

## **Biochemical studies on pesticides benomyl and propargite in rats**

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### **Abstract**

The effect of administration albino male rats a daily diet polluted with propargite and benomyl a concentration of 1.22,2.44 ,0.5 and 1.0 ppm respectively for 30 days, on the growth, biochemical parameters and its accumulation in organs.

The tested pesticides significantly increased of body weight at all levels with different variation.Both pesticides significantly increased the levels of bilirubin uric acid, creatinine, Aspartate aminotransferase (AST) and Alanine aminotransferase (ALT) while significantly decrease the level of cholesterol and Alkaline phosphate (AP).

The residues of propargite were detected in liver, kidney and spleen at low and high doses while benomyl residues were not detected in different organs except liver.

### **Introduction**

The recent increase in the use of pesticides in pest control has coincided with an increase in food polluted with these compounds. It is assumed that some residues of such pesticides could be etched in varying concentrations after their applications such remaining residues could be hazard to the consumers health (**Saleh *et al.*,2003**).

Thus pesticide residues may be investigated by the young and old human for long or short life cycle. The hazards that may enuse from polluted flood are not recognized known to consumers.

Benomyl is a systemic benzimidazole fungicide that is selectively toxic to microorganisms and invertebrates. It binds to microtubules interfering with cell function. It is of such a low toxicity to mammals, it has been impossible to administer doses large enough to establish an LD<sub>50</sub>. The us environmental protection agency clarified as a possible carcinogen and hepatotoxic effect (**Tomlin, 1994**).

Propargite is a natural plant fungicide and it is highly toxicity, cholinesterase inhibitor, known probable carcinogen or known reproduction or development toxicant (**USEPA, 2006**).

The present study was designed to explore the effect of the feeding albino rats a daily diet polluted with propargite benomyl for 30 days and the animal body weight, biochemical aspects such as bilirubin, cholesterol, uric acid, creatinine contents and the activities of AST, ALT and AP. Moreover the accumulation of tested pesticides in different organs of treated rats.

### **Material and Methods**

#### **\* Pesticides :**

In this investigation, two pesticides were chosen

1- Propargite 75%. Its chemical name; 2- (4- tert- butphenoxy) cyclohexy) prop-2- ynyl sulfate. It was supplied by Changzhou.

2- Benomyl 50%: its chemical name: Methyl 1-(butyl carbamoyl-2- benzimidazol-carbamate.

They obtained from central Agric. Pest. Lab.

#### **\* Animals:**

Mature male albino rats of 150-180 g-b-wt- were used. They were fed on a standard diet and watered ad-libitum.

#### **\* Experimental design:**

Male rats were divided into 5 groups of 5 animals each. The first group kept as control. while the 2<sup>nd</sup> and 3<sup>rd</sup> group feed on diet polluted with propargite at reference for dose concentration of 1.22 and 2.44 ppm (**Hamed, 1990**) for 30 days. 4<sup>th</sup> and 5<sup>th</sup> groups fed on diet polluted with benomyl at concentration of 0.5 and 1.0 ppm (**Hess, 1991**) for 30 days .

The rats of each group were weighted at the beginning of the experiment then every week, the change in body weight was calculated and recorded. Blood samples were obtained from each rat for obtaining clear serum to estimate the levels of bilirubin (**Allain et al. 1974**) cholesterol (**Ramesh et al., 1975**), creatinine (**Houot, 1985**), bilirubin (**Jend rassil, 1935**), and the activities of AST, ALT (**Reitman and Frankel. 1957**) and AP (**Roy, 1970**).

At the end of experimental period the rats were sacrificed and samples from liver, kidney and spleen were taken for residues determination by using GLC according to (**Barno *et al.*,1995**).

Extraction and cleanup of tested pesticide:

Liver, kidney and spleen (2gram) were blended in high blender, 10 ml acetone were added and blender for 2 min at high speed according to the method of **Luke *et al.* (1975)**. The mixture was filtrated through Buchner Funnel linked with Watman No.1 filter paper. Sample extract (8ml) was placed in 50ml separating funnel then shaken for 1 min. The lower aqueous layer in the first funnel was dried over anhydrous Na<sub>2</sub>SO<sub>4</sub>. The aqueous layer in the second funnel was extracted with "10ml X2" methylene chloride and the lower organic phosphate as above was dried. Finally the residues were transferred quantitatively by 5ml acetone into small vial for cleanup.

Cleanup:

A glass column was packed from bottom to top with florisil (2.5m length) and anhydrous Na<sub>2</sub>SO<sub>4</sub> (1cm length) then eluted with 100ml 15% ethyl ether in petroleum ether, the extract was evaporated at 35°C to dryness and dissolved in 1ml acitonitril to GLC analysis according to **Baruo *et al.*(1990)** was used to measure the benowyl and propargite under the following condition.

