COMPARAISON OF THE EFFICACY OF FIVE RODENTICIDES ON ALBINO RATS

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ABSTRACT

The ready-to-use baits of *Storm, *Kilrat, *Z.P. *Vengeance and *Fumakilla at three dosage levels were fed to albino rats. The dosages used were 3gm, 7.30gm and 14.5gm respectively.

The percentage kill, the time of death after ingestion of poison and weight lost were determined for each rodenticide at different dosage level.

One hundred percent mortality of the rats that ingested Storm at the 3 treatment levels was achieved. One hundred percent mortality was only achieved at the highest dosage level of 14.5gm of Kilrat and Z.P. rodenticides. The highest dosage level of 14.5gm Vengeance gave 80 % mortality while all the three dosage levels of Fumakilla did not kill any of the rat.

* Storm, Kilrat, Vengeance, Z.P and Fumakilla are brand names.

INTRODUCTION

Infestation of rodents is a serious problem to the Government and people of Nigeria; Apart from the damage to crops, storage structures, packaging and pest control materials are also vandalized by rodents (Adesuyi 1966). Rodents are also important household pests in urban areas. They has been found to damage cable of important instruments rendering them useless. There have been reports of rodents damaging ornaments, books and important people by their presence at the most unwanted time in their offices and homes. Therefore the control of rodents in Nigeria is of utmost importance.

The control measures which are practised in Nigeria are mainly by physical means. The use of rodent proof materials to prevent rats from getting into storage structures is quite common. Some examples are the use of bamboo for the construction of maize crib to prevent rodents from climbing (Anon 1982). Rodents baffles are recommended for use on cribs made of saw-wood (Anon 1982). Various types of rodents traps are available for use in the control. The use of sticky material e. g. "ate" is popular in some areas. Biological control by means of cats as predators is practised in many homes.

The use of chemicals to control rodents is now on the increase. Most of the rodenticides which are in the Nigerain Market are in the form of ready-to-use baits.

Some of these chemicals have been tested for their efficacy against rodents (Adesuyi 1966, Sowunmi 1979-80). Those rodenticides that were effective were recommended for use in Nigeria. Recently there have been complaints on the effectiveness of some of them.

The reason for this may be due to: (Anon 1982)

(1) unpalatable and unattractiveness of food used as baits;
(2) low dosage of active ingredients;
(3) placement of bait in the wrong place;
(4) availability of other food;
(5) resistance of rodents to rodenticides.

It is therefore important to regularly determine the efficacy of rodenticides in the market and probably find out reasons for the effectiveness of some.

MATERIALS AND METHODS

The test animals used were albino rats.The experimental diets were ready-to-use baits which contained either, flocoumafen, chlorophacinone, or zinc phosphide and their details are on table 1.

Table 1

DETAILS OF RODENTICIDES TESTED

TRADE NAME	COMMON NAME	% ACTIVE INGREDIENT
Storm	Flocoumafen	0,005
Kilrat	Chlorophacinone	0,005
Z.P.	Zinc Phosphide	2,0
Vengeance	Chlorophacinone	0,08
Fumakilla	Chlorophacinone	unknown

The diet for the control was a mixture of ground, maize and groundnut.

The test animals used were individually weighed and caged during the trials. 3gm, 7,3gm and 14,5gm of each of the five experimental diets were weighed out. Each of these were supplied to different individually caged animal.

After the consumption of the poisoned baits, the treated rats were subsequently supplied with a diet of maize and groundnut which was the diet given to the control. Drinking water was supplied to each rat. In each treatment, six rats were used for each rodenticide.

The time of death for each rat after the ingestion of the poison was recorded. The rats were weighed immediately after death had occured. The number of rats that died by ingestion of the poison were recorded. Statistical differences were determined by the analysis of variance and student-test.

RESULTS AND DISCUSSION

Table 1 shows the common names of the brand of rodenticides used in this trial. Three of them have chlorophacinone as their active ingredient. There effectiveness however differed as seen on table 2. The percentage active ingredient used were much lower in Storm (flocoumafen) and Kilrat (chlorophacinone) than ZP (zinc phosphide) and Vengeance (Chlorophacinone).
There was no indication of the percentage active ingredient of fumakilla on the label. The food media in the ready-to-use baits of the rodenticides in the trials were unknown.

