Title: Assessment of gross alpha/beta activity in tap water of Dhaka city using ZnS (Ag) scintillation detector and concomitant health hazard

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Abstract: Quantification of gross alpha and beta-emitting radionuclides in drinking water helps to understand the water quality as well as the long-term exposures to human health. The gross alpha and beta activity concentrations have been measured in 35 tap water samples taken from different residential areas of Dhaka city in the year 2020–2021. The measurement was performed using a dual phosphor Zinc Sulphide Scintillation Detector, ZnS(Ag). The activity of gross alpha of the collected tap water samples ranged from 0.45 ± 0.04 to 16.53 ± 0.01 mBq/L with an average value of 7.22 ± 0.43 mBq/L, which is below the WHO recommended limit of 0.5 Bq/L (WHO, 2011) or 0.1 Bq/L (WHO, 1978). Furthermore, the activity of gross beta in the tap water samples ranged from 3.26 ± 1.25 to 57.99 ± 1.98 mBq/L (mean 30.78 ± 1mBq/L) which is below the WHO recommended limit of 1 Bq/L (WHO, 2011). The total annual equivalent dose due to tap water was found below the WHO recommended dose limit of 100 μSv/y due to radionuclides in water. Present results may help to create baseline data for gross alpha and beta activity in drinkable water in Bangladesh and also for further analysis in identifying specific radionuclides.

Keywords: Gross alpha and beta activity, tap water in Dhaka, ZnS(ag) scintillation detector, annual equivalent effective dose, Base values.

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