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Effect of "Flit"^{TM} on the Productive Profiles and the Histopathological Changes of Internal Organs of Adult Albino Rats

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THIS FORMULATED product as composed of the necessary amounts of pyrethroids and the required amount of the Kerosine caused severe, unacceptable pathological developmental changes.

Body weight of newborns showed progressive affection of the newly born, of which Kerosine has marked influence.

Mother behaviour was studied from quality of nest, post parturient aggressive interest of mother towards their youngsters were found to be significantly affected.

Male sexual activity was revealed from weight of testis or accessory organs and semen quality. Kerosine alone induced significant differences.

Estrous cycle was affected and regressive activity prolonged whatever the animal is exposed.

Number of dead and resorbed foeti was significantly different in Kerosine and the whole compound.

Teratogenic affection of the born foeti were clear even with Kerosine alone and absence of accessory elements (thymus gland).

Thus, this formulation is described as being severely hazardous and care should be taken even with the manipulation of Kerosine alone.

Kerosine was used to control Agricultural arthropods pests in 1983-1984 in India and in 1984 in USA and in USSR as reported by Teli *et al.* (1983), Bhowmik *et al.* (1985); Arkipov (1984) and Mohanamy *et al.* (2000), respectively.

On the other hand, Foley *et al.* (1954) demonstrated that, following the administration of Kerosine in a quantity up to 50 ml / kg with subsequent group of the oesophagus, there were no pathological changes in the lungs, intestine or viscera, of young children.

However, in Egypt, it has been reported by Fakhry *et al.* (1990) and Ibrahim *et al.* (1991) intoxication from a formulated compound that contained Kerosine and pyrethroids (EZALOTM). Hussein *et al.* (1993) reported that the effect of MATOXTM in which Kerosine is administrated could be described as an aerosolic contaminant. It caused haemorrhagic changes in the heart, lung, and liver and increased level of GOT, creatinine, uric acid and blood urea nitrogen.

Flit^{TM} is supplied by Home Care, Cairo, Egypt, it contains 0.3% tetramethrin and 0.18% permethrin, with Kerosine as solvent.

The target of this research is to investigate the effect of such formulation in the adult albino rat if used for long period of time.

Material and Methods

A total of 72 mature albino rats, "Wistar" strain obtained from the Animal Health Research Institute Colony (Giza, Egypt).

They were 4-8 months of age with a body weight ranging from 150 to 200g, and were fed on powdered food that contains crude protein (18.04 %), crude fat (3 %), crude fibres (4 %), vitamins and minerals, which were mixed with 10% dried milk (Nido). Food and water was fed *ad. libitum*, with water being supplied from the water facility used by the Institute.

Materials

1. Flit^{TM} was obtained from Home Care Cairo and consisted of two pyrethroids (0.3% tetramethrin and 0.18% permethrin) with Kerosine as solvent.

2. White Kerosine was obtained from Misr Petroleum Co.

Experimental animals

Rats were acclimatized to the laboratory conditions for a period of 30 days.

The animals were divided into 3 groups each of which consisting of 18 females and were kept in separate rooms.

Flit^{TM} group: exposed to 5ml /m^3, thus it had: 16.2 mg permethrin /m^3, 27 mg tetramethrin/m^3, 9.0 mg Kerosine.

Kerosine group: exposed to 9 ml /m^3

Control group: not treated

The exposure was made for six days per week during 2 months, i.e. 288 hours throughout the experiment.

For the histopathological changes, post mortem examination was carried out on the dead or experimental animals on the time of experiment estimation. Macroscopical examination of internal organs was registered for each animal. For

histopathological examination, the organs of examined animals were studied macroscopically and registered. For histopathological examination, organs in 10% formalin (formol saline) were used. Sections with 5μm in thickness were examined microscopically and stained with haematoxylin and eosin. The sections were identified and registered for the cellular integrative changes.

For the males

Epididymal spermatozoal examination

The epididymal content was obtained immediately after sacrificing the male rats. The tail of epididymis was squeezed gently in a clean watch-glass for evaluation of motility (Bearden and Fluquary, 1980).

A small droplet of epididymal contents was added to one drop of sodium citrate solution 2.9 % on a warm slide. Several fields were examined and the incidence of progressively motile sperms was estimated and recorded.

Sperm cell concentration

This was performed according to the technique adopted by Bearden and Fluquary (1980).

Epididymal cell abnormalities

According to the technique adopted by Bearden and Fluquary (1980).

For the females

Weight of the new born was carried out successively for the experimental groups.

Developmental toxicity

Solutions used in teratological examination: Cook and Fairweather (1968).

Morphological examination

According to Cook and Fairweather (1968).

Visceral examination of the foetus: Wilson (1965)

A systemic record was made on a specially designed form after Cook and Fairweather (1968) and also skeleton examination of fetus.

Maternal behaviour

Parameters of maternal behaviour were recorded both in writing and in photography along the period of the experiment, as follows.

Results

Clinical symptoms and mortalities

Rats which were exposed to Flit™ and those who were exposed to Kerosine displayed mild respiratory manifestations. Some rats of those groups showed redness of the eyes. None of the control rats exhibited any such symptoms. The

mortality rate was higher in rats exposed to Flit^{TM} (21 %) (5 out of 24 rats) than in those which were exposed to Kerosine (13 %) (3 out of 24 rats) and than in rats in control group (13 %) (3 out of 24 rats).

For the females

Newborns: Table 1 and Fig. 1 show a significant decrease in body weights in newborn rats which were exposed to either Flit^{TM} or Kerosine, compared to the control ones at all ages (10, 20, 30 days). The effect of Flit^{TM} on body weight was more pronounced at 10 and 20 days of age than that of Kerosine. versus in the control group. At 30 days of age, exposure to Flit^{TM} or Kerosine reduced the body weight (51.50 g and 87.04 g respectively) versus (104.80 g) in control group.

