

**DETERMINATION OF RADON-222 CONCENTRATION
AND EMANATION RATE OF SOIL FROM TASIK PAYA
BUNGOR, GAMBANG USING SOLID STATE NUCLEAR
TRACK DETECTOR (SSNTD)**

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ABSTRACT

DETERMINATION OF RADON-222 CONCENTRATION AND EMANATION RATE OF SOIL FROM PAYA BUNGOR LAKE, GAMBANG USING SOLID STATE NUCLEAR TRACK DETECTOR (SSNTD)

Since the decay of radon and its progenies contribute to 50% of naturally occurring radioactive materials and is the second leading cause of lung cancer, an assessment on the radiological risk in the perimeter of Paya Bungor lake, Gambang was carried out using Solid State Nuclear Track Detector (SSNTD) to evaluate the radon concentration and emanation rate of the area. A type of SSNTD, CR-39 was used, where it was exposed to be irradiated by alpha radiations for a month until retrieval. Etching process was done on the CR-39 using 6.0 M NaOH solution for 6 hours at 70 °C after retrieval to enhance the radon tracks left on the CR-39 which was then its density can be counted under optical microscope. From the radon track density, radon concentration and its emanation rate are calculated. The radon concentration in the area yields the average value of $27.47 \pm 2.77 \text{ Bq m}^{-3}$ that ranges from 7.37 Bq m^{-3} to 63.09 Bq m^{-3} . While for radon emanation rate, the value obtained in this study has the average value of $0.51 \pm 0.051 \text{ Bq m}^{-3} \text{ day}^{-1}$, with the range of $0.14 - 1.17 \text{ Bq m}^{-3} \text{ day}^{-1}$. On the other hand, the value of the annual effective dose rate in the area is $0.261 \pm 2.77 \text{ mSv per year}$ with the range value of $0.070 - 0.600 \text{ mSv per year}$. All of the values are quite low and does not exceed the world limit of radon concentration, radon emanation rate and annual effective dose rate recommended by UNSCEAR which is 200 Bq m^{-3} , $3.43 \text{ Bq m}^{-3} \text{ day}^{-1}$, and $1.00 \text{ mSv per year}$ respectively. Thus it can be concluded that the area is still safe for agriculture and plantation of future use. Other than that, a radiological risk distribution was assessed using isodose map to illustrate and to have an overview on the highest and lowest value of radon concentration, radon emanation rate and its annual effective dose rate in the map.

TABLE OF CONTENT

	Page
ACKNOWLEDGEMENTS	iii
TABLE OF CONTENT	iv
LIST OF TABLES	vi
LIST OF FIGURES	vii
LIST OF ABBREVIATIONS	viii
ABSTRACT	x
ABSTRAK	xi
CHAPTER 1 INTRODUCTION	
1.1 Background of study	1
1.2 Problem statement	2
1.3 Significance of study	3
1.4 Objectives	4
CHAPTER 2 LITERATURE REVIEW	
2.1 NORM	5
2.2 CR-39	7
2.3 Chemical Etching	8
2.4 Radiological risk	9
2.4.1 Radon gas concentration	10
2.4.2 Emanation rate	11
CHAPTER 3 METHODOLOGY	
3.1 Apparatus	13
3.2 Material	13
3.2 Chemical	14
3.3 Instrument	14
3.4 Method	14
3.5 Preparation of CR-39 detector	15
3.6 Sampling point of the CR-39	16
3.7 Etching process	18
3.8 Radiological analysis	19
3.8.1 Track Density	19
3.8.2 Radon gas concentration	20
3.8.3 Radon emanation rate	20
3.8.4 Annual effective dose rate (AEDR)	21

CHAPTER 4 RESULTS AND DISCUSSION	
4.1 Introduction	22
4.2 In-situ radiation surface dose rate	23
4.3 Assessment of Radon-222 concentration at Tasik Paya Bungor, Gambang	25
4.4 Evaluation of radon emanation rate	28
4.5 Comparative study from different places	30
4.6 Annual Effective Dose Rate (AEDR)	31
4.7 Effect of fertilizer on radon concentration	33
4.8 Radiological risk distribution	34
 CHAPTER 5 CONCLUSION AND RECOMMENDATION	
5.1 Conclusion	37
5.2 Future recommendation	38
 REFERENCES	40
APPENDICES	43
CURRICULUM VITAE	44

LIST OF TABLES

TABLE	TITLE	PAGE
3.1	Coordinate of sample at the selected location in Tasik Paya Bungor	18
4.1	Surface dose rate reading in Tasik Paya Bungor, Gambang	25
4.2	Radon concentration in the perimeter of Tasik Paya Bungor, Gambang	27
4.3	Emanation rate at the perimeter of Tasik Paya Bungor, Gambang.	30
4.4	Comparative study of radon emanation rate of different places	32
4.5	Comparative study of radon concentrations of different places	33
4.6	Annual effective dose rate at the perimeter of Tasik Paya Bungor, Gambang.	34