

Long-term Loading of Organic Pollutants from Urban Streams and Its Effects on Coastal Sea Environment

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Organic pollutant loads from urbanized coastal zone have seriously affected enclosed coastal sea environments. Reduction of their loads remains the most basic measure for improving such sea environments even though inner loads from primary production such as red tides have become an issue. The input from coastal zone includes direct discharge from large-scale factories and inflow of rivers. Since the control for industrial waste waters is strengthened, the influence of loads from urban streams receiving so much untreated household effluents has increased on the organic pollution of coastal sea area.

In the present study, long-term changes of water quality for urban streams in Hyogo Prefecture and their organic pollutant loads to the coastal area of the eastern Seto Inland Sea were analyzed statistically by using personal computer and monitoring data during past 20 years. And the effects on water quality of its coastal sea were evaluated from the result.

Recent state for organic pollution of 37 urban streams analyzed was as follows : below 5 mg·l⁻¹; 43%, 5-10mg·l⁻¹; 38%, 10mg·l⁻¹ or above; 19% as the proportion of stream by average COD concentration in 1991. This distribution indicating many streams to be in relatively low COD concentration reflected the improvement from the serious pollution in 1970's. As shown in Table 1, significant decreases over 50% from peak COD concentration level (which peaks were mainly observed in 1970's) were found in 68% of the streams. These decreases were further characterized in highly polluted streams. Such a tendency was also recognized in COD load from the stream, moreover, T-N and T-P indicated similar decreases in many streams. It was considered that major factor for the improvement of organic pollution in these urban streams was the steep development of public sewerage in the analyzed area in the latter half of 1980's (e.g. 97% of sewerage ration of Kobe City in 1991).

However, marked long-term decreases in COD concentration of sea surface water were not observed at many coastal monitoring points which located off shore at the distance of 0.1-4km, while T-N or T-P showed significant decreases at a few points near Kobe. These suggest that the reduction of marine pollution is not easy.

Table 1 Characteristics of change of COD in urban streams during past 20 years

	Number of stream by degree of decrease from peak level (): %							
	Concentration				Load			
	<25%	25-50%	50-75%	75%≤	<25%	25-50%	50-75%	75%≤
T o t a l	3(8)	10(27)	12(32)	12(32)	2(6)	2(6)	7(20)	24(68)
Peak conc. <20mg·l ⁻¹	3(14)	9(40)	7(32)	3(14)	2(10)	2(10)	5(25)	11(55)
≥20mg·l ⁻¹	0(0)	1(7)	5(33)	9(60)	0(0)	0(0)	2(13)	13(87)