IOSR Journal of Biotechnology and Biochemistry (IOSR-JBB)
ISSN: 2455-264X, Volume 6, Issue 5 (Sep. – Oct. 2020), PP 32-34
www.iosrjournals.org

Biochemical Study of Blood after Administration of Herbicides 2, 4-D & 2, 4, 5- T on Guinea Pig (Caviaprocellus)

Raj Kumar Singh
Department of Zoology, Patna University, Patna

Abstract
Background- *Herbicides are those chemicals which are employed to kill weeds. Selective herbicides kill a considerable number of weed species such as 2, 4-D are 2, 4, 5- Tthese toxic molecules are entering in animal systems through the plants. There is concern about the possible long term effects of some herbicides on the human population. If herbicides are consumed by primary consumers, this creates a danger to top consumer and proceeds biological magnification.*
Materials and Method-
Rearing of animals: *The test animals were kept separately at constant temperature of 25± 5^0C. After three weeks from the date of capture, the animals were considered for the experiment.*
Method of determination of LD_{50} *value- LD_{50} value of 2,4-D and 2,4 5-T were calculated by probit analysis (finney 1971) and expressed by graphical method (trevan 1927; Bliss 1935, Smyt et. Al 1962).*
Collection of blood or blood sample collection- *After anaesthesied the animal blood was taken by the disposable syring (Dispovan 2 ml) with the 23 No needle.*
Staining of the blood *–Here we have selected the leshman's stain-*
Total count of R.B.C *– For total erythrocytes count improved naubourHacmocytometer and haym solution is used.*
Results and Discussion- *In blood 2,4-D and 2,4,5-T poisoning coused considerable changes. There herbicide caused marked decreased in number of R.B.C,decrease in haemoglobin content 2,4-D caused degeneration in neutrophil. The E.S.R rates decreaseinitially after 2,4-D and 2,4, 5-T poisoning. The poisoning caused anemiaie decreases in haemoglobin parentage. Toxicant not only circulates in blood but they also enter the haemopoietic tissue and cause the abnormality.*
Conclusion- *Lack of oxygen play a central role in cell injury which is brough by to toxic moleculesthey are creating the problem of ecotoxicity therefore, careful use of herbicide should be preferred.*
Keywords: *ecotoxicity, Herbicides,2, 4-D , 2, 4, 5- T, biological magnification, probit analysis , leshman's stain , haemopoietic tissue*

Date of Submission: 28-10-2020 Date of Acceptance: 09-11-2020

I. Introduction

large amount of herbicides are being widely used in agriculture and horticulture they are one of the important agriculture pollutant they creates the problem of ecotoxicity the efficiency of herbicides depend upon how effectively they enter in plant system Different plant surface have different capacity to absorb herbicides some herbicides enter plants via the leaves and move along the vessels of the phloem, while other enter through the roots. Some herbicides like di- nitro phenol uncouple the oxidative phosphorylation of carbohydrates and bring about toxic effects herbicides are entering in human system through the food.

There is concern about the possible long term effects of some herbicides on human population. 2, 4, 5- T usually contains small amount of highly toxic impurity called dioxin or TCDD which is known as teratogen and liable to cause congenital malformation. If herbicides are generally comsumed by primary consumer this creates a danger that some species especially the higher one's in the series will be affected by biological magnification.

So herbicides not kill the weeds but also bring about wide range of effect on the ecosystem. Therefore it is necessary to study the full implication of chemical control of weeds through herbicides. A limited attempt has been made in present project to understand Biochemical study of blood after administration of herbicides (2,4-D & 2, 4, 5- T) on Guinea pig (Caviaporcellus).

The herbicides selected in this project are sodium salt of 2,4 -D and 2,4, 5-T this compound was used by zimmermann and Hitchcock in 1942 as a plant growth regulator and later marthi and Mitchell (1944) reported its herbicidal properties (craft 1957).

II. Materials and Method

Rearing of animals: The guinea pigs were obtained from local market. They were divided in to 8 groups of six each. Each group was kept in cage (2'x4'x3'). The test animals were kept separately at constant temp- of 25± 5^0C. After three weeks from the date of capture, the animals were considered for the experiment.

