

PALATABILITY OF SOME FIELD RODENTS TO CERTAIN VEGETABLE OILS BAITS

A.A. Asran; Y.M.A. Abd El-Galil; A.A.M. Abo-Hashem and
Fatma K. Khidr

Plant Protection Research Institute, Agriculture Research Center, Dokki, Egypt.

Abstract: Laboratory experiments were carried out to clear the possibility of using some expired vegetable oils in rodent baits instead of using the non-expired ones or getting rid of them. The obtained data proved that the highest average of bait consumption by *Mus musculus* per day was recorded at 0.25% for all the tested oils (Lettuce, olive, sesame and cotton seed oils). The variations in consumption especially between 0.25% concentration and the remaining concentrations were noticeable. Results proved also that lettuce, olive and sesame oils were more palatable to the mice at 0.25% concentration. Moreover, olive oil and sesame oil baits were more palatable to *M. musculus* than lettuce oil and cotton seeds oil both.

On the other hand, *Rattus norvegicus* accepted the lowest concentration (0.25%) more than the others, (0.50%, 0.75% and 1% concentration) for olive oil and cotton seeds oil. Meanwhile the Norway rat accepted the lettuce oil at 0.75% concentration and sesame oil at 0.5% concentration more than the other concentrations. As well as, the results assured that palatability of the Norway rat was parallel to their bait consumption for the whole experimented oils. Finally, the whole results confirmed that baits of the expired oils; lettuce, olive and sesame oils at either 0.25% or 0.5% concentrations increased consumption of mice and rats more than same concentrations of cotton seeds oil (The recommended one).

Key words: The Norway rat, *Rattus norvegicus*, the house mouse *Mus musculus*, vegetable oils baits.

Introduction

Approximately 5000 species of mammals exist today of which about 2000 are rodents. These range from unfamiliar creatures such as capybara (the largest rodent) and the pygmy mouse (the smallest rodent) to the more

familiar rats and mice. Rodents cause heavy economic losses to farmers, food manufacturers and processors, as well as causing damage to the structure and fabric of buildings (Meehan, 1984).

Received on: 29/3/2009

Accepted for publication on: 4/5/2009

Referees: Prof.Dr. Nagua A. Abd-Albari Prof.Dr. Khalifa H. Abd-ElGouad

Many investigations had been done in different places of the world to know rodent behavior, food and feeding, population dynamics, etc., to put good programs for managing this pest thoroughly (Abazid, 1990 and Ansari et al., 2005). In Egypt, several studies were carried out in some Governorates such as Fayom (Asran et al., 1985), Minia (Mourad et al., 1982), Assuit (Abd El Gawad and Ali, 1982) and Qalubiya, Luxor and Behera (Asran et al., 1989).

This investigation aimed to use some expired vegetable oils in rodent control to save the edible oil (cotton seed oil) for human been.

Materials and Methods

A) Tested animals:

Five males and five females each of the Norway rat, *Rattus norvegicus* and the house mouse *Mus musculus* were selected for preference and acceptability experiments. Mice and rats were brought from special farm for animals breeding at Abu-Rawash village, Giza district, Giza Governorate.

B) Tested oils:

Expired sesame, olive, and lettuce oils besides a fit cotton seed oil (which have been used in rodent control for several years) as a control were chosen to estimate their acceptability for each of *Rattus norvegicus* and

Mus musculus to know the preferred one of these oils to each species of the tested rodents. Each of oil kinds was mixed thoroughly in certain concentrations (0.25%, 0.50%, 0.75% and 1%) with wheat grains to make rodent baits.

C) Procedure:

Two kinds of mixed oils were chosen in one such as sesame with lettuce, sesame with olive, sesame with cotton seed oil, lettuce with olive, lettuce with cotton seed oil and olive with cotton seed oil, were tested to estimate the acceptability of different used plant oils in 0.25% concentration. A similar test was undertaken for the other concentrations as previously mentioned for all testing pairs. Individual food cups were provided with 30 gm. of each food (2 cups in each cage, every cup had one type of food). Consumption was recorded to the nearest 0.01 g. on daily basis for each individual and for each food type. Preference was measured as percentage of consumption of tested food contributed to the total amount of food eaten during 4 days. For palatability tests, two cups with double food stuff were provided for 4 days. The position of each cup was changed daily in the cage (approximately 10 cm apart) to avoid any bias from position preference. The following equation was used for calculating palatability:

Total consumption of the tested bait in g

$$\text{Palatability \%} = \frac{\text{Total consumption of the tested bait in g}}{\text{Total consumption of the whole baits in g}} \times 100$$

Total consumption of the whole baits in g

A paper was placed under each cage to recover spilled food, and to ensure accurate measurement of consumption. Daily food intake was determined by subtracting the spilled and the remaining food in each cup from the original quantity given to each individual.