TABLE 1. Body weight of newborn rat which inhaled insecticides (g/ rat)

Treatment **Age in days**	Flit (g)	Kerosine (g)	Control	LSD AT 5%
10	14.33*	20.96*	27.93	3.32
20	30.50**	49.94**	70.40	0.72
30	51.50**	87.04**	104.80	3.86

* Significant

** Highly significant

List of figures

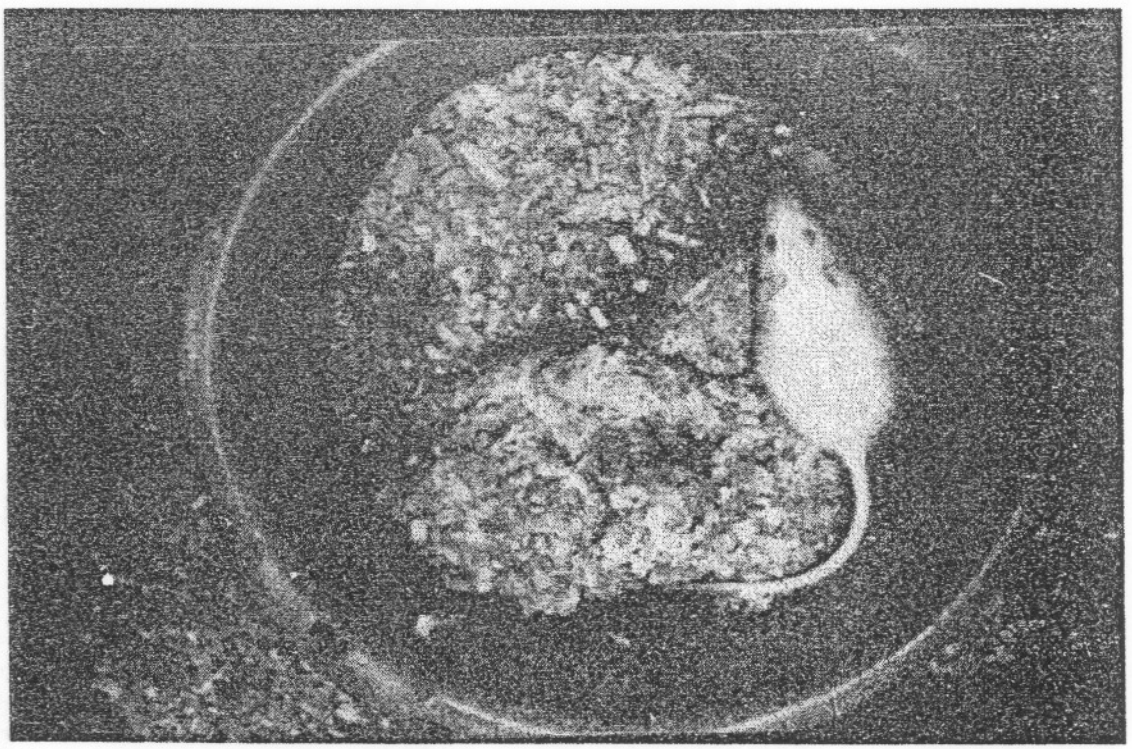

Fig. 1. The control rats shows fair nest with a high wall and good arrangement of pups.

Table 2 shows the weights of newborn which inhaled Kerosine (0.69) and those which inhaled Flit™ (1.99) when compared to the controls (2.66).

Results were tested for significance: according to the procedure by Snedecor and Cochran (1980).

TABLE 2. Rate of growth of newborn rats which inhaled insecticides.

Treatment	Flit (g)	Kerosine (g)	Control
A	1.99*	0.69*	2.66
B	0.99*	0.99*	0.98
C	99%	99%	98%

A = Regression coefficient (growth rate / 10 days)
B = The relation between time and growth rate
C = The effect of time on the growth rate
* Significant at 5%

Maternal behaviour

Table 3 shows that the maternal behaviour of females which inhaled kerosine was increased significantly, i.e. the post parturient aggression and in the interest of mothers towards their pups, with insignificant increase in the nest quality (Fig. 2-4).

TABLE 3. Effect of insecticides on mother behaviour.

Treatment Behaviour	Flit (10)	Kerosine (10)	Control (10)
Quality of nest	2.00 ± 0.58 (Fair)	3.00 ± 0.00 (Good)	2.00 ± 0.67 (Fair)
Post parturient aggression	3.00 ± 0.33 (aggressive)	4.00 ± 0,00 (very aggressive)	3.00 ±0.33 (Fair)
Interest of mother toward her young	3.00 ± 0.33 (Good)	4.00 ± 0,00 (Excellent)	2.00 ± 0.67 (Fair)

- Results represented: Mean ± S.E.
- Results significantly differ from their control at $P < 0.05$