A Hewlett Packard GLC model 5890 instrument, equipped with flame ionization detector, coupled with 3392-A-HP integrator.

The column ph-MESilican (HP-50 cross linked 50%) (1.5 X0.53nm) was used as liquid phase on 80-100 mesh chrowosar bw-H-P.

Oven temperature 220°C, carrier gas was nitrogen and flow rate was 60 ml/min.

#### **Statistical analysis :**

was carried out after snedecor (1971).

### **Results and Discussion**

The present work was under taken to study the effect of feeding albino male rats on daily diet polutted with has tested pesticides for 30 days a body weight and some biochemical aspect of rats and the accumulation of those pesticides in their organs.

### **1- Effect of tested pesticides on body weight:**

Increase percentages of body weight of rats administered pesticides and control are found in Table (1). In general all groups were increased in their body weights but the increase percentages, were higher in case of control than those of treated groups. Our results are in agreement with those found by **Schmmc and Wilson (2009) and Zayed et al. (2012)**.

### **2- Effect on biochemical parameters:**

The effect of propargite and benomyl on serum bilirubin, cholesterol, uric acid, creatinine, AST, ALT and AP of male rats were investigated and the results are given in Tables (2, 3). The obtained results revealed that the levels of bilirubin, uric acid and creatinine were higher in all treated groups these results in agreement with those found by **Mohamed (2008) and Enan et al. (1995) and Rizk Alla (2005)**.

The results showed different alterations in cholesterol concentrations after propargite and benomyl administration. The elevation in cholesterol level have been obtain in rats with leptophos (**Enan et al., 1995**), with hexachoro Cyelohexane (**Ravinder et al., 2009**) and **Risk Alla (2005)**.

The increase of bilirubin may be attributed either to haemolysis of peripheral blood or to intrahepatic toxicosis. (**Benjamin, 2004**).

Our results show significant increase in the activity of AST, ALT while significantly decrease of AP. In comparison with control values a slight but not significant increases were observed in serum activities of AST, ALT and AP of female rats received atrazine (**Gojmerac et al., 2005 and Eman and Bcrberian, 2006**).

### **3- Pesticides residue in some organs**

As illustrated in Table (4) the residues of propargite in different organs at the end of experiment were 0.52, 0.35 and 0.66 ppm for liver, kidney and spleen respectively in rats received propargite 1.22 ppm ((i), in group received 2.44 ppm (Gh) the residues were 3-96, 2.11 K 0.90 ppm in same sequence.

The residues of benomyl in different organs were non detect except in the liver 0.13 ppm in group (5) which received high dose.

These findings come in agreement with those of **Said et al. (2003,2004)** who reported that concentration of tlocoumafen and chlorpyrifos accumulated in liver, kidney and brain rats., similar results recorded by **Heath and Leathy (2009)**.

**Table (1) Effect of preporgate and benomyl on percentage body weight.**

Group	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>
C	10.2	201	31.0	41.8
2	5.3	10.6	15.7	20.5
3	5.8	113	21.9	27.2
4	4.9	9.8	13.1	17.7
5	7.3	14.7	22.2	29.0

**Table (2) Effect of progargate and benomyl on level of bilirubin, cholesterol uric acid and creatinine in rats.**

Group	Bilirubin μmol/l	Uric acid mg/ml	Cholesterol mg/ml	Creatinine mg/ml
C	97±9.9	28.7±1.6	980±99.1	96±14.8
2	183.7±4.1***	1013±5.5**	520.3±41.2**	89.4±7.0
3	115.7±1.7	86.5±4.8***	343.1±28.4***	343.1±28.4***
4	118.0±10.2	69.1±3.3***	641.5±26.1*	107.0±5.9
5	164±13.1**	47.4±2.5***	555±41.5*	87.0±3.7

Each value mean± SE, n=5;

significant at P≤0.05

**Table (3): Effect of pesticide on enzymatic activities**

Group	AST μ/ml	ALT μ/ml	AP μ/ml
C.	49.4±2.5	64.4±3.2	35.2±1.8
2	61.6±4.7**	90.8±4.2***	28.5±1.0***
3	62.4±2.6**	45.0±0.8***	26.1±1.0***
4	66.0±3.7**	45.8±4.3***	20.7±0.9***
5	55.0±4.1	38.8±4.7***	10.51±0.9***

Each value mean± SE, n=5;

\*=P<0.05; \*\*=P<0.01; \*\*\*=P<0.001

**Table (4): Concentration of propagate and benomyl in tissue of malrats**

Group	Liver ppm	Kidney ppm	Spleen ppm
C	ND	ND	ND
2	0.52	0.35	0.66
3	3.96	2.11	0.96
4	ND	ND	ND
5	0.13	ND	ND

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