

RESEARCH ARTICLE

PATHOLOGY

CHANGES IN OXYGEN CARRYING CAPACITY OF BLOOD IN FISH, CHANNA PUNCTATUS (BLOCH) EXPOSED TO CHLORPYRIFOS.

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ABSTRACT

Organophosphate pesticides widely used all over the world to control pest. They ultimately make their way into aquatic habitat and proved harmful to fishes and other aquatic flora and fauna. Organophosphate insecticides that kills insects by disrupting their nervous system and is effective against a wide range of plant eating insects. In the present study effect of sub lethal concentration of chlorpyrifos on oxygen carrying capacity of blood in fish, *Channa punctatus* (Bloch.). The study showed a significant decrease in the oxygen carrying capacity of blood after 24hrs. 48hrs., 72hrs. and 96hrs. respectively, when compared to control group

KEYWORDS

Oxygen carrying capacity, chlorpyrifos and *Channa punctatus* (Bloch.)

INTRODUCTION

Water is the essential part of life. The great solvent power of water makes the creation of absolutely pure water, a theoretical rather than a practical goal. The aquatic environment is subjected to different types of pollutants which enter water bodies with industrial, domestic and agricultural waste water and severely affect the aquatic organisms. The problem of environmental pollution and its deleterious effect on aquatic biota, including fish received focused interest during the few last decades.

Recently, a great deal of attention has been paid to evaluate the hazardous effect of organophosphorous compound on physiology of many non-target organisms, particularly fish. The insecticides pollute the aquatic ecosystem were they are carried by rain water from here they pass into the food chain, ultimately produced toxicity to fish, birds, wildlife and man.

The organophosphate chemical chlorpyrifos is a commonly used pesticide in the country. The pesticide on reaching to aquatic system influence greatly the non target organism such as fishes and birds etc. Blood is a very important tool for studying the effect of toxicant. It is highly susceptibility to internal environmental fluctuation. Change in the physicomorphology of the blood can readily indicate the change in the quality of the environment. (Hum, 1967; Blaxhall, 1972; Pandey and Pandey, 2001) which indicates the increasing importance of haematology in health, disease and toxicological screening of fish as test species (Modesley Thomas 1971;).in the present paper an attempt has been made to study the effects of chlorpyrifos on oxygen carrying capacity of blood of fish, *Channa punctatus* (Bloch.)

MATERIALS AND METHODS

Live specimen of *Channa punctatus* (Bloch.) were collected from the local fish

market and were transferred into glass aquaria containing 25 liters of chlorine free water for acclimatization after dipping them into low concentration of potassium permagnate for a few seconds in order to check microbial infection. The determination of LC_{50} was analyzed statistically by log dose/probit regression line method (APHA, 1971). Fishes were scarified after 24, 48, 72, and 96hrs, respectively. 800mg of potassium oxalate and 1200mg of ammonium oxalate were dissolved in 100ml distilled water. One drop of this solution was added to each empty sterilized vial, shaken and dried in an oven. Blood was collected into vials containing disodium salts of EDTA as anticoagulant by severing the caudal Peduncle. Oxygen carrying capacity of fish blood was calculated by multiplying the hemoglobin content with 1.25 oxygen combining power of Hb/g (Johansen, 1970).

RESULTS AND DISCUSSION

It is observed that oxygen carrying capacity of blood of *Channa Punctatus*(Bloch.) in control set was measured as 10.35ml O_2 -g-1Hb., were as in experimental sets of fish, exposed to 25ppm of chlorpyrifos for 24 hrs, 48hrs, 72hrs, and 96hrs. was found to be 9.20ml O_2 -g-1Hb. 8.70ml O_2 -g-1Hb, 8.31ml O_2 -g-1Hb, and 7.18ml O_2 -g-hb respectively. It is clearly evident that there is reduction in the level of O_2 carrying capacity of blood after exposure of chlorpyrifos of 25ppm. Such decreased rate of oxygen carrying capacity of blood in fish is due to the reduction of R.B.C. count and Hb. content, James and Sampath (1995) found that the declined O_2 carrying capacity of blood of copper and ammonia mixture exposed in heteropneustes fossils due to reduction of R.B.C count and Hb. Content which reflects on tissue

respiration. Sampath *et, al.* (1998) have reported the decrease of O₂ carrying capacity due to the reduction of R.B.C and Hemoglobin content in *O. mossambicus* when exposed to copper and zinc, It is known that number of R.B.C and Hb. Concentration often follow a direct and positive physiological interrelationship (Chatterjee and Ganguly, 1993). Reduced O₂ carrying capacity of

blood in the present study may be due to damage in the gill under chlorpyrifos stress and leads to loss of respirations. The agreement consider with a findings of Karuppasamy (2005) in cadmium treated *Channa Punctatus* (Bloch.). The loss of Hb. and consequent reduction in the O₂ carrying capacity of the blood is the most conspicuous feature of anemia.

TABLE-1.
Oxygen carrying capacity (ml O₂g-1Hb) of *Channa Punctatus* (Bloch) under toxicity of chlorpyrifos pesticide.

Conc.In ppm	Control	24hours	48hours	72hours	96hours
25ppm	10.35	9.20	8.70	8.31	7.18

CONCLUSION

So we come to conclusion that with the increase in chlorpyrifos intoxication to fish, *Channa punctatus* (Bloch.) leads to decrease in oxygen carrying capacity of blood which directly reflects on tissue respiration. It is known that

number of R.B.C. and Hb. Concentration often follow a direct and positive physiological interrelationship, thus preventing a reduction in hemoglobin oxygen carrying capacity that would curtail oxygen transport.

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