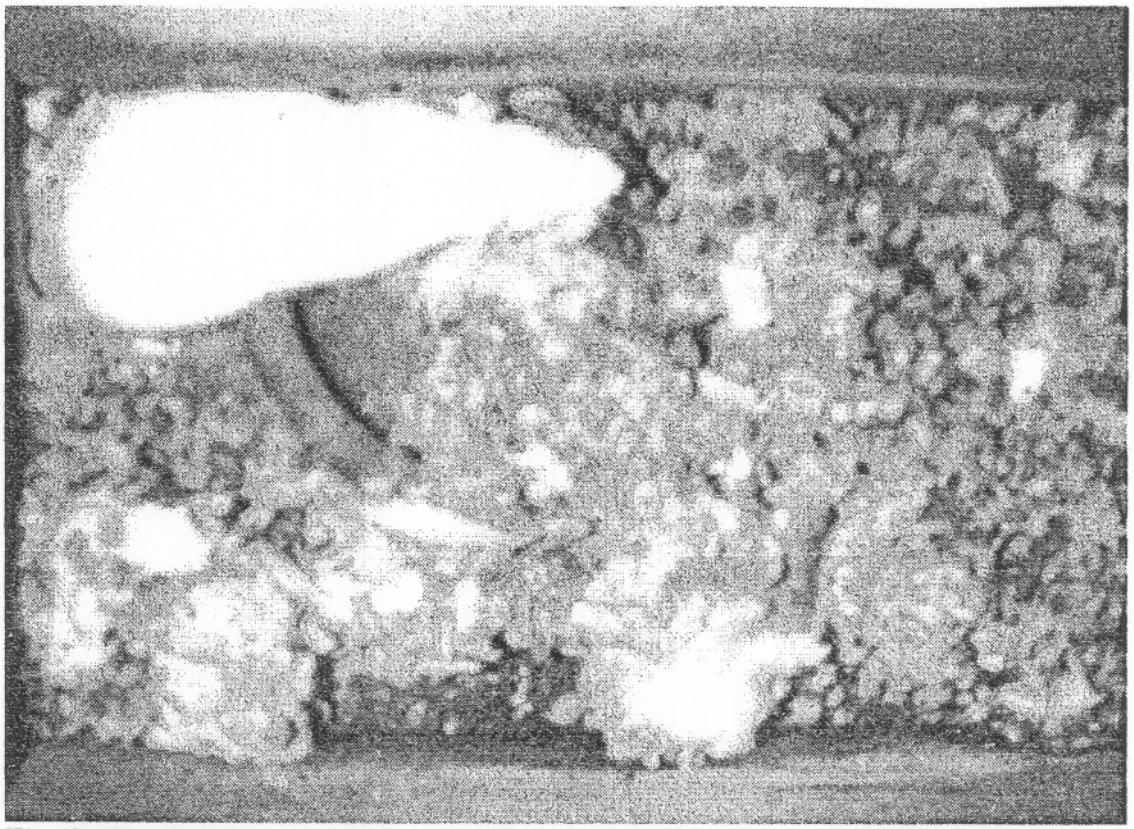

Fig. 2. The female rats which inhaled kerosene carry its pup, irritable as a result of unsuitable environmental condition.

Fig. 3. The female rat completely covered the pups with the nesting materials which appeared in kerosene inhaled rats.

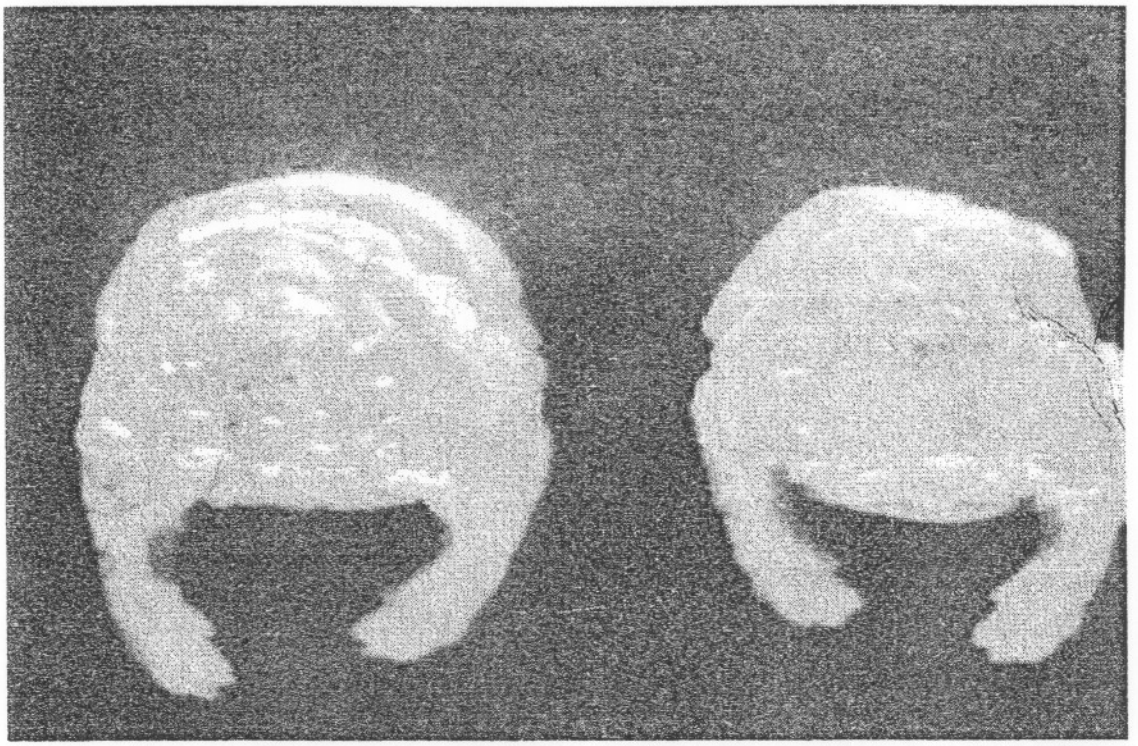

Fig. 4. Absence of thymus in rat foetus obtained from mother rats that inhaled kerosene during pregnancy (Control in the left).

Male reproduction

Sexual organs weight

Table 4 shows insignificant increase in testicular weight (g /100g.bwt) of males which inhaled Flit™ (9.17g) and decrease in males which inhaled Kerosine (8.84 g) compared to control (9.09 g). Also, the weight of seminal vesicles of rats which inhaled Flit™ (2.48 g) was decreased insignificantly while increased significantly (5.09 g) in Kerosine treated rats than in control rats (3.10 g). The weight of epididymis in Flit™ (3.21 g) and Kerosine (3.47 g) inhaled rats was decreased significantly as compared to the control group (6.21 g).

Epididymal spermatozoa : Table (4)

The sperm concentration and motility decreased more significantly in the two treatments than in the control, with increase in sperm abnormalities.

TABLE 4. Examination of sexual organs of male rats which inhaled insecticide.

Treatment	Weight of sexual organs (g /100 g body weight)				Epididymal sperm characters		
	Testes	Prostate	Seminal vesicles	Epididymis	Concentration (10^6 mm^3)	Motility (%)	Abnormality (%)
Flit™ (6)	9.17+0.32	4.23+0.72	2.48+0.83	3.21+0.77*	208.30+12.50***	38.60+3.60***	10.50+0.30***
Kerosine (6)	8.84+0.97	4.88+1.26	5.09+0.53*	3.47+0.72*	239.10+9.08***	50.20+3.80***	4.80+0.22***
Control (6)	9.09+2.27	2.08+0.75	3.10+0.15	6.20+0.37	328+0.37	88.30+3.30	2.60+0.21

Results represent: Mean + S.E.

Results significantly differ from their control at:

$P < 0.05$

***$P < 0.001$

Female reproduction

Estrous cycle

Table 5 shows that the estrous cycle increased in length in rats which was exposed to Flit^{TM} and Kerosine when compared to control.

TABLE 5. Phases of estrous cycle of female rats which inhaled insecticide in hours.

