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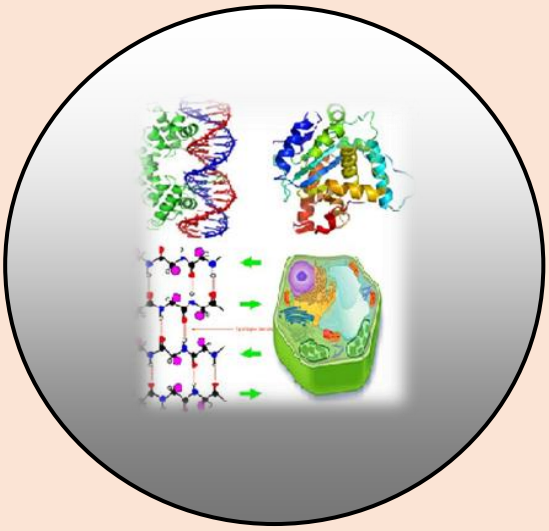
ISSN 2319-3077 Online/Electronic
ISSN 0970-4973 Print

UGC Approved Journal No. 62923
MCI Validated Journal
Index Copernicus International Value
IC Value of Journal 82.43 Poland, Europe (2016)
Journal Impact Factor: 4.275
Global Impact factor of Journal: 0.876
Scientific Journals Impact Factor: 3.285
InfoBase Impact Factor: 3.66

J. Biol. Chem. Research
Volume 36 (1) 2019 Pages No. 235-238



Journal of Biological and Chemical Research

An International Peer Reviewed / Referred Journal of Life Sciences and Chemistry

Indexed, Abstracted and Cited in various International and National Scientific Databases

Published by Society for Advancement of Sciences®

J. Biol. Chem. Research. Vol. 36, No. 1: 235-238, 2019
(An International Peer Reviewed / Refereed Journal of Life Sciences and Chemistry)
Ms 36/01/7979/2019

ISSN 2319-3077 (Online/Electronic)
ISSN 0970-4973 (Print)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RESEARCH PAPER

Received: 22/02/2019 Revised: 30/03/2019 Accepted: 31/03/2019

Haemotoxic effect of Organochlorine (Endosulfan) Pesticide on *Clarias batrachus*

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ABSTRACT

Different types of pesticides and different types of chemicals have been used in Agriculture for centuries. Due to which good and high yield can be easily done in a short time, but these pesticides are having a very bad effect on our environment and many organisms. Endosulfan is also a pesticide among them. In this experiment, we observed these in the freshwater fish Clarias batrachus after placing it in a solution containing 0.01 ppm concentration of Endosulfan for 24 hours and studied the degradation of hemoglobin, RBC cells and heamatocrit values.

Keywords: Pesticide, Organochlorine (Endosulfan) and Clarias batrachus.

INTRODUCTION

Now - a - days we are increasing the use of different types of pesticides day by day in the field of agriculture to promote the yield of crops in a short period of time and minimum labor. As a result, the yield of crops has also increased significantly. But these different types of pesticides are having a profound impact on our environment and our health. As a result of the use of pesticides, their effects are not only on humans or animals but also on aquatic organisms like fish etc.

Endosulfan was developed in the early 1950s and registered by Hoechst in 1954 in USA. (Panap 2008) Global production of endosulfan was estimated to be 10,000 tonnes annually in 1984. India is regarded as being the world's largest producer and user (Li & Macdonald 2005), with more than 60 endosulfan manufacturers and formulators, mostly the latter (WebIndia 2007). Germany is the worlds' second largest producer of endosulfan, with Bayer CropScience producing approximately 4,000 tonnes per annum at its Frankfurt plant. Most of this is exported to Southeast Asia, Latin America, and the Caribbean (GFEA-U 2007).