Method of determination of LD_{50} value- The herbicides 2,4-D and 2,4, 5-T were diluted in acetone for different concentration for the assessment of LD_{50} value, mortality count was taken after 24 hrs, in each treatment. Diflerent concentration of 2,4-D and 2,4, 5- T were applied to each group of specimen and concentration mortality curve was obtained. LD_{50} value of 2,4-D and 2,4 5-T were calculated by probit analysis (finney 1971) and expressed by graphical method (Trevan 1927; Bliss 1935, Smyt et. al 1962)

Collection of blood or blood sample collection the test animal were caught gently by hand and anaesthesied by eather. The time for animal anaesthesied was nearly 2-3 minutes. After anaesthesied blood was taken by the disposable syring (Dispovan 2 ml) with the 23 No needle. The needle was inserted at 90^0angle and punctured the heart. It was then gently aspirate the blood about half ml in the syring.

Preparation of blood film on slide- For preparing blood film a small drop of blood was placed in the centre line of the slide and the spreading slide is placed at an angle of about 45^0 to slide and then moved back to make contact with the drop. Blood film spread by a rapid, smooth, forward movement of the spreader.

Staining of the blood – for staining dried slide is kept in Horizontal Position in staining tray and flooded with the stain. Here we have selected the leshman's stain-

Total count of R.B.C – For total erythrocytes count improved naubour Haemocytometer and haym solution is used the erythrocytes present in 5 squares (4 corner + 1 central) were counted and the total number was multiplied by 10^6 to give the number of erythrocytes per mm^3 of blood.

III. Result and Discussion

In blood 2,4-D and 2,4,5-T poisoning caused considerable changes. The 2,4-D poisoning caused crenation in R.B.C. The 2,4,5-T poisoning caused haemolysis of R.B.C. In both cases marked decresed in number of R.B.C. was observed and also initially decrese in haemoglobin content was obserbed in both the cases. Similar observation on the blood has observed by sharma, et. al. (1989) in blood of fishes. Ahmad (1978), Gupta, et. al. (1982) ,Mandal and lahiri (1985) , KaveriGhosh and Banerjee (1989). The study of vermaet. al. (1984), and Mishra and Shrivastava (1985), also showed that poisoning caused anemiaie decrease in haemoglobin. Dutta and Das (1989), suggested that toxicant not only circulate in blood but they also enter the haemopoietic tissue and cause the abnormality.

As regard the white blood cells the 2,4-D poisoning caused degeneration in neutrophils and degeneration of nucleus was also observed. The herbicides poisoning caused hypoglycaemia ie blood suger level starts decreasing. Similar observation were also reported in various species of fishes and mammals due to different herbicidal and pesticidal intoxicants by Frank (1980), Singh (1982), Agrawal et. al. (1987), Srivastava and Mishra (1983). It might be possible that hypoglycaemia effect is due to inhanced secretion of insulin from the beta cells of islet.

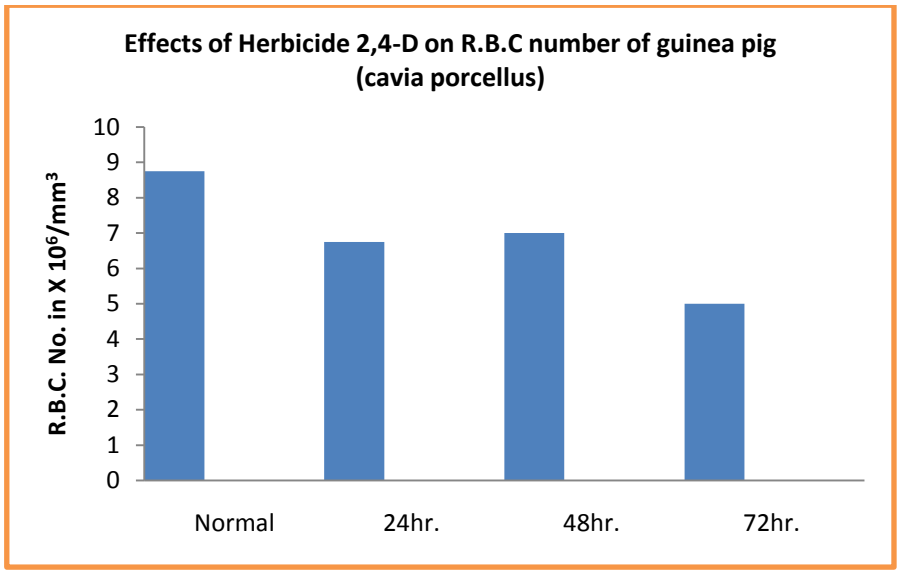
In the present investigation T.L.C. increased in case of poisoning of both 2,4-D and 2,4, 5-T Mukhopodhyay and Dehadri (1980), Kumari and Yadava (1988) and Dhilon and Gupta (1983), was also reported increase in T.L.C by agro-chemical poisoning.