The laboratory conditions had been adjusted during the whole experimental period (65%±5 R.H % and 25 ± 2^o C).

The data of bait consumption was submitted to analysis of variance using F-test (P<0.01), discrimination by Tukey (P<0.05) with SAEG 0.9 statistical software.

Results and Discussion

1. House mouse:

1.1. Bait consumption:

The presented data in Table (1) showed that the highest average of bait consumption (in g) by an individual of the target animal per day under double cup system conditions was at the lowest concentration 0.25% for the whole tested vegetative oils. The consumed amounts at that concentration were 3.51, 3.58, 4.86 and 1.24 g for lettuce oil, olive oil, sesame oil and cotton seed oil, respectively. The variations in consumption rates

were noticeable especially between 0.25% and the three remaining concentrations. But, no remarkable differences could be detected between 0.50 and 0.75% concentrations.

While, the obtained data in Table (1) revealed that *Mus musculus* consumed more amount from sesame oil (4.86 g) followed by olive oil (3.58 g) and lettuce oil (3.51 g), while the lowest consumption rate (1.24 g) occurred by adding the cotton seeds oil at 0.25% concentration. The house mouse took approximately the same trend in its consumption from the baits of the other applied concentrations. Moreover, mice accepted olive oil and sesame oil baits more than lettuce oil and cotton seed oil at most concentration Asran (1993) agreed with the previous results and stated that five males of albino house mouse, *Mus musculus* L. consumed the biggest quantity from carrot oil bait (33.2 g/5 males / 3 days) and the lowest quantity from sesame oil bait (20.6 g / 5 males / 3 days). Meanwhile, females consumed carrot oil bait (30.0 g/ 5 females / 3 days) more than soy-bean oil bait (27.6 g / 5 females / 3 / days) followed by olive oil (24.2 g / 5 females / 3 / days) and sesame oil bait (22.2 g / 5 females / 3 / days).

1-2 Palatability:

The different investigated baits were more palatable to *M. musculus* at 0.25% concentration. The palatability of the experimental mice at the used concentrations (0.25%, 0.50%, 0.75% and 1%) were respectively; 26.61%, 21.29%, 24.02% and 25.64% (for lettuce oil), 27.14%, 23.06%, 24.22% and 28.86% (for olive oil), 36.85%, 22.84%, 21.74% and 25.64% (for sesame oil) and 9.40%, 32.81%, 29.81% and 18.53% (for cotton seeds oil) Table (1). These results proved that each of olive oil and sesame oil baits were more palatable to *M. musculus* than lettuce oil and cotton seeds oil both. In addition, to mice preferred the lowest concentration 0.25% than the other ones for the tested oils except for cotton seeds oil. In case of cotton seeds oil, mice preferred 0.50% concentration than the other baits with the other three concentrations.

Asran (1993), agreed with the obtained results in this work when he reported that sun flower seeds were most preferred by the house *Mus musculus* L. which consumed 12.5 g in average within ten days. The least preferred was cotton seeds (1.9 g consumed during the same period). He found also that pea and horse-bean were the least preferred. However, Bran + 5% molass was the most preferred followed by cowpea.

2. The Norway rat:

2.1 Bait consumption:

Average of bait consumption in gram by an individual of the *R. norvegicus* per day for certain vegetative oils at some concentrations was compiled in Table (2). The recorded data cleared that rats accepted 0.75% concentration (6.32 g), 0.25% concentration (4.32 g), 0.50% concentration (3.9 g) and 0.25% concentration (2.71 g) more than the other used concentrations for lettuce oil, olive oil, sesame oil and cotton seeds oil respectively. In other words, *Rattus norvegicus* accepted the lowest concentration (0.25%) more than the others for olive oil and cotton seeds oil, meanwhile it accepted bait of lettuce oil (at 0.75%) and sesame oil (at 0.50%) more than the other ones. The differences in daily bait consumption for the used concentrations varied so much for each oil. As well as, the data presented in Table (2) revealed that lettuce oil bait was more consumed by *Rattus norvegicus* than olive oil, sesame oil and cotton seeds oil for instance, the daily in take amounts by rat individual at 1% concentration from lettuce oil, olive oil, sesame oil and cotton seeds oil were respectively, 5.17 g, 3.48 g, 2.98 g and 2.34 g

El-Nashar (1998), mentioned that, the consumed amount from olive oil, soy-bean oil, seeds oil baits by five males of the albino

Table(1): Effect of the different concentrations of some expired vegetable oils on acceptance and palatability of the house mouse, *Mus musculus* L.

