

## Age-dependent dose and carcinogenic risk assessment for radionuclide $^{210}\text{Po}$ in 5 species of shellfish, Thailand

**Abstract.** The Thai population has the seafood as an important component in their diet because seafood are a source of protein that is easily available. This paper aimed to determine the  $^{210}\text{Po}$  concentrations in 5 species of shellfish, i.e., green mussel (*Perna viridis*), oyster (*Saccostrea cucullata*), enamel venus clam (*Meretrix meretrix*), radiated scallop (*Amuseum pleuronectes*) and cockle (*Anadara granosa*) collected from the upper Gulf of Thailand. The estimation of age dependent effective dose and lifetime cancer risk were performed. The determination of  $^{210}\text{Po}$  consisted of spontaneous deposition on silver discs, followed by alpha counting. The average values found for the activity concentration of  $^{210}\text{Po}$  in green mussels, oyster, enamel venus clam, radiated scallop and cockle were  $3.31 \pm 0.20$ ,  $2.54 \pm 0.36$ ,  $1.07 \pm 0.24$ ,  $1.73 \pm 0.37$ , and  $6.05 \pm 0.94$  Bq.kg<sup>-1</sup> wet basis. The feeding habit and transfer factor in the trophic level between species caused the different concentrations of  $^{210}\text{Po}$  accumulation. Annual effective dose for each species as well as for four age groups (19-30 years, 31-50 years, 51-70 years, and >71 years) of 2.31–14.92  $\mu\text{Sv}$  were well below the WHO permissible limit of 100  $\mu\text{Sv.yr}^{-1}$ . The calculated cancer risk of mortality was found in the range of  $0.32 \times 10^{-5}$  to  $1.80 \times 10^{-5}$  and also the calculated cancer risk of morbidity was found in the range of  $0.44 \times 10^{-5}$  to  $2.49 \times 10^{-5}$ . As per the WHO and USEPA, the carcinogenic risks in the study area were well below the recommended safe level for radiological risk. Therefore, shellfishes in the upper Gulf of Thailand were safe from the radiological aspect for investigated radionuclide, and poses no significant radiological exposure and health risk to the public.

**Keywords:**  $^{210}\text{Po}$ , shellfish, age-dependent dose, carcinogenic risk, Gulf of Thailand

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