A-15

Heavy Metals in Water with special reference to Chemical Speciation, Arsenic and Selenium Toxicity

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The study of heavy metal pollution is of utmost importance when discussing key environmental issues. Metals are non biodegradable and are placed second only to pesticides in terms of environmental importance. It is now well established that it is the chemical form (speciation) of the heavy metals and not their total concentration alone which determines, bioavailability, accumulation, enrichment and ultimately their toxicity.

The research work carried out in the water bodies of selenium and arsenic affected region of Panjab by researchers from the Chemistry Department of Panjab University along with those from other local academic institutions will be presented. The data obtained will be further discussed in the light of observations made by researchers working on Arsenic Pollution in Water Bodies of Bangladesh, West Bengal and Bhojpur region lying at the border of Eastern UP and Bihar. The importance of chemical speciation in such studies will also be highlighted.

A-16

Production of Coarse Aggregates from Demolished Concrete *via* Recycling: Engineering Properties, Strength Attainment Features and NDT Correlations

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Coarse aggregate, fine aggregate, cement and water are the major constituents to make concrete. All of these components are generally derived from natural resources that are easily accessible for a construction. Since, aggregate forms the major volume of concrete there lies an potential to reduce the use of natural resources by recycling the demolished concrete as aggregates in a country like Bangladesh where natural resources are limited but anticipated pace of infrastructure development is quite fast. Therefore, recycling of demolished concrete can save the environment further by efficient and cost effective management of generated solid wastes. To this end, the research work was emphasized on obtaining a reliable and cost effective method of producing aggregates from recycled concrete by using locally available indigenous techniques, to determine the various fundamental material properties of recycled stone aggregate concrete, recycled brick aggregate concrete when used as coarse aggregates, strength attainment features of concrete made from recycled aggregates, to study the effect of discontinuous curing effects on various aggregate types and also to ascertain the correlations like the rebound number vs. compressive strength and the penetration value vs. compressive strength for various NDT techniques, e.g. Schmidt Hammer, Windsor Pin methods, respectively.

The results indicate that brick aggregates or recycled brick aggregates are remarkably low in unit weight and specific gravity than stone aggregates or recycled stone aggregates. The absorption vales indicate the presence of larger void fraction in the aggregates of lighter unit weight. Furthermore, due to the presence of weak mortars, recycled aggregates have higher Loss Angeles abrasion value than their parent aggregates. In general,

for given cement content, concretes from recycled aggregates were distinctly found to give higher strengths than those from their parent aggregates. The surface characteristics of recycled aggregates may have a role behind displaying this motivating feature. Differential Scanning Calorimetry (DSC) investigation indicated the existence of recoverable un-hydrated cement in recycled concrete. The strength test results of recycled concrete and mortars using fine fractions of demolished concrete are compared together with the DSC data to resolve the results. The findings display the possibility of reducing cement content for achieving a target strength using recycled concrete. This contains further energy saving implications from environment preservation view point. The NDT correlation curves for concrete with investigated aggregate types are presented at the end of the paper.

A-17

Changes in the animal - human interface and emergence or resurgence of zoonotic disease

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About 75% of emergent human pathogens are zoonotic or have arisen from an animal reservoir. Some zoonotic pathogens cause sporadic infection in humans but do not propagate further, while others could succeed in overcoming the species barrier and becoming established in the human population. HIV, SARS and Nipah virus infection, avian influenza, 'swine influenza' in human are few recent zoonoses to mention. Although emergence of human diseases of zoonotic origin has taken place throughout the history of mankind as a matter of chance, the recent changes in the interfaces between animals and humans and their ecosystem have significantly increased these chances. The major factors that contribute to this increasing trend include the exponential growth in human and livestock populations, rapid urbanization, rapidly changing farming systems, closer integration between livestock and wildlife, forest encroachment, climatic changes and globalization of trade in animal and animal products. Animal agriculture worldwide is increasingly moving from the relatively low efficiency, family-centered, low-input model to intensive systems, which are loosely defined as the production of large numbers of genotypically-similar animals often under concentrated confinement with rapid population turnover. This paper provides an overview on the trends and impact of these changes in the animal-human interface with regard to the emergence or resurgence of zoonotic diseases and advocates the adoption of 'one world – one health' policy as a possible mitigation approach.

A-18

Climate change: Emergence of infectious diseases in Bangladesh

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Bangladesh is extremely vulnerable to growing climate change impacts because of its geographical location, high population density, high levels of poverty, high burden of infectious diseases, and the reliance of many livelihoods on climate-sensitive sectors, particularly rural agriculture and fisheries. During the last 30 years, climate change (rise in temperature and humidity, changes in rainfall magnitude and patterns, precipitation, flood etc) facilitated the emergence, spread and increased endemicity of many new and old infectious diseases in Bangladesh risking human health posing additional burden on already over-stressed health infrastructures and services. Dengue a climate-sensitive fastest spreading mosquito-borne viral disease in the world emerged in