

Determination of 17 β -estradiol concentration in aquatic environment of Peninsular Malaysia using the ELISA technique

ABSTRACT

Effluents from municipal and industrial wastewater treatment plants, agricultural run-off and domestic drainage add numerous pollutants to the aquatic system. Among them is 17 β -estradiol (E2), which is known as one of the strongest estrogenic chemical in the environment and commonly found in wastewater. This study was conducted to assess present concentration of E2 in aquatic environment of Peninsular Malaysia. Water samples were collected from rivers, estuaries and lakes at the northern, central and southern regions of Peninsular Malaysia. E2 concentration was determined using ELISA technique. Results revealed that the center region has the highest E2 average concentration (149.19 ng/L), followed by the northern region (95.04 ng/L) and southern region (15.66 ng/L). These results exhibit size of human population and activities may directly related with E2 elevation in aquatic environment as reflected by high human population in the central region. The lakes have the lowest concentration (11.83 ng/L), thus suggesting E2 discharges flow directly into river system. Comparison with other countries demonstrates E2 in aquatic environment in Peninsular Malaysia is higher several folds. If no immediate actions are implemented to control E2 level in the environment, there could be some adverse effects, especially to male aquatic animals, such as ova-testis, feminization, fertility reduction and villetogenin gene expression. Application of suitable bio-indicator is recommended in order to monitor estrogenic activities in aquatic environment.

Keyword: 17 β -estradiol; ELISA; Pollution; Aquatic environment; Peninsular Malaysia