Concentration	Average of bait consumption (g.) / individual/day				Total Consumption (g.)	Palatability %			
	Lettuce	Olive	Sesame	Cotton seed		Lettuce	Olive	Sesame	Cotton seed
0.25%	3.51	3.58	4.86	1.24	13.19	26.61	27.14	36.85	9.40
0.50%	0.96	1.04	1.03	1.48	4.51	21.29	23.06	22.84	32.81
0.75%	1.16	1.17	1.05	1.44	4.83	24.02	24.22	21.74	29.81
1.0%	1.91	2.15	1.91	1.38	7.35	25.64	28.86	25.64	18.53
Total	7.54	7.94	8.85	5.54	29.88	25.23	26.57	29.61	18.54
Mean	1.88	1.98	2.21	1.38	7.47	25.17	26.56	29.58	18.47
L.S.D.	Non Significant								

Table(2): Effect of the different concentrations of some expired vegetable oils on acceptance and palatability of the Norway rat, *Rattus norvegicus* Berken.

Concentration	Average of bait consumption (g.) / individual/day				Total Consumption (g.)	Palatability %			
	Lettuce	Olive	Sesame	Cotton seed		Lettuce	Olive	Sesame	Cotton seed
0.25%	3.20	4.32	3.06	2.71	13.29	24.08	32.51	23.02	20.39
0.50%	3.54	3.12	3.90	2.55	13.11	27.00	23.79	29.75	19.45
0.75%	6.32	1.74	2.25	1.92	12.23	51.67	14.23	18.39	15.31
1.0%	5.17	3.48	2.98	2.34	13.97	37.00	24.91	21.33	17.01
Total	18.23	12.66	12.19	9.52	52.06	34.65	42.06	23.17	18.09
Mean	4.56	3.16	3.05	2.38	13.15	34.68	24.03	23.19	18.09
L.S.D.	Non Significant								

Norway rat, *Rattus norvegicus* Berken, for three successive days were 60.9, 74.0, 66.2, 47.5 and 45.8 g, respectively and were 69.0, 70.4, 60.9, 53.7 and 59.4 g for females, successively.

2.2. Palatability:

The tabulated results in Table (2) proved that palatability of the experiment animals was paralleled to the mean of bait consumption for the used oil. So, bait of lettuce oil at 0.75% concentration (51.67%) was more palatable than other concentrations. Meanwhile, 0.25% concentration was more palatable to the Norway rat for each of olive oil and cotton seeds oil. 0.50% concentration of sesame oil was the most palatable concentration to rats. The obtained results revealed that lettuce oil bait (37.0%) was more palatable to the Norway rat, *Rattus norvegicus* than olive oil (24.91%), sesame oil (21.33%) and cotton seeds oil (17.01%) at 1% concentration for example.

Asran, (1993) reported that the arrangement of the different plant oils which were mixed with wheat grains in the rate of 1% according to their consumption (in gm) by the females of *Rattus rattus* for three successive days was as follows: in a descending order carrot oil bait (84.5 g/5 females / 3 days) > olive oil bait (64.6 g/5 females / 3 days) > sesame oil bait (61.1 g / 5 females / 3 days) > cotton seeds

oil bait (33.9 g/5 females / 3 days). For males of the climb rat, *R. rattus* L., five individuals consumed the most quantity from olive oil bait (71.1 g/5 males / 3 days), during three successive days; meanwhile, soybean oil bait (34.0 g / 5 males / 3 days) was the least one in consumption.

So, the previous results confirmed that baits of the expired oils; lettuce, olive and sesame oils at either 0.25% or 0.5% concentration increased their consumption by each of mice and rats than the same concentrations of cotton seeds oil (the recommended oil).

