



Evaluation of Natural Radioactivity and Associated Hazards in Certain Ceramic Samples Commonly used in Iraq

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SUMMARY. This research focuses on measuring natural radioactivity (^{238}U , ^{232}Th , and ^{40}K) in ceramic samples which were collected from different sites in Iraqi markets. The experimental study is done by gamma ray spectroscopy analysis system. Also, ten radiological factors with radioactivity risk due to specific activity of ^{238}U , ^{232}Th , and ^{40}K . The results show that, the range of the specific activity for ^{238}U , ^{232}Th , and ^{40}K of ceramics samples were 10.39 ± 1.15 to 69.68 ± 3.24 Bq/kg, 1.05 ± 0.12 to 15.91 ± 0.53 Bq/kg, and 86.42 ± 3.48 to 522 ± 9.99 Bq/kg, respectively. It is found that, the values of ^{238}U in most samples are higher than the average of worldwide limits (35 Bq/kg), according to UNCEAR 2008. As well as, the specific activity of ^{232}Th , and ^{40}K (45Bq/kg and 420 Bq/kg) are lower than worldwide according to UNSEAR 2008, except some samples has ^{40}K larger than worldwide. Accordingly, the results of radiological hazard indices due to the specific activity ^{238}U , ^{232}Th , and ^{40}K from ceramics samples, were within the world levels limit that recommend by several organizations and commissions, including the UNSCEAR, and ICRP. Finally, it may be concluded that there is danger from natural radioactivity (^{238}U , ^{232}Th , and ^{40}K) in some samples of ceramics in Iraqi markets on human health.

RESUMEN. Esta investigación se enfoca en medir la radiactividad natural (^{238}U , ^{232}Th y ^{40}K) en muestras de cerámica que se recolectaron en diferentes sitios en los mercados iraquíes. El estudio experimental se realiza mediante un sistema de análisis de espectroscopia de rayos gamma. Además, diez factores radiológicos con riesgo de radiactividad por actividad específica de ^{238}U , ^{232}Th y ^{40}K . Los resultados muestran que el rango de actividad específica para ^{238}U , ^{232}Th y ^{40}K de muestras cerámicas fue de $10,39 \pm 1,15$ a $69,68 \pm 3,24$ Bq/kg, $1,05 \pm 0,12$ a $15,91 \pm 0,53$ Bq/kg y $86,42 \pm 3,48$ a $522 \pm 9,99$ Bq/kg, respectivamente. Se encuentra que, los valores de ^{238}U en la mayoría de las muestras son superiores al promedio de los límites mundiales (35 Bq/kg), según UNCEAR 2008. Así como, la actividad específica de ^{232}Th , y ^{40}K (45Bq/kg y 420 Bq/kg) son más bajos que en todo el mundo según UNSEAR 2008, excepto que algunas muestras tienen ^{40}K más que en todo el mundo. En consecuencia, los resultados de los índices de riesgo radiológico debido a la actividad específica ^{238}U , ^{232}Th y ^{40}K de muestras de cerámica estuvieron dentro del límite de niveles mundiales que recomiendan varias organizaciones y comisiones, incluidas UNSCEAR e ICRP. Finalmente, se puede concluir que la radiactividad natural (^{238}U , ^{232}Th y ^{40}K) en algunas muestras de cerámica en los mercados iraquíes representa un peligro para la salud humana.

KEY WORDS: ceramic, Iraqi market, NaI (Tl), radiological hazards.

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