Month	Treatment	Proestrous	Estrous	Metestrous	Diestrous	Total
1st	FlitTM	12.00+0.00	45.00+3.00	22.00+1.15	33.00+5.74**	112.00+3.65
	Kerosine	12.00+0.00	42.00+3.46	20.00+1.00	36.00+6.93**	110.00+4.11
	Control	12.00+0.00	42.00+3.46	23.00+ 1.00	24.00+0.00	101.00+4.12
2nd	FlitTM	12.00+0.00	45.00+0.00	20.00+0.00	45.00+3.00***	122.00+6.00
	Kerosine	12.00+0.00	48.00+0.00	21.00+1.00	48.00+0.00***	129.00+1.00***
	Control	12.00+0.00	42.00+3.46	23.00+1.00	24.00+0.00	101.00+1.00

Results represent: Mean + S.E.
Results significantly differ from their control at:
P< 0.05
P< 0.01
***P < 0.001

Conception rate

Table 6 shows that conception rate decreased in rats which inhaled Flit^{TM} (33%) was lower than that of the control group (50%). Rats which were exposed to Kerosine showed a similar conception rate (50%) to that of the controls.

TABLE 6. Conception rate (in percentile) of rats which inhaled insecticide.

Treatment	Flit^{TM}	Kerosine	Control
Number of mated females	12	12	12
Number of pregnant females	4	6	6
Conception rate %	33%	50%	50%

Developmental toxicity

Table 7 shows that morphological examination of fetuses revealed a decrease in the number of viable foeti in either Flit^{TM} and Kerosine inhaled groups (5.00 and 6.00) *versus* (10.00) for their controls. Foetal body weight in both Flit^{TM} and Kerosine inhaled groups was decreased (2.50 g and 2.60 g) versus (3.80 g) for their controls. Resorbed foeti was increased in the treated groups (2.00) versus their controls (1.00). Visceral examination of foeti revealed absence of thymus with hypotrophy of lungs (Table 8, Fig 1).

TABLE 7. Morphological examination of fetuses from pregnant female rats which inhaled insecticide.

Treatment	Viable foeti		Dead foeti		Resorbed foeti		Foeti B.wt.(g)
	Mean	%	Mean	%	Mean	%	Mean
Flit™	5.00+0.18***	70.00	0	0	2.00+0.08***	31.00	2.50+0.10***
Kerosine	6.00+0.20***	78.00	0	0	2.00+0.07***	23.00	2.60+0.12***
Control	10.00+0.21	95.00	0	0	1.00+0.04	5.00	3.80+0.11

Results represent: Mean + S.E.
Results significantly differ from their control at:
***P < 0.001

TABLE 8. Morphological examination of fetuses from pregnant female rats which inhaled insecticides.

Treatment	Malformation (%)																	
	Palate		Eye		Brain		Absence of thymus		Heart		Lung hypotrophy		Liver		Intestine		Kidney	
	M	%	M	%	M	%	M	%	M	%	M	%	M	%	M	%	M	%
Flit™	0	0	0	0	0	0	24.00	92.30	0	0	20.00	76.90	0	0	0	0	0	0
Kerosine	0	0	0	0	0	0	28.30	90.30	0	0	22.00	71.00	0	0	0	0	0	0
Control	0	0	0	0	0	0	0.00	0.00	0	0	0.00	0.00	0	0	0	0	0	0

M= Means

Relative organs weight

Visceral organs

Table 9 shows the relative organs weight of rats which was exposed to Flit™ and Kerosine. For male rats exposed to Flit™ there was no significant decrease in the weights of liver, heart and spleen, with increase in weights of lung and kidney compared to those of the control. In female rats which inhaled Kerosine, there was a significant increase in the weight of lungs (11.68 g) *versus* (7.93 g) for their controls and decrease in the weight of the heart (3.64 g) versus (5.22 g). Females which inhaled Flit™ showed an increase in the weights of liver, brain and kidney with a significant decrease in the heart weight (3.45 g) *versus* (5.22 g) in control.

TABLE 9. Relative organ weight of rats which inhaled Flit™ in g/100 g body weight.

Treatment / Organ	Flit™		Control	
	Male (6)	Female (18)	Male (6)	Female (18)
Lung	7.21+0.67	7.62+1.71	7.87+0.67	9.39+0.61
Liver	23.73+9.12	31.61+5.00**	39.27+0.80	48.33+1.24
Brain	4.05+0.54	5.87+1.09*	7.58+1.55	2.48+0.18
Heart	3.40+0.15	3.53+0.65*	4.07+0.31	4.39+0.05
Spleen	4.13+0.61	4.43+0.67	4.83+1.35	6.36+0.68
kidneys	2.98+0.94	3.97+0.48	5.69+0.65	3.97+0.15

Results represent: Mean + S.E.
Results significantly differ from their control at:
*P< 0.05
**P< 0.01
***P < 0.001

Endocrine glands

Table 10 shows the relative weight of the adrenal gland of males which significantly increased in both Flit^{TM} (211.51 mg) and Kerosine (172.5 mg) inhaled rats in comparison to their controls (139.92 mg). Female rats also showed a significant increase in the weight of adrenal gland in Flit^{TM} (562-4 mg) and in Kerosine (420.72 mg) *versus* (130.08 mg) of their controls. Thyroid gland decreased significantly in Kerosine-treated females (10.1 mg) in comparison to the control group (31.40 mg) while decreased insignificantly in the other female group. Pituitary gland increased in both Flit^{TM} (22.10 mg) and Kerosine treated females (20.50 mg) in comparison to their controls (14.62 mg). Ovaries weight decreased significantly in rats which inhaled Flit^{TM} (54.80 mg) *versus* (159.95 mg) for controls .

TABLE 10. Relative endocrine glands weight of rats which inhaled insecticides in mg/100 g body weight.

Treatment / Endocrine gland	Flit^{TM}		Kerosine		Control	
	Male (6)	Female (18)	Male (6)	Female (18)	Male (6)	Female (18)
Adrenal	211.51+16.96**	562.47+27.40***	172.50+4.20***	420.72+66.29**	139.92+0.52	130.08+7.08
Thyroid	14.29+16.96	18.08+8.10	10.11+4.50	10.14+0.96***	12.48+2.00	31.40+4.31
Pituitary	8.66+1.60	22.10+4.94*	9.10+2.05	20.50+0.86*	6.95+2.13	14.62+2.35
Ovary		54.80+9.31***		102.13+17.00		159.95+5.90

Results represent: Mean + S.E.
Results significantly differ from their control at:
*P< 0.05
**P< 0.01
***P < 0.001

Histopathology

Examination of male rats that inhaled Flit^{TM} for two months

Macroscopical examination: Gross examination revealed congestion and haemorrhages in both liver and medulla of adrenal glands. Hepatization occurred in the lung with multiple small nodular formation of greyish white color, and in three cases the vesicular glands were hypertrophied; on cut section a thick greenish yellow fluid oozed out.

