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Prediction and Determination of a Radon Gas levels in animals barns air and it's effect on animal health

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Abstract

This study was conducted to predict and determine the radon gas in animals barns air. This experiment was carried out at the animal farm, college of veterinary Medicine, university of Baghdad from the 2nd April to 20th July 2014. Five radon detectors type (Alpha-track test kits) Long-term was accomplished from the manufactures corporation and the instruction was followed . These were hanged by the ceiling of animals barns. All boxes of the detector came in saved returned by mail package promptly after the end of the test to a special laboratory for analysis to obtained the result. The results revealed statistically significant ($p<0.05$) differences in radon concentration in barns air of different animals. Therefore, it could be concluded from this study that radon gas can affects animal health in the same way as in human.

Keywords: Radon, air, barns, detector, health.

Introduction

Radon is an inert natural radioactive colorless, odorless , tasteless noble gas formed in the decay product series of uranium occurring naturally and can be found in trace amount in many soils , it produces radioactive progeny and emit significant levels and is generally present in the atmosphere **[1, 2].**

The radioactive radon gas is widely considered to be a health hazard due to it's radioactivity by many environmental agencies in the world **[3]** , also this gas is responsible for the majority of the mean public exposure to ionizing radiation and emanates, accumulate naturally from the ground building materials . moreover the radon can migrate from soil into groundwater all over the world could , thus in geographic areas where radon is present in heightened concentration , radon is considered a significant indoor air contaminant **[4, 5].**

Its atmosphere concentration levels varies greatly depending on the season and conditions like locality and the composition of the underlying soil **[6, 7].**

Epidemiological evidence shows a clear link between some adverse health outcomes and high concentration of radon , ascribe to entry through the lung or skin and reach to blood stream , then distributed throughout the body tissues that will be subjected to the actions of freeradicals created by radiation , inhalation and may suffer inflammation , besides exert it's carcinogenic effect and it's decay products in humans **[8, 9].**

Accordingly, radon can affects animals health in the same way as in human. The objective of this study was to prediction and determine radon concentration in animals barns air it's effects on animal health.
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Materials and Methods

1. Radon Detectors

Five radon detectors type (Alpha-track test kit's-long term) were purchased from the manufactures corporation *(American source) and the instruction of using were followed.

2. Time of the experiment and location:

This experiment was carried out at the veterinary medicine collage –Animal barns/Baghdad University from the 2nd April to 20th July 2014.

3. Experimental design:

All radon detectors were maintained in a protective pouch and were opened to remove the detector , then the start date of the experiment was write on the top of the detector and were hanged by the ceiling of the animals barns at the level of breathing zone about (2 - 6) feet above the floor and at least one foot from the exterior walls and three feet from windows and exterior doors and placed at least four inches away from other objects and in location where it would not be disturbed [10, 11]. Subsequently the box the detector came in saved after filled out all information form.

At the end of the experiment, all the *data were recorded (location type , data of the start and end of experiment)and send to the manufacture for the determination of radon levels in their laboratory . [12][13].

*Louisiana Departmentof Environmental Quality 602N Fifth street , Baton Rouge LA70802 USA. Order#:1359695682VDW . State radon office (Louisiana) http://wwwdeq. Louisiana.gov/portal. *www.rssi.us//result.php

Results

The result of this study revealed that a significantly ($p< 0.05$) higher value of radon concentration (0.8±0.012) picocuries perliter (pci/L) in air of claves barn were found compared to both air of sheep, and cattle barns while no significant differences were recorded in radon concentration in air of both sheep and cattle barns (Table 1).

(Table 1): Radon concentration (picocuris per liter) pci/L in animals barns air of Vet-Med-college

Barn	Concentration pci/L
Cattle (1)	0.4± 0.007 B
Cattle (2)	0.4± 0.006 B
Sheep (1)	0.4± 0.004 B
Sheep (2)	0.4± 0.004 B
Calves	0.8± 0.012 A

Different letters show significant differences ($p<0.05$) in concentration among barns air at 5% Level.

Discussion

This significant ($p<0.05$) higher values of radon concentration (0.8± 0.012) (pci/L) in air of calves barns (Table 1) compared to the values that found in both air of sheep and cattle barns could be due to the exposure period of the study. In addition , the test period was more than 90 days according to the EPA device protocol (402-R-92-004) , which recommend that the radon gas levels in outdoor should be about 0.4 pci/L . The result of this study disagree with the recommendation of many world agencies [15, 16, 17, 18]. This could be attributed to the calves barns many be nearby from location that exposed to military activities during occupation of Iraq at 2003 by world alliance armed and may be used radioactive weapons like uranium and this lead to exist the radon activity in the site.

Conclusion

It could be concluded from this study that the radon gas affect animals health just as in humans due to it's adverse health outcome, also there is sufficient evidence for the carcinogenicity of radon and it's decay products in human for such exposure, I suggest the need for further studies assess the relationship between radon and many health indisposition in animals.

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