

HAEMATOLOGICAL CHANGES IN RAT AFTER CHLOROPYRIFOS INTOXICATION.**Dubal R.S*, Kamble K.J**, Dhonukshe Y.V**, Ghorpade D.V**.**

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Abstract

Pesticides are widely used for control of pest in all types of crops. Chloropyrifos most popularly used as pesticide for fruit plants, flower plants, seeds, grain and different vegetables. The aim of present study; to investigate the effects of chloropyrifos on haematological parameters in albino rat. 0.5mg/ml/kg body weight dose injected intraperitoneally ; rat sacrificed ; Samples collected and haematological changes were studied. Changes in haemoglobin level, total and differential count of WBCs and platelets were significantly observed up to 96 hrs. exposure of chloropyrifos.

Key words- Haematological changes, Chloropyrifos, & Albino rat etc.

Introduction-

Pesticides are substances which are use for the controlling the pests. The term pesticides includes herbicides, insecticides, nematocides, molluscicides. (Cope et., al. 2004). Most pesticides intended to serve as plant protection product which in general, protect plant from weeds, fungi, and insects. Environmental pollution is one of the byproduct of human activities and its direct and indirect effect on animal as well as plants. More than 50% pesticides were used all over the world in agriculture sector for increasing the crop production but due to excess use it causes hazardous health problem in humans. Insecticides are mainly classified into two groups, Organophosphate and Organochlorides. Organophosphate insecticides exist in liquid and solid forms these TEPP-Tetraethylpyrophosphate, malathion, parathion or triphos, methyl parathion, chloropyrifos etc. (Tripathi and Shrivastava, 2010) Chloropyrifos is one of the insecticides used in agriculture use and domestic areas (EPA. 2008) [Environmental Protection Agency's 2008]. Chloropyrifos has been found to disturb biochemical, physiological and haematological function of red blood cells (RBCs) Through process of liquid peroxidations (Ambali, 2011, Nishi and Hundal, 2013). Chloropyrifos is considered as moderately hazardous to humans, According to world health organization (WHO). Exposure surpassing recommended levels has been linked to neurological effects, persistent developmental disorders and autoimmune disorders. Effects of accidental or prolonged exposure to these chloropyrifos causes toxicity, neurological syndrome, immunosuppression, tumors, respiratory, renal, hepatic, cardiac and reproduction failure and economic losses. However, overall effects of pesticides on mammalian embryo during the post implantation period have been documented. (Domaracky, et., al. 2007; Ambali, et., al. 2009). Chloropyrifos is widely used for variety of agriculture and public health applications. In present study efforts have been made to determine the toxicity of chloropyrifos on haematological and serological changes of adult albino rat.

Material and methods-**I] Experimental Animal-**

Male albino rats weighing 200-300 gm used for this experiment were obtained from the laboratory animal

house of Satara Pharmacy College, Satara. The animals were allowed to acclimatize for one week.

II] Chemical Preparation-

Chloropyrifos was purchased from local market which contain 48% emulsified concentration of chlorozan.

III] Experimental Design -

The rats were divided into five groups.

- Group-1:- Include two rat acclimatized in laboratory condition were sacrificed after one weeks.
- Group-2 :- (Chloropyrifos treated group for 24 hrs.) Consists of two rats and were given a dose of '2' ml/200-300 gm rat by intraperitoneal cavity.
- Group-3 :- (Chloropyrifos treated group for 48 hrs.) Consists of two rats and were given a dose of '2' ml/200-300 gm rat by intraperitoneal cavity.
- Group-4 :- (Chloropyrifos treated group for 72 hrs.) Consists of two rats and were given a dose of '2' ml/200-300 gm rat by intraperitoneal cavity.
- Group-5 :- (Chloropyrifos treated group for 96 hrs.) Consists of two rats and were given a dose of '2' ml/200-300 gm rat by intraperitoneal cavity.

- Experimental Setup -

Table Number 1:- Experimental Design

Group	Experimental Design
1	Normal
2	Treated-24 hours
3	Treated-48 hours
4	Treated-72 hours
5	Treated-96 hours

In each group, the rats were sacrificed by cervical decapitation at the end of duration related to each group. The blood sample were collected in 10% EDTA solution. Blood samples were analyzed for Total RBCs, WBCs, Differential count of WBCs, SGOT, SGPT, PCV, PCT as described by Kjeldsberg, 1998.

Result and Discussion-

In acute toxicity tests the chloropyrifos treated rat with 0.6 µl Concentration / kg/Body weight showed following changes as per experimental design. Table No.2 shows mean values of haematological changes in male albino rat on chloropyrifos intoxication as compare to the control. Table No.3 shows mean values of serological changes in control and experimental rat after chloropyrifos intoxication. During the whole experimental observation no mortality were recorded. During the exposure, the quantity of food and water intake by different dose groups found to be decrease as compare to control group. Piloerection, sleepy posture, shivering significantly observe after 72 hours chloropyrifos intoxication.

