key words: *Noise modeling, $L_{Aeq.}$ traffic noise*

Introduction

Noise is an unwanted sound that produces a displeasing effect and interferes with human communication, comfort and health. Now-a-days noise is becoming a major health hazard in the world. There are several countries in the world, where freedom to create noise has been strictly controlled. However, in India, the menace of noise is growing day by day due to population explosion, rapid industrialization and urbanization.

Of all kinds of noise, traffic noise is known to contribute the maximum. Transport noise is an increasingly prominent feature of the urban environment. The vehicle speed and traffic flow intensity influence the noise level greatly. One truck, which goes 90 km per hour, makes the same noise as 28 cars going at the same speed[1]. Parida et al[2] have suggested that traffic related noise accounts for nearly two-third of the total noise pollution in a metropolitan city. In India, the number of vehicles is growing at an annual rate of more than 7% per annum[2]. A traffic noise prediction method is an important tool to assess the effects of noise mitigation measures. A number of noise prediction models have been developed which can predict noise levels at a receptor point. The control of traffic noise of motor vehicles has become a matter of major concern. To ensure a high quality environment, methods for prediction of the noise emission of motor vehicles are necessary for controlling, planning new dwellings in the vicinity of existing roads, approval of noise activities and treating complaints etc.

In order to reduce traffic noise of motor vehicles, it is necessary to know the functional relationship between noise emission and meas parameters of traffic. Several models have developed from fundamental variables such a traffic flow, speed of vehicles and percentage of vehicles etc. But these models are not applica city studied. In the present study, efforts are ma develop a statistical model for city, detail discussed. The objective of this study is to de road traffic noise prediction model from traffic va and conditions of transportation in the city.

Materials and methods

In this study, Data Logger Sound Level M Center 322 was used which is supplied by CEN TECHNOLOGY, TAIWAN. This unit confirms t IEC651 type2, ANSI S1.4 Type2 for sound level me It uses RS232 interface to perform bi-direct communication with PC. The resolution of the m is 0.1dB. The instrument used during measureme sound level was Brand New from Center Techn Corporation, Taiwan and duly calibrated at P Control Research Centre, Palghat (India) and the e study was carried out in one go.

In the present study, the noise measurem were carried out at 24 different location Aurangabad city (Latitude - 19°53' N and Longi – 75°23' E) during peak hours (9 to 1pm and 4 pm). These measurements were carried out distance of 5m from the edge of road. All locations selected were on main roads with build far away to affect the measurements. The m level meter was placed 1.2 m above the grou The monitoring was done for 3-4 times during successive days at each location and the equiv

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Use of Optimization Technique for Optimal Scheduling of Booster Chlorination in Drinking Water Distribution Systems

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Chlorine concentration is an important parameter used to assess the quality of water supplied by a distribution network. Incontrast to conventional methods that apply disinfectant only at the treatment works or source, booster disinfection reapplies disinfectant at strategiclocations within the distribution system to compensate for the losses that occur as it decays over time. Booster disinfection strategy can reduce the mass of disinfectant required to maintain a detectable residual at points of consumption in the distribution system, which may lead to reduced formation of disinfectant by products such as Trihalomethanes also. The aim of present study is to formulate an optimization model using Liner Programming in Excel by coupling the results of residual chlorine obtained using EPANET software for selection of location of Booster chlorination stations as well as to optimize the Chlorine mass rate injections for the steady state flow conditions. Results from application of the formulated model suggest that schedule minimizes the total dose required to satisfy residual constraints of 0.2 mg/L (IS 10500-1991) at all the locations within distribution network as compared to conventional chlorination in which chlorine is applied at source only.The use of optimization method to select the scheduling of Booster stations can be used as the decision making tool for the water supply authority for the selection of location and number of booster station along with the application of chlorine mass rate to maintain the residual chlorine as 0.2 mg/L at all the locations in Drinking Water Distribution system.

Key words: *Drinking water distribution system, Booster chlorination, optimization model, linear programming*

Introduction

To control the pathogenic microorganisms in drinking water distributionsystems generally disinfectant is added at the supply source commonly known as conventional method. Since disinfectants arereactive, the residence time of water in the distribution network can deplete the disinfectant residual at the edges of thedistribution network and in storage reservoirs. Therefore, the source concentration must be large enough to maintain adequatedisinfectant residuals throughout the distribution system,which may cause taste and odour complaints by consumers receivingthe higher disinfectant concentrations. Additionally,disinfectants, such as chlorine and chloramines, have also beenshown to be potential carcinogens at various concentrations[1]. Thus, the quality of water supplied by a distribution netw usuallyassessed by evaluating residual ch concentrations, if they aremaintained between and upper bounds, to ensure good disinfectingpro and avoid poor tasting water.The booster chlor strategy allows the water utilities to meet disin goals by providing proper balance betwe minimum and maximum concentration of chlor

The determination of chlorine concent throughout a pipe network under steady or un hydraulic and water quality conditions is of par interest. Determination of the best disinfection s is also a critical step in water distribution n management.Chlorine concentration simulato EPANET[3] are currently available and enab prediction of chlorine distribution in a network

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Research on Promoting Potential of Public Behavior in Sorting Collection of Municipal Solid Waste: A Case of Kunming in Chi

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Relying on the current status of implementation and development trend of sorting collection of municipal solid waste (simply called MSW below) in China, we analyzed the significance of the research on promoting potential of public behavior in sorting collection of MSW. Take Kunming as a case example, we proposed an evaluation index of promoting potential in sorting collection of MSW. And we forecast that there will be huge promoting potential of public behavior in sorting collection of MSW in Kunming by using the *Fuzzy probability method* in Fuzzy Synthetic Evaluation Model, with on-site investigation and analysis of the results of opinion polls.