Microscopical examination

Visceral organs

Liver- congestion was associated with severe periportal mononuclear cells infiltration and multiple newly formed bile ducts (Fig 5, 6). Severe vacuolar degeneration of hepatocytes was observed, with multiple focal areas of necrosis with aggregation of mononuclear cells.

Cerebrum: oedema in rubin spaces and astrocytes, wallarian degeneration (demylenation) in two case, focal areas of necrosis with glioses.

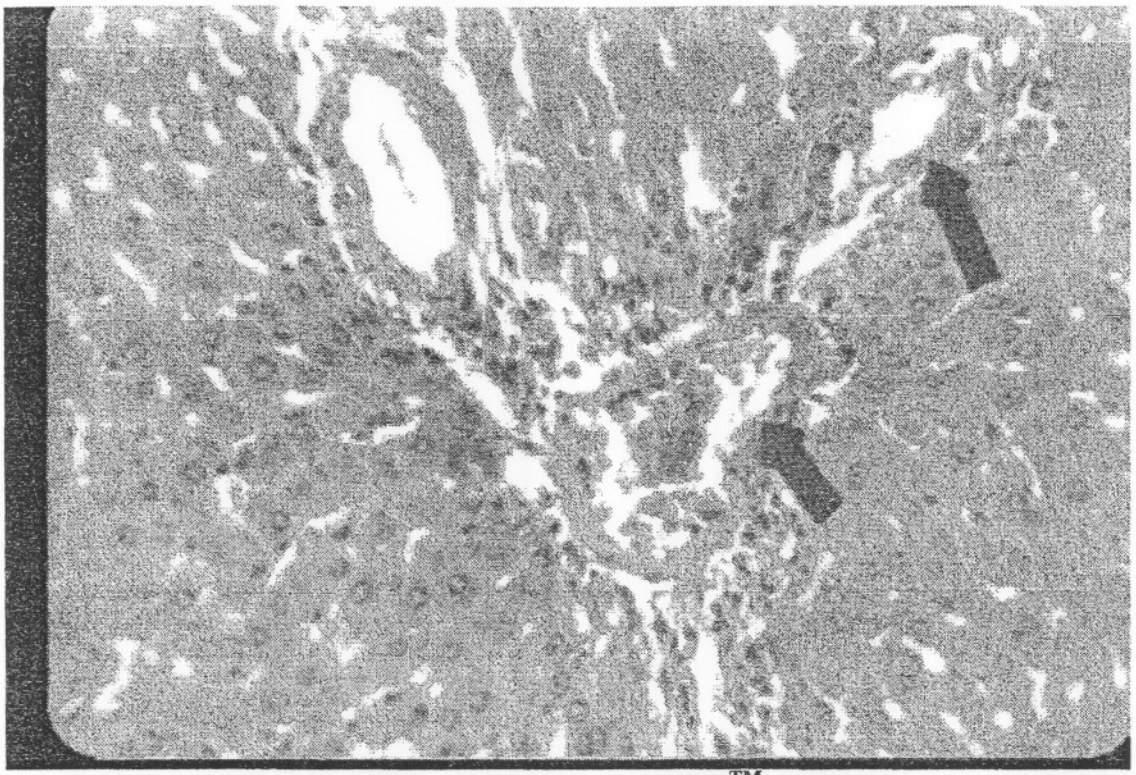

Fig. 5. Liver from rats which were exposed to Flit™ revealed severe periportal mononuclear cell infiltration , multiple newly formed bile ducts and focal arrears of vacular degeneration of hepatic cells (H&EX 100).

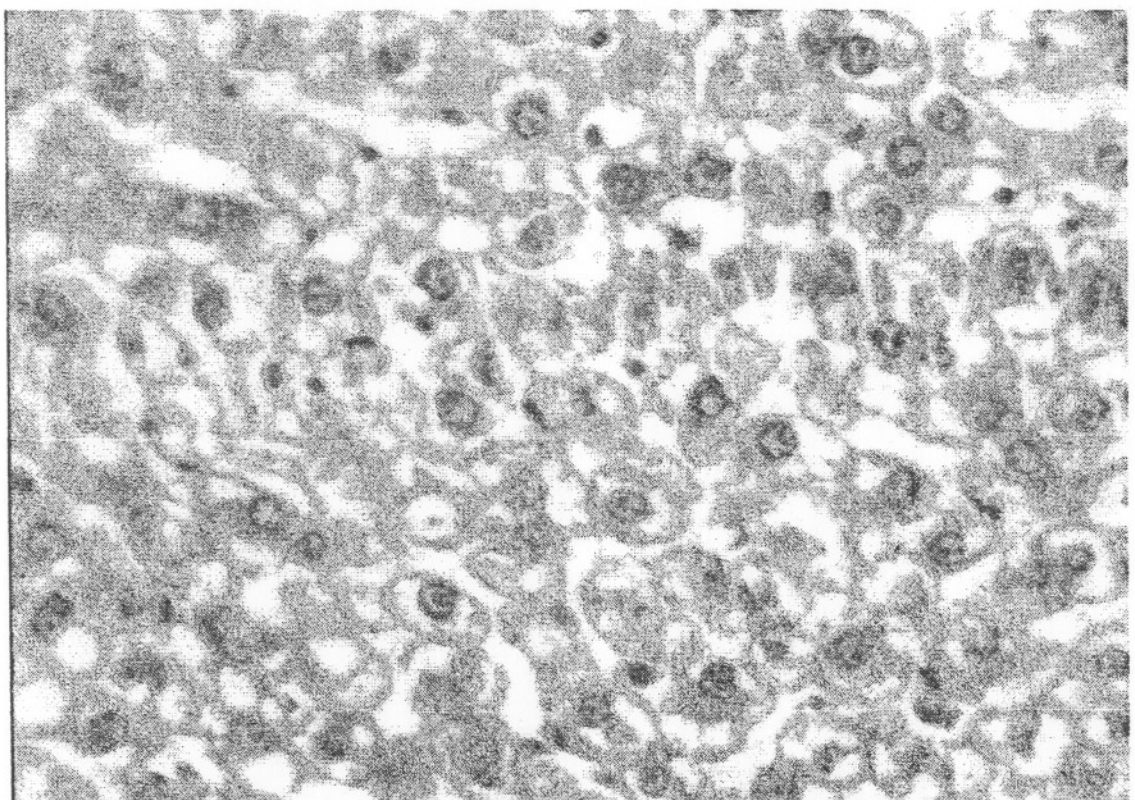

Fig. 6. Liver from rats which were exposed to Flit™ shows vacular degeneration of hepatocytes with individual cells necrosis (H&EX 100).

