SUMMARY

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Propoxur is a carbamate insecticide used for household control of flies, ants, aphids, mosquitoes, cockroaches and millipedes. Despite the increasing use of propoxur in Egypt, there is no complete information on the toxicity of this insecticide in birds. Therefore, the present study was carried out to investigate the acute oral LD_{50} of propoxur to pigeons and the physiological changes in some blood parameters of the rock pigeon, *columba livia domestica* which may be arise due to the toxicity of a single oral dose (1/2 LD_{50}) or a repeated oral dose (1/10 LD_{50}) of carbamate insecticide propoxur .

The parameters chosen for the present study were blood indices (leucocytes count, erythrocyte count, haemoglobin content, haematocrit, MCV, MCH, and MCHC), the respiratory function of blood (blood gases, acid-base status and oxygen equilibrium curve), some serum metabolites (glucose, total proteins, albumin (A) , globulins (G) , A/G ratio, total lipids, triglycerides, cholesterol, urea, uric acid, and creatinine), some enzymes (a spartate aminotransferase, and alanine aminotransferase), and some serum electrolytes (sodium, potassium, and chloride ions). The study includes two parts : -

1- The first part concerning the determination of the median lethal dose (LD_{50}) value of propoxur at 24 hrs. and changes in the studied parameters due to administration of a single oral dose (1/2 LD_{50}) of propoxur.

2- The second concerning the effect of administration of a repeated oral dose (1/10 LD_{50}) of propoxur on such parameters.

The data obtained in the present study can be summarized as follows:-

I-Median lethal dose (LD_{50}) value of propoxur at 24 hrs. was found to be 38.83 mg/kg body weight with a confidence limits (32.52 – 46.35 mg/kg body weight) .

II - Effect of administration of a single oral dose (1/2 LD_{50}) of propoxur on :-

A-Blood indices :-

1- Propoxur increased the number of leucocytes, haematocrit value and mean cell volume, but decreased the number of erythrocytes and haemoglobin level after all experimental periods, compared with control pigeons .

2-The mean cell haemoglobin and the mean cellular haemoglobin concentration were found to be un-affected significantly.

B - Respiratory functions of blood :-

1- There were significant decreases in arterial and venous blood oxygen partial pressures, percentages of oxygen saturation and alveolar oxygen partial pressure after all experimental periods .

2- Significant elevation were recorded in arterial and venous blood carbon dioxide partial pressures, alveolar- arterial oxygen partial pressure difference, percentage of venous admixture (% shunt), and the percentage arterio – venous difference of percentage oxygen saturation, oxygen partial pressure and carbon dioxide partial pressures after all experimental periods .

3- The arterial and venous blood pH, calculated $HCO_3^-/\alpha\ PCO_2$ ratios, and the percentage arterio-venous differences of base excess were significantly decreased after all experimental periods .

4- Significant reductions in arterial blood HCO_3^-, TCO_2 and BE and venous blood HCO_3^-, TCO_2 and calculated $HCO_3^-/\alpha\ PCO_2$ ratio after 3, 6 and 12 hrs. of treatment.

5- There were significant decreases in venous blood BE and percentage arterio-venous difference of HCO_3^- after 3 hrs. and in venous BE and percentage arterio-venous difference of TCO_2 after 6 hrs. of treatment.

6- Significant elevations were recorded in arterial and venous calculated buffer value ($logPCO_2$ / pH) and percentage arterio-venous difference of pH after all experimental periods and percentage arterio- venous difference of calculated buffer value ($logPCO_2$ / pH) after 3 and 6 hrs . and HCO_3^- and TCO_2 after 24 hrs. of treatment .

7- The blood oxygen affinity decreased (i.e. P_{50} increased) and the blood oxygen equilibrium curves shifted to the right in most of the experimental periods.

8- Hill's constant (n value in Hill's equation) were found to be increases after all experimental periods .