The result of the percentage mortality is on table 2 : all the rats which ingested flocoumafen (Storm) at the three dosage treatment died.
The percentage mortalities of the rats which ingested 3gm of the other rodenticides were much lower than that of Storm. At the higher dosage, all the rodenticides killed over 80% of the rats whith the exception of Fumakilla.

All the rats which were introduced to this bait refused to eat it throughout the experimental period. They died of starvation. Also the bait which contained Vengeance was relunctantly consumed by the rats. It took the rats up to three days to finish their ration of baits with vengeance.

Table 2

AVERAGE PERCENTAGE MORTALITY OF RATS

Weight of bait	Storm	Kilrat	Z.P.	Vengeance	Fumakilla	Control
3gm	100	16,66	66,67	16,66	*	0
7,3gm	100	66,67	83,33	100	*	0
14,5gm	100	100	100	83,33	*	0

* The rats did not eat the bait with fumakilla

The results of the experiment showed that Storm was the most potent of the rodenticides tested foilowed by ZP. Its percentage mortality at the lower dose was significantly different from Kilrat, Vengeance and ZP at $P < 0,001$ for Kilrat and Vengeance and $P < 0,05$ for ZP. Percentage mortality of ZP was different from that of vengeance and Kilrat $P > 0,05$. Fumakilla was no potent.

Table 3 shows that all the rats which were supplied with poisoned bait lost weight. There was not much difference in the loss of weigh between the rodenticides.

Table 3

AVERAGE PERCENTAGE WEIGHT LOSS IN GMS

Weight of bait	Storm	Kilrat	Z.P.	Vengeance	Fumakilla	Control
3gm	30	12,5	25	50	*	0
7,3gm	45	37,5	30	53,3	*	0
14,5gm	24,2	20	35	35	*	0

* The rats did not eat the bait with fumakilla

The average percentage time of death is on table 4. It ranged between 3,8 and 8,26 days. There was not much difference in their time of death.

Table 4

AVERAGE PERCENTAGE TIME OF DEATH IN DAYS

Weight of bait	Storm	Kilrat	Z.P.	Vengeance	Fumakilla	Control
3gm	7,6	7	8,5	7,5	*	0
7,3gm	5,2	6,3	6,8	7,2	*	0
14,5gm	3,8	6,5	6,28	8,26	*	0

* The rats did not eat the bait with fumakilla

Fumakilla was the most unattractive, repulsive and unpalatable rodenticide in the test as the rats rather starved to death than to eat iot. This experiment proved that palatability of baits are important in rodent control.

The experiment re-emphasized the need for evaluation of the efficacy of rodenticides so as to recommend the most effective for use in the country.

Proper labelling which would indicate the names, active ingredient and direction of use should be introduced and enforced in Nigeria.

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ANALYSIS OF VARIANCE OF MAIN % MORTALITY AT 3GM DOSAGE

Source of variation	S S	D F	M S S	F	P
Treatment	6,84	3	2,26	45,2	0,01
Residue	1,01	20	0,05		4,95
Total	5,833	23			

COMPARAISON DE L'EFFICACITE DE CINQ RODENTICIDES CHEZ DES RATS BLANCS (*RATTUS NORVEGICUS ALBINOS*)

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Résumé

On a alimenté des rats blancs avec des appâts "prêts à l'emploi" : *storm, *kilrat, *2-P, *Vengeance et *Fumakilla, les animaux étant répartis en trois lots pour chaque spécialité. Chaque lot recevait l'une des trois quantités suivantes par individu : 3 g, 7,3 g et 14,5 g en une seule fois.

Les pourcentages et les délais de mortalité après ingestion du poison et les pertes de poids ont été notés pour chaque rodenticide et chaque dose.

Tous les rats ayant ingéré "storm", quelle que soit la quantité, ont succombé. Avec "kilrat" et 2-P, les 100 % de mortalité n'ont pu être obtenus qu'avec la quantité maximale de 14,5 g. Cette même quantité avec "Vengeance" a donné un taux de mortalité de 80 % alors qu'avec " Fumakilla" elle n'a tué aucun des rats l'ayant ingérée.

* : Les noms de marques déposées ne sont mentionnés que pour information.