Adrenal cortex : focal areas of vacuolar and / or granular degeneration with areas of necrosis and aggregation of mononuclear cells. Also multiple areas of atrophied cells of adrenal cortex were seen (Fig. 7).

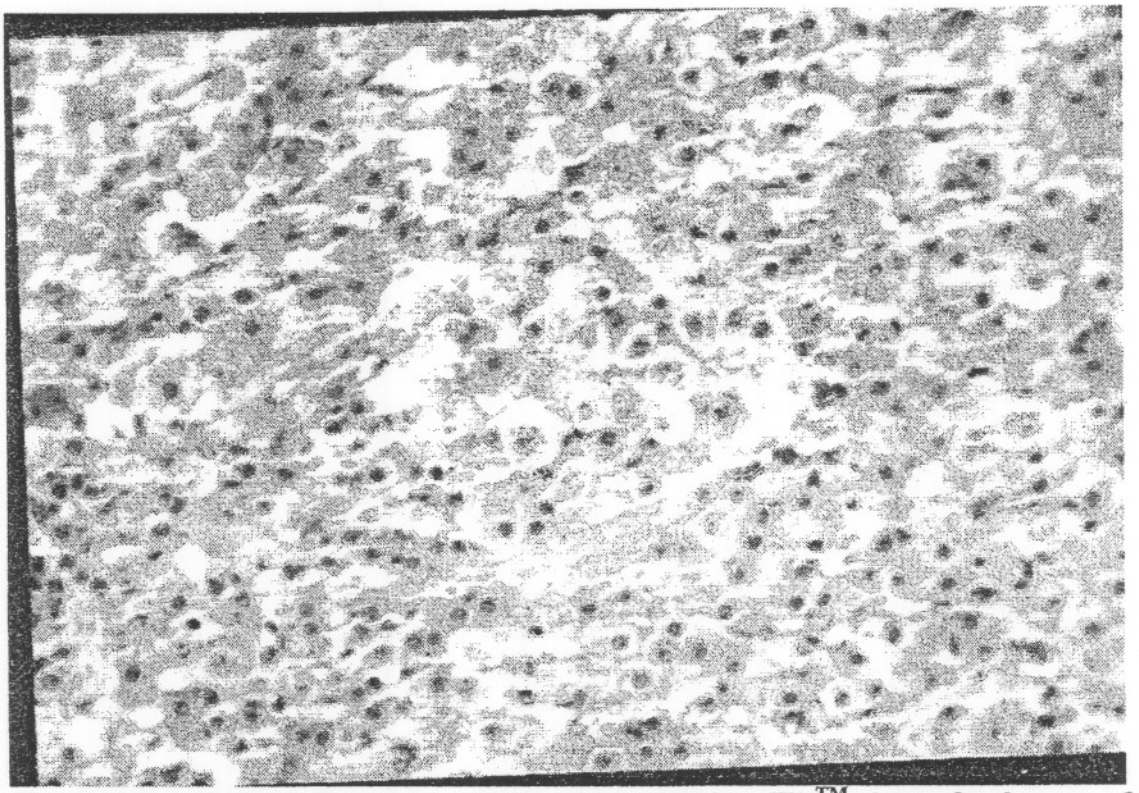

Fig. 7. Adrenal gland from rats which were exposed to Flit^{TM} shows focal areas of degeneration and necrosis with some atrophid cell of zone fasciculate (H&EX 100).

Thyroid and Pituitary: Showed slight congestion only.

Genital organs: interstitial oedema, multiple thrombus formation, degeneration and necrosis of some seminefrous tubules, fibrosis of interstitial tissue and hyperplasia of the epithelium of prostate (Fig. 8) and congestion with mononuclear cells infiltration was also seen. The interstitial tissues of cells of the epididymis were edematous with proliferation of fibrous connective tissues.

Examination of male rats that inhaled Kerosine for two months

Macroscopical examination: Revealed congestion and haemorrhages in the internal organs. Lungs were pale coloured with multiple nodular formation and focal areas of grey whitish discoloration.

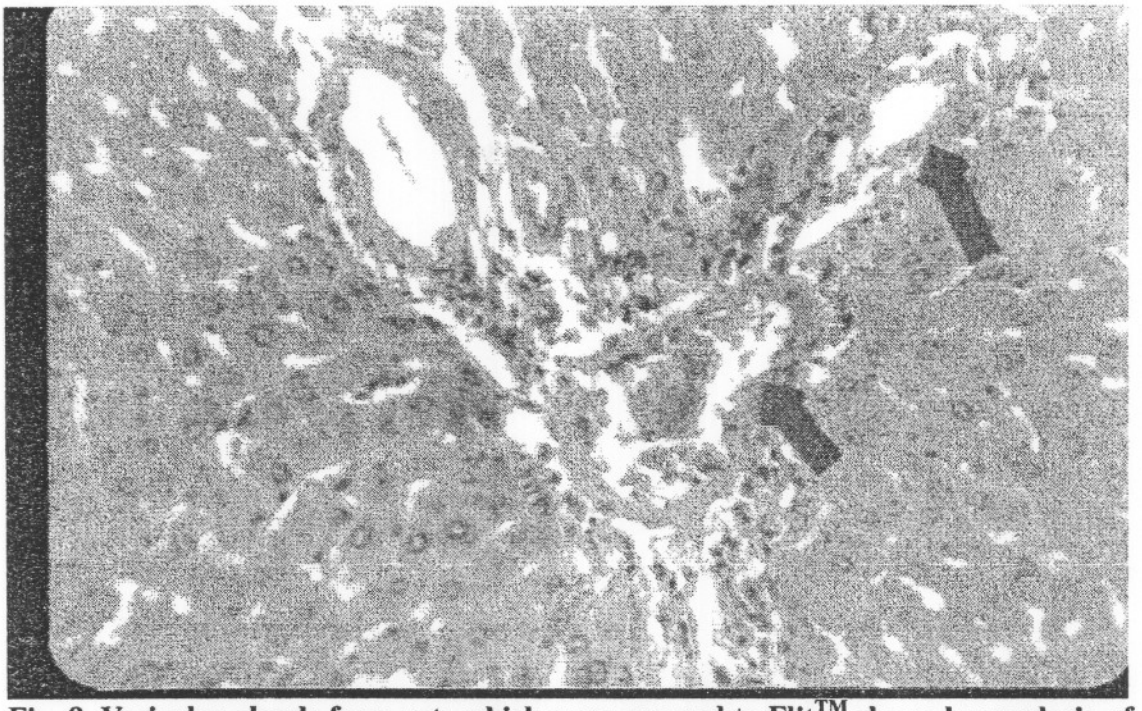

Fig. 8. Vesicular glands from rats which were exposed to Flit™ shows hyperplasia of some lining epithelium, congestion and few inflammatory cell infiltration (H&EX 100).

