Investigations on Indoor Radon Levels in Dwellings of some Selected Areas of Khulna, Bangladesh

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Introduction

- Radon (^{222}Rn) is a cancer-causing radioactive gas. Moreover, numerous public health agencies rank residential radon exposure as the second leading cause of lung cancer after smoking. Radon is estimated to cause many thousands of deaths each year[1,2].

- (^{222}Rn) is a noble radioactive gas generated by disintegration of radium (^{226}Ra) which is present in soil, water and building materials. The indoor radon level is strongly influenced not only by the radium in the underlying soil or walls, but also by the life style and building use, that is to say by the natural or mechanical exchange of indoor air with outdoor air[3].

- In Bangladesh, some limited studies on the concentrations of (^{222}Rn) in homes have been carried out for limited areas. In the present work indoor radon levels have been measured by CR-39 detectors. The purpose of the present study is to obtain preliminary data about indoor radon levels in Khulna city for the first time as a baseline study for a wider future national survey in the whole Khulna city.

Objectives

•To get a better understanding of indoor radon levels so that it can inform and help to protect the Khulna City from the risks of long term radon exposure as well as to compare the average indoor radon concentrations between different floor levels inside the selected areas.

•The measured level of radon can be considered in future studies as well as constructing of buildings in future.

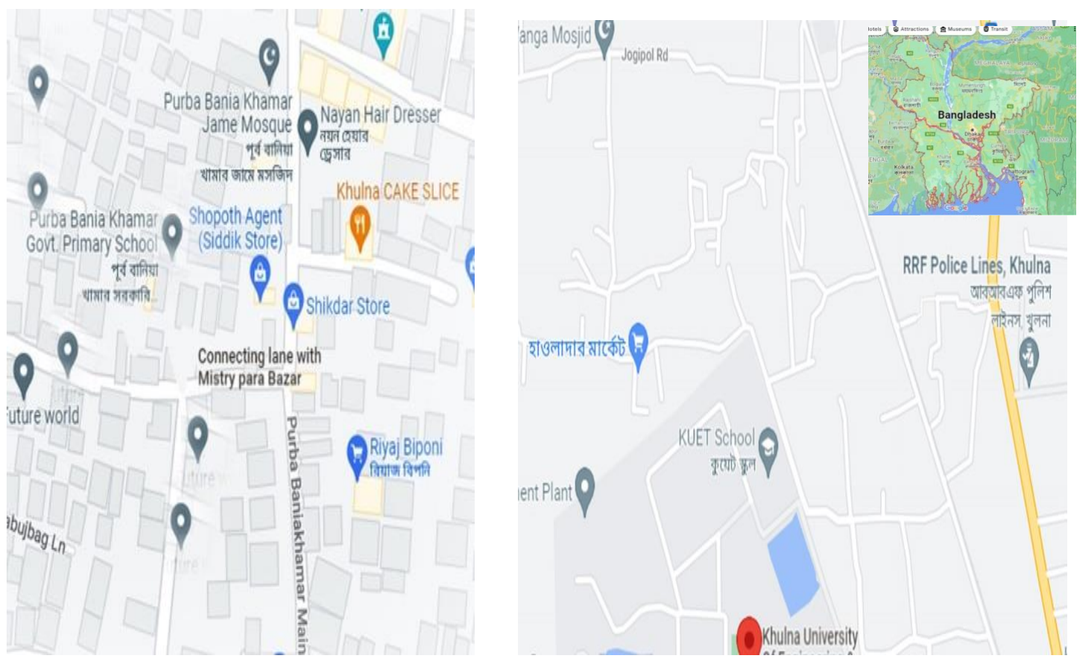
Methodology

•In the present work indoor radon levels have been measured by CR-39 plastic track detectors (standard grade solid state nuclear tract detector).

• Detectors have been exposed on air above 1 meter from the ground for three months in 11 different places during summer season (March to July) and 9 different places during winter season (August to December).

