

**Research on the water quality characteristics in controlling sections in Yangtse Rive and its effects to Yangtse Rive estuary**

Binghui ZHENG, Yanwen QIN & Liqian WANG

In this present study, three sections including Cuntan (upstream), Yichang (middlestream) and Jiangning (downstream) in Yangtse River were selected, and the diversities of water quality were analyzed on the basis of the data of water quality and hydrography monitoring in 2004-2005. The average of pH was 8.07 (from 7.95 to 8.15) in Yichang section, and 7.83 (from 7.6 to 8.0) in Datong section throughout the river, indicating that the middle and downstream water quality in Yangtse Rive was acid characteristic, and the pH value was less than 7.0 according to the runoff gross.

The suspended particle results showed that it was 311.8, 100.7 and 102.1 mg/L in Cuntan section, Yichang section and Datong section, respectively, indicating that the Three Gorges Reservoir has significant retention effects on suspended particles and the ratio of retention was about 67.7 %.

The index of COD<sub>Mn</sub> showed that it was 3.37, 2.44 and 2.17 mg/L in Cuntan section, Yichang section and Datong section, respectively, indicating that the Three Gorges Reservoir from Cuntan to Yichang retained and eliminated those organic compounds and caused 27.6 % contamination decreasing. Although the middle- and downstream of Yangtze River accepted large amounts of organic pollutants, the organic pollutants discharged along sections were decomposed and the COD<sub>Mn</sub> contents also reduced 11.1 % from Yichang section to Datong section. All of these suggest that Yangtse Rive can eliminate the COD<sub>Mn</sub> to some extent.

The NH<sub>3</sub>-N results showed that it was 0.15, 0.12 and 0.32 mg/L in Cuntan section, Yichang section and Datong section, respectively, indicating that the Three Gorges Reservoir from Cuntan to Yichang has self-purified capacity and caused 20% NH<sub>3</sub>-N reduction. The concentrations of NH<sub>3</sub>-N, however, increased 166.7 % from Yichang Section to Datong Section, indicating that the NH<sub>3</sub>-N loading from middle- and downstream in Yangtse Rive exceeded the self-purification capacity of the mainstream in Yangtse Rive and the water quality declined significantly.

To similar the NH<sub>3</sub>-N, total phosphorus (TP) results showed that 0.16, 0.10 and 0.12 mg/L in Cuntan section, Yichang section and Datong

section, respectively, indicating that the Three Gorges Reservoir from Cuntan to Yichang has self-purified capacity and caused 37.5% TP reduction, while 20.0% TP increased from Yichang section to Datong section.

NO<sub>3</sub>-N results showed that it is 1.24, 1.40 and 1.52 mg/L in Cuntan section, Yichang section and Datong section, respectively, indicating that there was an increasing trend from Cuntan section to Datong section. The NO<sub>3</sub>-N discharged mainly from municipal, industrial effluents and agricultural runoff, which accounted for about 50 %, respectively.

In view of the contamination control, the water quality of main channel in Yangtse River can not be affected, and there was no obvious effect on Yangtse River estuary environment with the presupposition that the COD<sub>Mn</sub> discharge must meet the criterion in effluents discharging areas under present conditions. And it is necessary to improve the treatment efficiency of municipal and industrial effluents, to control the agricultural pollution loading, and to reduce the NH<sub>3</sub>-N and TP discharges for ensuring the water quality in Yangtse River. At present, the main pollution factors are inorganic nitrogen and phosphorus in Yangtse Rive estuary, and so it is significant to control the TP and NO<sub>3</sub>-N discharges for improving Yangtse River estuary environment and adjacent marine environment. Thus, in view of the gross controlling, it is not enough to control the water quality in Yangtse Rive area with COD controlling only, and it is necessary to control the contamination gross with different orientations and criterions.

**Restoration of nutrient laden shrimp culture systems through improved feed technology an aspect of coastal zone management**

Felix NATHAN<sup>1\*</sup> & J W KIRUBAKARAN<sup>2</sup>

<sup>1</sup>Department of Aquaculture, Fisheries College and Research Institute, Tamilnadu Veterinary and Animal Sciences University, Tuticorin 628008, India  
Email: nathanfelix@yahoo.com

<sup>2</sup>Centre for Fish research, Lady Dock College, Madurai, India

The effluents from shrimp farms are known to develop eutrophication in discharged sits viz., adjacent coastal waters due to excess nutrients like phosphorus (P). In order to restore normalcy in such sites, a case study was undertaken at Tharuvaikulam shrimp farm area (south India) during March to July 2006. The effluents

discharged from entrepreneurs' shrimp farms were found to be rich in total phosphorus (3.45-3.50 mg L<sup>-1</sup>). 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<sup>-1</sup> while it was 3.36-3.47 mg L<sup>-1</sup> 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**

Gan Zhang<sup>1,2</sup>, Tian Lin<sup>2</sup>, Zhigang Guo<sup>3</sup> & Jianhui Tang<sup>1</sup>

<sup>1</sup> Yantai Institute of Coastal Zone for sustainable development, Chinese Academy of Sciences, Yantai, Shandong, China

<sup>2</sup> State Key Laboratory of Organic Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou 510640, China

<sup>3</sup> School of Geosciences, China Oceanology University, Qingdao, China

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**

Kazunori TANJI<sup>1\*</sup>, Masataka WATANABE<sup>2</sup> & Kaiqin XU<sup>3</sup>

<sup>1</sup> Graduate School of Media and Governance, Keio University,

<sup>2</sup> Faculty of Environment and Information Studies, Keio University 5322, Endo, Fujisawa, Kanagawa, Japan