Microscopical examination

1. Visceral organs

Liver: congestion of the central arteries of liver was associated with extravasation of blood and perivascular mononuclear cells infiltration. Newly formed bile ducts with portal fibrosis were associated with noticed focal areas of granular and /or vacuolar degeneration with multiple focal areas of necrosis and mononuclear cells aggregation.

Lung: concomitant congestion with extravasation of blood, oedema and perivascular as well as massive diffuse mononuclear cells infiltration was observed. Multiple granuloma formation sometimes associated with abscess and interstitial pneumonia were usually observed.

Brain: congestion of the meningeal blood vessels with hemorrhage, focal glioses were seen associated with demyelination and oedema.

2. Endocrine glands

Adrenal gland: revealed congestion. Hemorrhage in the medulla, focal areas of degeneration and necrosis in the adrenal cortex.

Thyroid and pituitary: there were no marked histopathological changes on examination of thyroid and pituitary gland, except mild mononuclear cells infiltration in the interstitial tissues.

3. Sexual organs

There were degenerative changes and necrosis of some seminiferous tubules of testis with interstitial mononuclear cells and polymorphs infiltration and sometimes oedema; in advanced cases, the tubules were lined by a layer of sertoli cells and many spermatids were necrotic and others fused together to form giant spermatid cells. The epithelial lining of epididymal tubules were hypoplastic and empty, or contained seminal product. Haemorrhage and portal haemolysis of erythrocytes and aggregation of mononuclear cells were seen in the acenal epithelium with slight interstitial connective tissues proliferation of the prostate gland.

** Examination of female rats that inhaled Flit^{TM} for two months*

The findings were the same as in male, in addition to the presence of some changes in the ovary which showed congestion, a few thrombi and interstitial mononuclear cells infiltration.

** Examination of female rats that inhaled Kerosine for two months*

The findings were the same as in the male group, in addition to the female genital organs.

Ovary: congestion, haemorrhages formation of a few thrombus, marked dilatation of blood vessels, few interstitial mononuclear cells infiltration and moderate to severe degeneration of the growing graffian follicles.

Examination of control groups

These groups showed no marked microscopical changes during the whole experimental period, except slight congestion of the examined organs and some interstitial pneumonia.

Discussion

The inhalation LD_{50} of permethrin in Kerosine in rats is 685 mg^3 and the LD_{50} for tetramethrine is 4.464 mg/kg by oral administration.

However, the results of this effort revealed a bad influence when treatments were applied for 288 hours for successive aerosolic contamination, and this appeared in the male and female exclusively and the newborns. The compounds affected pregnant females, developed terratogenic effects that was observed during the long period of gestation.

Histopathological examination revealed inflammatory changes on the lung and interstitial pneumonia as a response to the time of affection.

In Table 5, Kerosine caused prolongation of the dioestrus phase with no response to the metoestrous phase and induced also a prolonged cycle and so also by the compound (Flit^{TM}).This disturbance in the phases of estrus cycle may be due to the effect of insecticides and Kerosine as stressors on the adrenal cortex.

Soliman and Shaker (1964) reported that any disturbance of adrenal function is responsible for disturbance in the estrous cycle. It has been found by Ali (1992) that Syfluthrin™ which is a synthetic administered pyrethroid in an oral dose of 0.53mg /kg body weight to normally cycling female buffaloes about 3 years old and weighing from 450-550 kg body weight had not affected the estrous cycle. WHO / FAO (1984) mentioned that permethrin at dosages of 20, 100, 500, 1000 and 2800 mg/kg (diet) produced no adverse changes on reproduction. Thus, the prolonged diestrus period could be related to the influence of Kerosine.

Table 4 shows the effect of these compounds on male fertility, and were studied via the characteristics and weights of sexual organs. Kerosine alone induced a low count of sperms and a high incidence of decreased activity and the presence of abnormal sperms. This was more obvious with the formulated compound. Our results come inconsistent with those of Amina Abd Alla (1995), who reported that administration of Ectomin (31 mg/kg.bwt) to male rats for 60 days decreased the sperms mobility, viability and abnormality. This indicates a direct influence on testosterone and decreased level of T4 hormone. Hassan *et al.* (1993) reported that when Sumicidin and S-3206 at doses of 5, 10, 20 and 100 mg/kg bwt were administrated to mature male rats for 62 days caused fluctuation in the levels of FSH and LH hormones. The levels of LH and testosterone were related to moderate quantities of androgens that inhibit FSH secretion and so depress spermatogenesis (Lee and Knowles, 1965).

Shtemberg and Rybackova (1968) reported that insecticides mostly interfere indirectly with hypothalamo-hyphyseal control function. The glucose level was increased due to increase in T4 level which enhance glycogenolysis as a result of increased basal metabolic rate (BMR) and heat production (Kasem, 1972).

The Flit™ group of non pregnant females showed higher values for glucose which would have been an endeavor to combine with increasing detoxicological materials for the detoxification procedures carried out in the liver. In addition to stress effects. El-Aggoury *et al.* (1988) reported glucose levels elevated in the blood of rats in response to stress.

In Table 6, the mortality rate increased in the Flit™ group, and this was also accompanied by the lowest conception rate from the three groups. This drastic effect was also observed as the low percentage of viable foeti, higher incidence of resorbed foeti, and low number of pups with low body weights. The mothers had not the adequate level of serum glucose or favorable amounts of progesterone to maintain their pregnancy. Our results agree with those of Shalaby (1988), who reported that exposure of pregnant ewes, to 10 different doses of pyrethroids decreased the progesterone levels in the blood. On the other hand, there was a higher level of thyroxin in the blood. Rumzey *et al.* (1983) reported that Runnel (an organophosphorus compound) had a direct stimulating effect on the level of T4 and T3 hormones of the thyroid gland.

