IOSR Journal of Electrical and Electronics Engineering (IOSR-JEEE)
e-ISSN: 2278-1676,p-ISSN: 2320-3331, Volume 10, Issue 4 Ver. III (July – Aug. 2015), PP 91-93
www.iosrjournals.org

Test To Investigate The Use Of Ultrasound As An Alternative Means Of Repelling And Eradicating Rodents

Nweke F.U.
Department of Industrial Physics, Ebonyi State University, Abakaliki.

Abstract: *An ultrasound is a mechanical wave which has a frequency above audible range; that is above 20 kHz. In this research, tests were carried out to investigate the effectiveness of using ultrasound to repel rodents in a designed and constructed ultrasonic repeller. Three species of rodents (rat, mice and rabbit) were introduced in the room where this device was mounted and the reactions of the rodents on the generated ultrasound on them were observed from a distance. The results of the test showed that the constructed ultrasonic repeller generated ultrasonic frequencies which irritated and repelled these rodents at a frequency of 35 kHz, 38 kHz, 40 kHz and 50 kHz as the rodents were seen trying to find their way out from the room. When these rodents were caged and brought close to the repeller for a few minutes, it was also discovered that the ultrasound irritated and finally demobilized them. From the test, an ultrasound is an alternative means of repelling rodents rather than the conventional means of using trap or poison to kill them; which is not safe and convenient to where children and their pet live.*

Keyword: *Ultrasound, Repeller, Rodents, Propagation and Auditory stress*.

I. Introduction

The damages caused by rodents to farmers and even to domestic residence have led to starvation, economic waste and disease transmission. Some rodents transmit deadly diseases to human being which include plagues, murine typhus, salmmellosis, rat bite fever, laptospirosis, trichniosis, lassa fever and hantavirus. These diseases are dangerous and can kill if not treated accordingly (National Pest Management Association, NPMA, 2002). A lot of measures have been adopted in an attempt to eliminate or reduce the existence of these rodents since they are enemies to humanity. These include the use of chemical (otherwise called poison) and traps. Some of these chemicals can be in powered forms, solid forms or liquid forms which are sprayed around the environment. This chemicals sometimes become poison also to man and its use are not safe where children and their pets live. Sometimes when the rodents are killed by the chemicals, they hide in a place that you may not find them easily. This results in producing dangerous odor that is injurious and uncomfortable to man as they wrought in such hidden places (International Programme on Chemical Safety, 1982; National Coalition Against Misuse of Pesticide and You, Federal Trade Commission, News Release, Australia, 2002). Hence an ultrasound was discovered as efficient, neat and as an alternative means of eradicating these rodents.

Meaning of Ultrasound

Ultrasound is a sound (i.e. mechanically vibration phenomenon) having a frequency of above the range of human hearing (i.e. above 20 kHz); which requires a material medium for its propagation [Jacke, 1979, Repacholi, 1989].

Ultrasound consists of electronically generated sound wave with frequencies too high to be heard by human ear. It repels rodents by subjecting them to intense auditory stress, hunts their ear makes them uncomfortable and create unfriendly environment that discourages infestation. [NPMA, 2002; Lund, 1984; Mix, 1984; Lavoie and Galhan, 1977].

Ultrasound can be exposed into two distinct environment; either airborne or liquid borne.

Liquid borne Ultrasound

Liquid borne ultrasound occurs through medical exposure in diagnosis, therapy, surgery, dentistry. Many women generally are exposed to ultrasound during pregnancy either one or twice before giving birth. Hence there are no risks that are detected to have associated with ultrasound exposure with human being IPCS, 1972, Bomford and O' Brian, 1990, Jacke, 1979].

