

UNIVERSITI TEKNOLOGI MARA

**ASSESSMENT OF RADIUM AND
SUPPORTED RADON IN GROUND WATER
FROM CAMERON HIGHLANDS AREA**



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Thesis submitted in fulfilment
of the requirements for the degree of
Master of Science

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

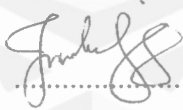
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ABSTRACT

Radon chamber using SSNTD CR39 (Columbian Resin #39) was developed and optimized to measure supported ^{222}Rn activity concentration through degassing process in ground water samples from Cameron Highlands, Malaysia. This ground waters contained natural radioactivity associated with uranium and thorium that present in rocks and soils. If this water is inhaled or ingested by human, they may be exposed to the emission of energetic alpha particle from radium and supported ^{222}Rn decaying process in this water. The measurement of supported ^{222}Rn activity concentration in ground water sources, rivers, treatment plants and its distribution areas samples was successfully carried out using CR39 inside radon chamber. Supported ^{222}Rn in samples ranged from 0.22 ± 0.13 to 1.45 ± 0.09 Bq/L. Validation of radon chamber using CR39 with continuous radon monitor has demonstrated this analytical technique was able to produce reliable analytical result for measuring supported ^{222}Rn in water. The supported ^{222}Rn results from radon chamber method have been verified with ^{226}Ra activity concentration results using gamma spectrometry technique through its progenies which a technique for measuring supported radon in water. Supported ^{222}Rn in samples from selected sites was lower than 11 Bq/L, the limit of radon in drinking water (USEPA 1999). The annual ingested dose for supported ^{222}Rn consumption was calculated based on consuming 2L of water/day and found to range from 45 ± 6 to 287 ± 27 $\mu\text{Sv/yr}$ which was below than 290 $\mu\text{Sv/yr}$ (worldwide average annual effective dose). This is due to the low levels of supported ^{222}Rn that indicates all investigated samples are acceptable for consumption.

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