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Naturally-occurring radioactivity in table wines

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Table wines are part of the Mediterranean diet and a common component of the adults' diet in many countries. Wines are produced from vineyards grown in soils of different types from loam soils to granitic soils and in regions with different natural radioactivity levels. Twenty table wines, red and white, from large producers in several regions of Portugal, encompassing uranium provinces, were analyzed for naturally occurring radionuclides including uranium isotopes, ^{226}Ra , ^{210}Po and ^{232}Th . Four other bottled table wines imported from Spain, France, USA, and Chile were analyzed for comparison. Uranium activity concentrations (^{238}U) in Portuguese wines ranged from 1.1 to 12.9 mBq/L, ^{226}Ra ranged from 2.0 to 22.0 mBq/L and ^{210}Po from 14.8 to 74.4 mBq/L. These ranges are nearly comparable to the activity concentration ranges determined in imported wines. Concentration of radionuclides in Portuguese wines were assessed by regions and it was observed that ^{238}U concentrations were in average slighter higher only in wines from granitic regions of the Centre-North than from sedimentary regions of the south of the country. Radium (^{226}Ra) concentrations in the wines were generally higher (by a factor of 2) than those of uranium, reflecting enhanced root uptake of radium from soils into grapes, such as commonly observed in many agriculture products. Polonium (^{210}Po) concentrations in wines were in the average higher (by a factor of 4) than ^{226}Ra concentrations, indicating that most ^{210}Po in wine was probably from atmospheric depositions on vines and grapes rather than from root uptake. Radionuclide concentrations in table wines are comparable to concentrations of the same radionuclides in drinking water, and the radioactivity exposure through this ingestion pathway is minor. Results suggest that natural radionuclide levels in wine from several continents and latitudes may be very similar.

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