Key words: *Promoting potential in sorting collection of MSW, public behavior, Fuzzy probability meth*

1. Introduction

Government explicitly proposed that they would make the MSW harmless treatment rate of 80% or more in 2015, (Twelfth Five-Year Plan of National Economic and Social Development) published in March 16,2011,which also regarded the "source reduction" as an important measure for the disposal problem of MSW, and the effective way to solve the "source reduction" is that sorting collection of MSW. Premier Wen Jiabao chaired a State Council executive meeting to plan to further strengthen the disposal work of MSW in March 2011. Moreover, in April 19, 2011, State Council approved "An Notice about furthering strengthen the disposal work suggestions of MSW" (Guo Fa [2011] No. 9) from the Department of Housing and Urban Construction, which explicitly proposed that each province (or region) should form one or more model cities for good separation of MSW, and half cities which have regions should preliminary achieve the collection and transportation of kitchen waste in 2015. The introduction of this series policy indicates that sorting collection of MSW will be a policy concerning people's livelihood, publicizing in large-scale across the country.

2. Basic concepts and significance of the research

Promoting potential in sorting collection of MSW or simply called "MSW sorting" means the promotion level of effective MSW sorting, by the means of formulating reasonable mode of sorting, public education and technical guidance, based on the public attitudes and awareness levels of MSW In addition, this MSW mainly refers to the v residential areas, enterprises and business d which haven't been classified. Promoting pot sorting collection of MSW includes three technology, management and behavior.

Sorting collection of MSW haven publicized comprehensively in China, and th of some pilot cities are not good. From the promoting potential, promotion of technol management only involves a small number of which can achieve good results by several w promotion of behavior refers to all people, the most difficult to control. This paper anal promoting potential of behavior in sorting coll MSW, taking Kunming as an example.

We should remove the obstacles in the of promotion by comprehensive analyzing the f of MSW sorting, trying to know the problem participation in the process of promotion and the public attitude to MSW sorting, then take incentives and publicities for different group critical factor in promotion that public partici MSW sorting is valid or not. Therefore, only the subjective views of the public clearly can go take appropriate measures to ensure promotion sorting smooth and effective.

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Health Risk Assessment of Pesticide Residues via Dietary Intake of Marke Vegetables from Nagpur District, India

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The study was carried out to assess the health risk of pesticide residues via dietary intake of vegetables collected from the agro-based market of Nagpur District, Maharashtra. The analysis was carried out as per the standard method of ICAR followed by Gas Chromatographic technique with electron capture detector (GC-ECD). It was used to identify organochlorine pesticides (OCPs) (e.g. aldrin, HCH, endosulphan, endosulphan sulfate, DDT, DDE, DDD, dicofol), in common vegetables of Nagpur district (cauliflower, brinjal, chili, carrot). Pesticide residues were compared with MRL established by Ministry of Health & Family Welfare and Codex Alimentarius Commission. It was found that pesticide residues detected in all vegetable samples were within the prescribed limits, whereas the highest health indices were found for aldrin (1.540), endosulphan (2.190) and dicofol (3.657) in brinjal, alone. Therefore, the main health risk may be posed by these recorded compounds, while the remaining pesticide residues present no risk in the other vegetables analyzed.

Key words: *Vegetables, health risk, pesticide residues, Nagpur district*

Introduction

Fruits and vegetables are important components of the human diet since they provide essential nutrients that are required for most of the reactions occurring in the body. A high intake of fruits and vegetables (five or more servings per day) has been encouraged not only to prevent consequences due to vitamin deficiency but also to reduce the incidence of major diseases such as cancer, cardiovascular diseases and obesity[1].

Food is required for survival but its contamination by chemical toxicants is a worldwide public health concern. Contamination may occur through environmental pollution of the air, water and soil, such as the case with toxic metals, PCBs and dioxins, or through the intentional use of various chemicals, such as pesticides, animal rugs and other agrochemicals. The presence of pesticide residues is a concern for consumers because of their toxic such as interfering with the reproductive syste foetal development as well as their capacity to cancer and asthma[1]. Some of the pesticid persistent and therefore remain in the body long term exposure.

Pesticides fate after application to frui vegetables

After pesticides are applied to the crop may interact with the plant surfaces, be expo the environmental factors such as wind and s may be washed off during rainfall. The pesticid be absorbed by the plant surface (waxy cuti root surfaces) and enter the plant transport (systemic) or stay on the surface of the (contact). While still on the surface of the cr pesticide can undergo volatilization, pho

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