The E.S.R rates decrease initially after 2,4-D and 2,4, 5-T poisoning, later after 72 hrs. the rate showed slight increased. The P.C.V also decreases due to destruction of blood cells both R.B.C and W.B.C Ghos and Banerjee also reported decrease in P.C.V after rogor poisoning.

Effect of intravenous administration of 2, 4-D on blood parameters in guinea pig.

Parameters	Normal	TREATED		
		24 hr.	48 hr.	72 hr.
R.B.C $10^6/mm^3$	8.56±0.34	6.85±0.44	6.97±39	5.2±0.26
Hbg/100 ml	13.1±0.56	12.1±0.85	1025±10.46	11.2±0.58
PCV %	44.5±0.94	36.6±0.72	38.5±0.42	40.0±1.02
E.S.R mm/h.	5.6±0.93	3.1±0.49	3.2±0.38	4.3±0.64
T.L.C thousand/mm^3	4.72±0.39	5.0±0.37	6.27±0.39	6057±0.68

(all observations are based on the mean± S.E. Six animal were used in each set)



IV. Conclusion

lack of oxygen play a central role in cell injury which is brough by to toxic molecules, some toxic molecule can act directly by combining with some critical molecular component or cellular organelle in mercuric chloride poisoning. Poison binds of the sulfhydral group of the cell membrane and other protein, causing increased membrane permeability and inhibition of A.T.Pase dependent transport. Many other drugs and chemicals also induce cell damage by direct cytotoxic effect (chipman 1989). Therefore herbicides are double edge weapon on one side they eliminate the weeds but on the other hand they are creating the problem of ecotoxicity therefore, careful use of herbicide should be preferred.

Reference

[1]. Finney, D.J. (1971) Probit analysis Ed_2 Cambridge University press,Cambridge.
[2]. Frank, J. (1980) Z. Angen. Zool, 66 (4): 475-504.
[3]. Trevan, J.M. (1927) The error of determination of Toxicity Proc. R.Soc.Lon. (Bio) 101: 483-514
[4]. Bliss. C.I. (1935) The calculation of the dosage mortality curve.Ann. Appl. Bio. 22:134-167
[5]. Smyth, H.F.Jr. (1962) Range finding toxicity data list VI Am. Ind. Hyg. Assoc. J. 23:95-107
[6]. Sharma, et. Al. (1989) Herbicides and its environmental impact onPissine
[7]. Kumari and Yadava (1988) Metacid induced Microcytic Anaemia in Fish clariusbatrachus (L), Proc. Nalt. Symp.1989: 111-115 Emerg. Tr. Anim. Haematol.
[8]. Dutta and Das (1989) Effect of Benzophenone on the Haemotopoictic tissue of caviaporcellus proc. Nalt. Symp.1989:117-122 emerg. Tr. Anim. Haematol.
[9]. Mishra and Shrivastava (1985) Mol. Biol, 30 (6): 519-524.
[10]. Mukhopadhyay, P.K (1980) Environ. Pollut. Ser.
[11]. &Dehadri, P.V. AECOL, Bio. 22:149 -154

Raj Kumar Singh. "Biochemical Study of Blood after Administration of Herbicides 2, 4-D & 2, 4, 5- T on Guinea Pig (Caviaprocellus)." *IOSR Journal of Biotechnology and Biochemistry (IOSR-JBB)*, 6(5), (2020): pp. 32-34.