• After completing three months of exposure then the CR-39 detectors have been chemically etched in 6N solution of NaOH at a temperature of 70 ^{0}C for 4 hours in a constant temperature water bath to enlarge the latent tracks produced by alpha particles from the decay of radon

•Finally, alpha tracks can be calculated by scanning under the optical microscope with 400x magnification and then radon concentration will be calculated.

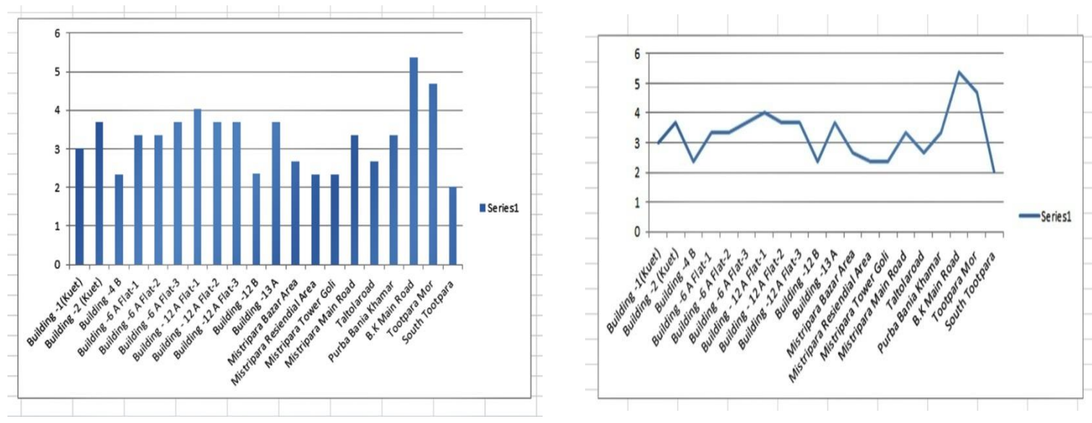


Study area (Khulna City , Bangladesh)

Results

Sl NO	Name of Places	Activity (Bqm^{-3})
01	Building -1 (Kuet Campus)	3.016 ± 0.056
02	Building -2 (Kuet Campus)	3.686 ± 0.06
03	Building -4 (B) (Kuet Campus)	2.345 ± 0.048
04	Building -6 (A) Flat-1 (Kuet Campus)	3.35 ± 0.059
05	Building -6 (A) Flat-2 (Kuet Campus)	3.35 ± 0.059
06	Building -6 (A) Flat-3 (Kuet Campus)	3.686 ± 0.06
07	Building -12 (A) Flat-1 (Kuet Campus)	4.022 ± 0.064
08	Building -12 (A) Flat-2 (Kuet Campus)	3.686 ± 0.06
09	Building -12(A) Flat-3(Kuet Campus)	3.686 ± 0.06
10	Building -12(B) (Kuet Campus)	2.68 ± 0.053
11	Building -13(A) (Kuet Campus)	3.686 ± 0.06

Sl NO	Name of Places	Activity (Bqm^{-3})
12	Mistripara Bazar Area	2.68 ± 0.053
13	Mistripara Residential Area	2.345 ± 0.048
14	Mistripara Tower Goli	2.345 ± 0.048
15	Mistripara Main Road	3.35 ± 0.059
16	Taltola Road	2.68 ± 0.053
17	Purbo Bania Khamar	3.35 ± 0.059
18	B.K Main Road	5.36 ± 0.074
19	Tootpara Mor	4.69 ± 0.069
20	South Tootpara	2.011 ± 0.045



Radon Activity in Bqm^{-3}

Conclusions

- A safe level of radon gas is no radon gas. Radon gas is a carcinogen which causes lung cancer. The US EPA has put it plainly, stating, Any radon exposure has some risk of causing lung cancer. The lower the radon level at home, the lower risk of lung cancer.
- This study provides preliminary data about indoor radon levels in Khulna city for first time in dwellings of Khulna city.
- The annual effective dose for the pupils from the indoor radon exposure will be known. From this study it has been observed that radon concentration in Khulna city is below the average level.

References

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