References

- Abazaid, A.A. 1990. Efficiency of some common used rodenticides and some New Alternative Against Rodents in Qena governorate. M.Sc. thesis, Fac. Agric., Assiut Univ., PP. 93.
- Abd El-Gawad, K.H. and A.M. Ali. 1982. Food preference and food consumption of various rodent species. Assuit J. Agric. Sci., 13 (2): 13-17.
- Ansari, S.A.; M.A. Rustamani; A.W. Kakar; A.A. Khooharo; Fozia Dars and Baloch, H.B. 2005. Grain losses caused by house rat *Rattus rattus* L. and its control. Pakistan Journal of Zoology, 37 (1): 33-38.
- Asran, A.A.; H.I. El Deeb; G Kuehnert and M.A. El-

- Halfawy. 1985. Population density of rodents in different locations in Fayoum Governorate. *J. Agric. Sci., Mansoura Univ. Egypt*, 10 (4): 1527-1528.
- Asran, A.A.; H.I. El Deeb and M.A. El-Halfawy. 1989. Burrow system and storage habits of the Nile rat, *Arvicanthis niloticus* 3rd Nat. Conf. of Pests and Diseases of Vegetables of Fruits in Egypt and Count. Ismailia, Egypt: 977-982.
- Asran, A.A. 1993. Susceptibility and palatability of some Egyptian rodents to zinc phosphide. *J. Agric. Res. Review*, 72 (1): 141-145.
- El-Nashar, M.A. 1998. Ecological and Toxicological studies on some Egyptian rodents in certain traditional cultivated areas in some Governorates in Egypt. M.Sc. Thesis, Fac. of Agric., Al-Azhar Univ., pp. 232.
- Meehan, A.P. 1984. Rats and mice, their biology and control. Rentokil limit, Felcourt, Grinstead, PP. 383.
- Mourad, M.G; K.H. Abd El-Gawad, and A.M. Ali. 1982. Population density of rodent species in some urban area in Minia Governorate, Assuit. *J. Agric. Sci., Egypt* 13 (2): 19-25.

قابلية بعض القوارض الحقلية لطعوم زيوت نباتية معينة

عبدالموجود عبدالله عسران – ياسر محمد عبدالقوى عبدالجليل – عبدالمقصود
عبدالمقصود محمد أبوهاشم – فاطمة كامل خضر

معهد بحوث وقاية النباتات – مركز البحوث الزراعية – الدقى – مصر

يهدف هذا العمل الاستفادة من الزيوت منتهية الصلاحية للاستخدام الأدمى فى طعموم القوارض بديلا عن زيت بذرة القطن (زيت الطعام) وذلك بدلا من التخلص منها.

وأوضحت النتائج أن أعلى متوسط استهلاك للطعم بواسطة الفار السيسى *Mus musculus* كانت عند تركيز 0.25% لكل الزيوت المختبرة (زيت الخس – زيت الزيتون – زيت السمسم – زيت بذرة القطن). وكانت الاختلافات فى الاستهلاك اليومى للفرد بين الطعوم ذات التركيز 0.25% والتركيزات الأخرى المختبرة (0.5% و 0.75% و 1%) واضحة.

وأكدت النتائج أن الفار السيسى كانت أكثر إقبالا واستساغة لزيوت الخس والزيتون والسمسم عند تركيز 0.25% ، بالإضافة الى ذلك طعموم زيت الزيتون وزيت السمسم عن طعموم كل من زيت الخس وزيت بذرة القطن .

ومن الناحية الأخرى أظهرت النتائج أن الجرذ النرويجى *Rattus norvegicus* كان أكثر إقبالا على الطعوم ذوات تركيز 0.25% أكثر من التركيزات الأخرى بالنسبة لكل من زيت الزيتون وزيت بذرة القطن بينما كان الإقبال والاستهلاك على الطعم ذو تركيز 0.75% زيت خس وطعم ذو تركيز 0.5% زيت سمسم من التركيزات الأخرى. وأكد ذلك مدى استساغة وإقبال الجرذ النرويجى لطعوم الزيت المختبرة.

من النتائج المتقدمة يتضح أن لطعوم زيوت: الخس والزيتون والسمسم منتهية الصلاحية للاستخدام الأدمى بتركيز 0.25% و 0.50% كانت عالية الاستهلاك بواسطة كل من الفار السيسى والجرذ النرويجى عن التركيزات المقابلة لها من زيت بذرة القطن الموصى باستخدامه وقد يعود ذلك الى إختلاف تركيبها الكيمايى أو طعمها أو رائحتها كما تفيد نتائج الأبحاث السابقة.