Airborne ultrasound

One of the critical organs for airborne ultrasound exposure is ear. The effect caused by exposure to airborne ultrasound includes temporary threshold shift in sound perception, altered blood sugar levels, electrolyte imbalance, fatigue, headaches, nausea, tinnitus and irritability. (IPSC, Geneva, 1982; Jacke, 1979; Repacholi, 1981)

In industrial applications, ultrasound can be used in many areas such as cleaning, emulsifying, welding and flaw detection and the use of consumer devices such as dog whistles, bird and rodent controllers, camera range finders, intrusion alarms [IPCS, 1982].

However, this research paper is aimed at carrying out a test to investigate the use of ultrasound as an alternative means of repelling and eradicating rodents which constitute havoc in an environment.

Research Methodology

A designed and constructed ultrasonic repeller was mounted in a room where the test was carried out. Three species of rodents (i.e. rat, mice and rabbit) were introduced one after the other in the laboratory where the repeller was mounted. The effects of the ultrasound on the rodents were observed from a distance. Also the effects of the ultrasonic repeller were also observed when the rodents were caged and brought close to it.

II. Results/Discussion

Fig 1 and 2 depicts the reactions of the rodents when introduced on the repeller and also when it was caged and brought close to the repeller. The results of the test showed that the rodents were repelled at an ultrasonic frequency of 35 kHz, 38 kHz, 40 kHz and 50 kHz, which were generated by the constructed ultrasonic repeller. From the figures, it were observed that the ultrasonic frequencies irritated and repelled these rodents as they were seen trying to find their way out from the room through a small opening at the door. Also when the rodents were caged and brought close to the device, the ultrasonic frequency irritated and finally demobilized them. Hence an ultrasound is an innovation of Science and Technology which can be used as alternative means in controlling and eradicating rodents rather than the use of traps and chemical, otherwise known as poison.

III. Conclusion

The use of ultrasound to eradicate rodent was proved to be efficient and convenient than the use of traps and poison which was found not to be safe where children and its pet live.

The irritation of ultrasound on rodents creates unfriendly environment that discourages infestation, thereby reducing the population drastically [NPMA, 2002]. Also because of the odor produced by the use of chemicals to kill rodents when it rotten in a hidden place, it can lead to lassa fever which one of the deadly diseases in Nigeria today.

IV. Recommendations

Because of the damages caused by rodents and the diseases it transmits, effort should be made to embrace the use ultrasound to complement other means of eradicate rodents. Government of Nigeria should try establish laboratory in almost all the six zones of the nation to detect some of the diseases transmitted by rodents especially lassa fever since it kills within a shortest time if not detected early enough and is communicable disease that even kill even the doctors that try to rescue the patient ignorantly.

References

[1]. International Programme on Chemical Safety, IPCS (1982). Environmental Health Criteria for ultrasound: World Health Organization, Geneva.
[2]. Jacke, S. E. (1979). Ultrasonic in industry today. In: Proceedings ultrasonic international 1979, Graz, Austria, Guildford, UK, IPC science and Technology Press, 80-200.
[3]. Lavoie, G. K. and Galhan (1977). Ultrasound as a deterrent to rattus norvegicus, J Stored pond press **13**: 23-28.
[4]. Lund, M. (1984). Ultrasonic pest control **16** (2**):** 82.
[5]. Mix, J. (1984). Researchers debunk controlling insect with ultrasound pest control **52**(2): 26-28.
[6]. National Pest Management Association, PestChaser (2002). Health Canada under pest control product Act Reg. No.'s 21465, 21989.
[7]. National Coalition against the Misuse of Pesticides and You. Federal Trade Commission News Release (Australia), Volume 22, No. 2, 2002, P.2.
[8]. Repacholi, M. H. (1981). Ultrasound: Characteristics and biological action, National Research Council of Canada, Ottawa Publication, 284.

Fig 1: Reactions of rodents when introduced to ultrasound. They try to find their way out because of the irritation of the ultrasound.

Fig 2: The effect of ultrasound on the rodents when caged. They were irritated and finally demobilized inside the cage since they can find their way out.