

discharged from entrepreneurs' shrimp farms were found to be rich in total phosphorus (3.45-3.50 mg L⁻¹). In these farms, it was found that only 13% phosphorus introduced through feed is incorporated into shrimp flesh. Since the effluents discharged showed alarming values of P, there is urgent need to modify the existing feed technology in these farms. In this regard, laboratory experiments were conducted for a period of 90 days with juveniles of *Penaeus monodon* (4.35 to 4.74 g). The newly introduced feed technology involved the inclusion of phytase in feeds. The phytase (Natuphos) was added in the shrimp feed at 0, 200, 400, 2000 and 20,000 FTU/kg feed. Among these feeds, addition of 400 FTU/kg feed significantly improved phosphorus retention in shrimp (P < 0.001). The retention of P was 72 % while the discharge was 28 %. Experiments without the addition of phytase enzyme in feeds, showed an increase of P discharge at 57 %. That is the phosphorus level of the water in shrimp tank fed the phytase treated feed showed reduced level of 0.5-0.6 mg L⁻¹ while it was 3.36-3.47 mg L⁻¹ in phytase untreated feed shrimp tank water. This novel and improvised feed technology needs to be popularized among the shrimp farmers so as to keep the near-shore areas receiving shrimp farm effluents free from pollution due to eutrophication.

Sedimentary records of organochlorine pesticides in coastal and near sea of Eastern China Sea and northern South China Sea: regional cycling and time trends

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Organochlorine pesticides (OCPs), such as DDT and HCH, were of the most widely used pesticidal persistent organic pollutants (POPs) in the world. While the bans of agricultural usage of technical DDTs and HCHs in different countries in East/South Asia were commenced in between 1970-1990s, other usages of these pesticides, e. g. Malaria control, antifouling paint for fishing ships, or in different formula (Lindane), still

remain. High concentrations of DDTs were still found in high concentrations in fishes and human breast milk in the coastal zones of China, posing potential negative impact on marine ecosystem and human health.

Laminated, undisturbed sediment cores are thought to be natural historic archives for POPs in aquatic environment, owing to the hydrophobicity of these chemicals which favors their association with suspended particulates and sediments. Many studies have been reported on using sediment cores to reveal the time trend of POPs. However, as a result of the intensive human activities, in particular large scale land transform, in the fast developing coastal zones, a sediment pool may also receive recycled POPs from/via soil runoff and relocation of previously deposited sediments in the watershed. Therefore, it is assumed that the information a sediment core in estuarine and coastal environment may be a cocktail of the real time trend of regional usage and regional geochemical recycling of the studied POPs.

In this talk we will report the vertical profiles of OCPs in 15 coastal and near sea sediment cores, among which 5 were from Eastern China Sea, 10 from the northern South China Sea. The results were evident to support our hypothesis, that in the cores from coastal zones a significant accumulation of OCPs in the upper layer sediment recording the regional cycling of these chemicals can be observed, while in the sediment cores in the near sea gave expected time trend of their regional application history, concentrations peaking at the layers corresponding to the highest application in 1970-1980s.

The findings of the study highlight the importance/scale of human activity on the ultimate fate of POPs in coastal zones, which will result a 'relaxation' of these chemicals, between their application in terrestrial environment and their being exported to the coastal water environment.

Estimation of nitrogen and phosphorus inputs from the Changjiang river watershed into the East China Sea

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