C-Some metabolites and enzymes :-

1- Significant elevations were recorded after 3 hrs. in serum AST activity , cholesterol , K^+ and Cl^-, after 6 hrs. in serum AST activity, cholesterol , A/G ratio and uric acid ,after 12 hrs. in serum glucose, A/G ratio, and AST, and after 24 hrs. in serum glucose, triglycerides and AST.

2- Significant reductions were recorded after 3 hrs. in serum urea, total lipids, ALT activity and Na^+; after 6 hrs. in serum total proteins, globulins, urea, total lipids, ALT activity , and Na^+ after 12 hrs. in serum total proteins, globulins,urea, total lipids, ALT activity, and Na^+; after 24 hrs. in serum urea, ALT activity and Na^+.

III- Effect of a repeated oral dose ($1/10LD_{50}$) of propoxur : -

A-Blood indices as follows :-

1- Leucocytes count was significantly increased after 3,6 and 9 doses of treatment .

2-Recorded significant reductions after 3, 6 and 9 doses as follows :-

a. After 3 doses: in haemoglobin content, haematocrit value, mean cell volume and mean cellular haemoglobin .

b. After 6 doses: in erythrocyte count, hemoglobin content, haematocrite, mean cell volume and mean cellular haemoglobin.

c. After 9 doses: erythrocyte count, haemoglobin content and haematocrite.

B-Respiratory functions of blood :-

1- There were significant decreases in arterial and venous blood oxygen partial pressure and percentage oxygen saturation after administration of all doses and in alveolar oxygen partial pressure after 3 doses and in percentage arterio-venous difference of carbon dioxide partial pressure after 6 doses of treatment..

2-Significant elevations were recorded in arterial blood carbon dioxide partial pressure after 3 doses, in venous blood carbon dioxide partial pressure, and in % shunt and percentage arterio- venous difference of percentage oxygen saturation

after 3, 6 and 9 doses.

3-Significant elevations in alveolar - arterial difference of oxygen partial pressure after 3 and 6 doses in percentage arterio- venous difference of oxygen partial pressure, after 6 and 9 doses, and in carbon dioxide partial pressure after 3 doses of treatment.

4- Significant decreases were recorded in arterial blood pH, HCO_3^-, TCO_2, BE, and calculated $HCO_3^-/\alpha\ PCO_2$ and venous blood pH, calculated $HCO_3^-/\alpha\ PCO_2$ and percentage arterio-venous difference BE after 3, 6 and 9 doses.

5- Also, significant decreases after 3 doses in venous blood HCO_3^-, TCO_2 , percentage arterio-venous difference of pH and calculated ($HCO_3^-/\alpha\ PCO_2$) .After 6 doses significant decrease were recorded in venous blood BE , percentage arterio-venous difference of HCO_3^- & TCO_2 and calculated buffer value (log PCO_2/pH).also significant decreases were recorded after 9 doses in venous HCO_3^-

and TCO_2 , in percentage arterio- venous difference of HCO_3 & TCO_2 and in calculated $HCO_3^- / \alpha PCO_2$.

6- The blood oxygen affinity decreased (i.e. P_{50} increased) and the blood oxygen equilibrium curves shifted to the right in most of the experimental periods.

7- Hill's constant (n value in Hill's equation) were found to be increases after all experimental periods .

C- Some metabolities and enzymes : -

1- In the present study, significant increases were recorded after 3,6 and 9 doses of treatment as follows : -

a- After 3 doses in serum, glucose, total proteins, albumin, globulins, urea, ALT, AST activities and Na^+ .

b- After 6 doses in serum glucose, total proteins, albumin, globulins, urea, uric acid, triglycerides, ALT, AST activities, Na^+ and K^+.

c- After 9 doses in serum glucose, total proteins, albumin, globulins, urea, uric acid, cholesterol, ALT, and Na^+.

2- Significant decreases were recorded in serum Cl^- after 3, 6 and 9 doses and in serum A/G ratio after 9 doses of treatment, but, non- significant after 3 doses in serum A/G ratio, cholesterol, triglycerides, total lipids, K^+ and after 6 doses in serum A/G ratio and total lipids and after 9 doses in serum triglycerides and AST activity.