Table No. 2 -Mean values of Haematological observations in control and experimental rat on chloropyrifos

Sr.	Parameter	Control	Period of experimental rat			
			24 hrs.	48 hrs.	72 hrs.	96 hrs.
1.	Hb [g/dl]	14.7	15.31	15.31	15.31	15.31
2.	Total Erythrocytes (Million/cu. mm)	6.35	7.83	6.30	5.80	4.14
3.	Total Lymphocytes count. (Cells/cu.mm)	6,213.5	5,563.5	4901	4,406	3,896
4.	Total platelet count. (/ μ l)	8,42,100	2,42,500	8,50,000	9,26,600	9,47,950

Table No.3 - Meanvalues of Serological observation in control and experimental rat on chloropyrifos

Sr.	Parameter	Control	Period of experimental rat			
			24 hrs.	48 hrs.	72 hrs.	96 hrs.
1.	S.G.O.T (Iu/L:at 37 ⁰ c)	288.35	335.08	280.08	306.29	290.44
2.	S.G.P.T (IU/L:at 37 ⁰ c)	320.07	112.00	108.11	96.07	88.17
3.	Albumin (g/dl)	4.32	4.80	4.43	3.59	3.26
4.	Globulin (g/dl)	4.26	3.85	3.47	3.14	2.79
5.	Alkaline Phosphate (IU/L)	210.19	297.00	172.19	166.47	134.07

In our finding the haematological level decreased from 15.31 gm/dl to 10.77 gm/dl on exposure upto 96 hours as compare to control rat 14.7gm/dl, similar finding were recorded by kingsley, Solomon et.,al (2016) on wister rat exposed to Dichlorovos based insecticide formulation. It has been observed that the number of erythrocytes decreased from 7.83 million/ Cu.mm to 4.14 million/Cu.mm on exposure upto 96 hours as compare to control rat 6.35 million/Cu.mm, similar finding were recorded by Shadia Ali Radwan et.,al (2010) on male albino rat on exposure to Amarnath extract. It is also reported by Y.Glucheva et.,al (2012). It has also been found that, the lymphocytes level deplicated from 5563.50 Cells/Cu.mm to 3896 Cells/Cu.mm on exposure upto 96 hours as compare to control rat 6213.50 Cells/Cu.mm, similar finding were observed by Barakat et.,al (2015) and George et.,al (2011). But it has been noted that the platelets level increased from 2,40,500/ μ l to 9,47,950/ μ l on exposure upto 96 hours as compare to control rat 8,42,100/ μ l, Similar finding also been reported by Owoyele et.,al (2011) in albino rat on exposure to

parquetting nigrescens root extract and also by Merchant and Modi (2004).

As compare to haematological changes, Serological changes showed more significant alteration in rat exposed to chloropyrifos as compare to control. It has been observed that, the SGOT (Serum Glutamate Oxaloacetate Transaminase) level decreased from 335.08 Iu/L; at 37°C to 290.44 Iu/L; at 37°C, on exposure upto 96 hours as compare to control rat 288.30 Iu/L; at 37°C, Similar finding were recorded by Jaiswal et., al (2017), In broiler chicken after lead intoxication on serological parameters. In our finding the SGPT (Serum Glutamate Pyruvate Transaminase) level decreased from 112.00 IU/L; at 37°C to 88.17 IU/L; at 37°C on exposure up to 96 hours as compare to control rat 320.07 IU/L; at 37°C, similar finding were recorded by, Souzar et., al (2013) and Agrawal et., al (2013). It has been reported that the albumin level decreased from 4.80 gm/dl to 3.26 gm/dl on exposure up to 96 hours as compare to control rat 4.32 gm/dl, Similar finding were observed by Kanwal et., al (2016) in mice after strawberry juice Ameliorate fluoride induced pathological changes. It has also found that the globulin level deplicated from 3.85 gm/dl to 2.79 gm/dl on exposure up to 96 hours as compare to control rat 4.26 gm/dl, Similar finding were recorded by NASR EL-DEEN et., al (2017). It has been reported that the alkaline phosphatase level decreased from 297.00 IU/L to 134.07 IU/L on exposure up to 96 hours as compare to control rat 210.19 IU/L, Similar results obtained by Sharma et., al (2009) on exposure to Tartrazine induced swiss albino mice.

The above finding observed are acute toxicity exposure up to 96 hours intoxication further research in this line is in progress for chronic exposure of chloropyrifos on albino rat in our laboratory.

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