Endosulfan is extremely toxic to fish and its use results in the disruption of the aquatic food chain. It is especially toxic to juveniles (Dutta & Arends 2003). In fish it causes marked changes in sodium and potassium concentrations, decreases in blood calcium and magnesium levels, inhibits brain ATPase, and cancause massive fish kills (Naqvi & Vaishnavi 1993). It inhibits acetylcholinesterase in the brain of fish (Dutta &Arends 2003).We know Endosulfan is an endocrine disruptor. Endosulfan is a non-systemic insecticide and acaricide with contact and stomach action (Kidd & James 1991). Endosulfan is reported to be one of the most commonly used pesticides in India in recent years, particularly on rice and cotton against thrips, stem borer, whorl maggot, case worm, boll worm and bud worm (Jayashree &Vasudevan 2007b).It is used to control ectoparasites on farm animals andpets in Ghana (Darko & Acquaah 2008).Fish can be considered 'the poor man's animal food" (Kent, 1997).
The aim of this paper is to assess the toxicological impact of pesticideOrganochlorine& Endosulfan. With the help of Haemometer (HB). The pesticide effects an fish in fresh water have been studies by many researcher in experimental laboratory condition.(O'Brien R.D. - 1976, Pandey *et al*. 1976, Alpha-1981, Singh 1982, Naqvi-1983, & Tandon *etal*. - 1986).The pesticides leach out in water areas and persist there in high quantities.(T.S.Nqvi - 2017). Endosulfan is an organochlorine insecticide commonly used in fields. We selected this endosulfan for the experiment. The fresh water fish Clarias batrachus, after exposure to 0.01 ppm of endosulfan for 24 hours, and tested after 24 hours and observed that it's affects thered blood cell (RBC) count, haematocrit (Hct) and haemoglobin content (Hb) values.

MATERIALS AND METHODS

All the fishes were collected from the Ganga River in village Bara district - Ghazipur, Uttar Pradesh and washed it several times with normal water. Again, these fish were thoroughly washed with a solution of 1% potassium per magnate solution($KMno_{4)}$, to remove external infection from the fish. And kept all the clean fish in large glass aquaria in 96 hours of normal water. Water characteristics, temperature (°C), pH, alkalinity (mg/L) and hardness (mg/L) were analyzed before dissolving the pesticide in water and after 24 hours by using standard methods. (Alpha-1981).

	Temp ^{0}C	pH	Alkalinity mg/L	Hardness mg/L	Dissolved Oxygen mg/L
Before dissolving the pesticide in water after 24 hours of exposure	23.0 ± 1.4	7.5 ± 0.3	110 ± 5	270 ± 4	7.1 ± 0. 3
	15.4 ± 0.3	7.9 ± 0.4	107 ± 3	271 ±3	6.5 ± 0.1

After 24 hours, fishes were extracted from aqueous aquarium of 0.01 ppm endosulfan. The fishes were thoroughly washed in running tap water. Then punctured the caudal vein of the fish vesicle and collected blood from it into a EDTA vial (Manufactured by Evergreen Enterprises) and added 1% ethylene di-amino tetra acetic acid mixed them. Now the prepared EDTS solution was entered into the 'ALERE H S30 HEMATOLOGY ANALYSER' and calculated hemoglobin (Hb), RBC and Hct. When the endosulfan is dissolved in water, the pH of Pesticide starts to increase, but the amount of oxygen dissolved in water decreases.

Fish and other aquatic life are also affected by the sudden rise in pH. Presence of strong alkalis can cause asphyxiation by coagulating the gill secretions in fish. Which causes the death of fish.

RESULTS

After 24 hours, keeping the fish out of the water containing endosulfan, we found a huge decrease of 25.2%, 8.8% and 14.85 in Hemoglobin content, RBC count and hematocrit (Hct) respectively and all the fish were anemic and weak.

Haematological parameters (Mean±S.D.)

	Hb (gm%)	Present decries %	RBC Count Million / cmm	Present decries %	Hct (%)	Present decries %
Control	**6.8 ± 0.8**	**25.20**	**3.1 ± 0.3**	**8.80**	**10.4 ± 1.2**	**14.85**
Treated	**4.5 ± 0.5**		**2.7 ± 0.5**		**8.2 ± 1.3**	

CONCLUSION

We have started using pesticides so much for high yield in agriculture that these pesticides are proving fatal for all organisms. As we have seen, such a low amount of endosulfan in water has caused death for fish and other aquatic animals. Therefore, we should grow all plants like Bt. cotton instead of pesticides today. Because today we are using pesticides so much that instead of going towards development, we are going towards destruction.

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