The behaviour of the mothers which inhaled Kerosine was better than that of the other groups in the nest quality, post parturient aggression and the interest of mothers towards their youngsters (Fig. 4).

These changes in behaviour may be due to increased levels of T4 hormone in the serum of mothers as a result of stress. Mona Mahmoud (1993) reported that stressed pregnant rabbits showed increase in post parturient aggression with increase of thyroid hormones in the blood. Ross *et al.* (1963) reported that the quality of nest in different breeds and one strain of rabbits are related to the relationship between pituitary and ovarian hormones.

In Table 7, following up the weight gain of the youngsters during the early 30 days of their life every ten days showed a significant decrease in this parameter than the controls and the formulated insecticide was more severe in their effects than the solvent (Kerosine). Shalaby (1988) reported the same results by oral doses of pyrethroids on rats.

The main malformations that have affected the newly born were the absence of thymus gland, which in turn influenced the hypertrophid lung. This could be related to the effect of the Kerosine more effectively since the percentage of this observation in this experiment was higher. It has been recorded that for permethrin at dosages 10-50 mg/kg b.wt from day 9, of gestation, the only observed effect was a slightly increased incidence of non ossified sternbone in cesarian developed pups at 50 mg /kg body weight (WHO / FAO, 1988); Spencer and Behan (1982) reported that permethrin at 2000 or 4000 ppm in the diet of rats caused increase in the rate of resorbed foeti. Amina Abd-Alla (1995) reported that Ectomin (31mg /kg.b.wt) caused hypoplasia of lungs, dilatation of renal pelvis, cardiomegaly and a significant decrease in foetal weights of rats. Sobhy (1991) studied the effect of oral administration of synthetic pyrethroids (Sumicidin) in doses of 0.5, 1.0 and 5 mg/ kg b.wt in pregnant rats during organogenesis, decreased the number of corpora lutea and implantation sites and causing early resorption of foeti. While the relative weight of the organs examined here did not show clear evidence. The macroscopical and microscopical examinations demonstrated the drastic effects of the diluent used (Kerosine) and the formulated insecticide.

In Fig. 7 and 8, the control groups had no evidence of abnormality that could be related to the histopathological changes observed. In the male and female groups the effect was traced after two months of exposure for the whole experimental period. There have been an evidence of inflammatory and degenerative changes in hepatocytes, renal tubular cells, seminiferous tubules and also in the brain stem cells, the brain showed demyelination and focal glioses. These drastic effects of kerosine and the compound was traced with degenerative change of hepatocytes, adrenal cortex and the seminal vesicles degenerative changes together with the effect on male reproductive profile of the seminal fluid as shown in Table 1.

Thyroids and pituitaries have not shown hyperactivities or hypoactivities (Table 8), and the lungs of some rats showed inflammatory changes and interstitial pneumonia as a result of decreased cortisol levels in the blood. High levels of cortisol would have suppressed the inflammatory changes and the fibroblast formation (Lee and Knowles, 1965).

The observed decrease in the relative weights of the lungs in female rats which inhaled Kerosine Table 10 may be due to the direct inflammatory effect of Kerosine on the lungs as represented by mild respiratory changes in some rats. In addition, there was a significant increase in the relative weight of the adrenal gland in the males and females after the use of the insecticide. This finding has been attributed to the adrenal gland stimulation, since the adrenal have long been known to play an important role in the organisms adaptation to excessive demands and stress which induce adrenomedullary and adrenocortical activation. This explains the excess of water consumption in this respect. Klemcke (1994) reported that chronic stressors increased the adrenal weights of pigs.

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اثر استعمال (الفلت)*على الكفاءات الانتاجية والتغيرات الهستوباثولوجيه في الاعضاء الداخلية للفئران الانجليزية البيضاء

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(الفلت) هو من المستحضرات التى حضرت فى مصر بقصد التخلص من الافات الحشرية المنزلية كمبيد حشرى هوائى ولكن لاحتوائه على المادة الفعالة البيروثرودية واذابتها فى الكيروسين لزم دراسة هذا المركب معمليا لدراسة اثر ذلك على حيوانات التجارب المعملية وقد تم استخدام الفأر الابيض الكبير ومتابعة التغيرات التى يمكن ان تحدث عند الاستعمال على الاجهزة التناسلية والمختصة بالكفاءة التناسلية وما تبع ذلك من تغييرات بالسيرم والاعضاء التناسلية والاعضاء الداخلية من اثار مرضية بمتابعتها هستوباثولوجيا والفحص المعملى النسيجى ومدى اثر تعرض الاناث الحوامل خلال فترة الحمل وقد تم تسجيل التغيرات التى نتجت عن التأثيرات المباشرة فى الاعضاء التناسلية الذكرية وكفاءة السائل المنوى والتاثير على الكفاءة التناسلية واثر ذلك فى دورة الشبق والحمل والتغيرات التى تحدث لها بعدوى الفئران ٢٨٨ ساعة من المركب كمؤثر وكمسبب للتلوث البيئى الهوائى فقد تاثرت بذلك الحيوانات البالغة الذكور والاناث وكذا الناتج من الابناء حتى فى التواجد الرحمى وقد تم استخدام المعادلات الاحصائية والتى يمكن بها استبيان اثر ذلك على المدى الطويل الى جانب تاثر الاعضاء الفسيولوجية الخاصة بالتناسل فقد تاثرت الاعضاء الداخلية كالكبد والغدة الفوق كلوية والحوصلة المنوية وتم مشاهدة ذلك باثولوجيا وبالفحص النسيجى الدقيق وذلك مما يشير الى اعتبار هذا المركب بما يحتويه من عناصر سامة كمبيد حشرى وتوجدها بالكيروسين يلزم اعتبارها كعنصر مسبب لتلوث بيئى ويلزم مداركتها عند الاستعمال المنزلى.

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*كمستحضر للاستعمال المنزلى فى مصر

البحث مستخلص من رسالة الدكتوراة الخاصة بالدكتورة مايسة محمد ثاقب – المقدمة لدرجة الدكتوراة لفسيولوجيا الحيوان والمقدمة لكلية الطب البيطرى – جامعة القاهرة بالجيزة عام ١٩٩٦– اثر بعض المؤثرات النمطية على النمو والمسالك التى تؤثر على الظواهر السلوكية للحيوان باستخدام حيوانات التجارب.