

HAEMOLYTIC ANAEMIA IN *ANABAS TESTUDINEUS* WITH REFERENCE TO ENDOSULFAN

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The sublethal effect of endosulfan (0.00125%) in *Anabas testudineus* showed that the outer layer of the RBC became wrinkled and there were formations of 2 to 3 Heinz body-like inclusions in the RBC. Moreover, the haemoglobin percentage had been decreased to 3 g% which was relatively low in comparison to normal value of 10.5 g%. So, it is assumed that due to the contamination by organochlorine pesticide *A. testudineus* could not absorb sufficient amount of iron from the intestine resulted methaemoglobin formation. Therefore, the red cells were developed with very low amount of haemoglobin. As a result, the fishes suffered from haemolytic anaemia and exhibited mortality.

INTRODUCTION

In aquaculture, better water quality creates congenial environment for the fishes. The fish becomes highly sensitive in such ecosystem where the water gets contaminated by toxic chemicals (Banerjee & Verma, 1992). Of the toxicants, the effects of pesticides cause very peculiar behaviour in the fishes (Chaturvedi & Agrawal, 1991). Due to such intoxication the carps die very rapidly (unpublished work) but the air breathing fishes are able to survive for long duration (Banik & Chakraborty, 1996a & b). At that condition, the most remarkable characters may be available in the haematological data (Banik & Ghosh, 1995). Several workers (Gordon - Smith, 1980; Petz, 1980) opined that the intoxication may lead to haemolytic anaemia in the animals. However, a survey into the literature explicitly reveals that more attention is given on the haematology of healthy fishes (McArthur, 1977; Elarifi, 1982; Kusuda & Ikeda, 1987). But such studies with pesticides did not receive due attention till to - date and some fragmentary data are available only (Banerjee & Verma, 1992; Banik & Chakraborty, 1995 a & b).

The present paper communicates the nature of effect of an organochlorine pesticide (endosulfan) in the haematology of *Anabas testudineus*.

MATERIALS AND METHODS

For the present experiment six adult and healthy fishes (*A. testudineus*) of similar size and weight were collected from a local fish farm, Tripura (Latitude 23°40'30"N and Longitude 91°16'40"E). The fishes were then kept in the laboratory for acclimation for about 24 hrs. The experiment was carried out in a glass aquarium (2x2x3.5') contained 30 l of water (chlorine free) where a sublethal concentration (0.00125%) of endosulfan 35% EC was added. For control, the size of the aquarium and water content remained same with that of the former. In each aquarium 3 fishes were kept and the blood was drawn from the caudal fin area of the fish during morning period. The haematological analysis was done adopting the methodology of Brown (1980).

RESULTS AND DISCUSSION

The pesticide effected fishes exhibited certain peculiarities in the RBC. These were with wrinkled outer border (instead of regular surface) and Heinz body-like inclusions ranged from 2 to 3 outside the RBC. Several workers (Firkin *et al.*, 1994) opined that the Heinz body-like inclusions are aggregates of denatured globin which form in the animal during contamination by toxic chemicals. At this condition, the reducing power of the red cell was probably unable to counter excess oxidative stress. As a result the fishes suffered from haemolytic anaemia (Ward *et al.*, 1983).

From the normal value of 10.5 g% (range = 6.0-15.0 g%), the haemoglobin % was decreased to a lower level of 3 g% (± 1.63 g%), after exposure for about 9 hrs period. Therefore, it is assumed that

due to the pesticide contamination the fishes could not absorb sufficient amount of iron from the intestine which resulted formation of methaemoglobin. As a result, formation of necessary amount of haemoglobin was not done. Thus, the red cells were then developed with too low amount of haemoglobin which gave rise to anaemia (Plowman, 1987). At the same time, the haemoglobin chains which determine the binding affinity of haemoglobin for oxygen probably had some peculiarities due to pesticide, which resulted the alteration of the physical characteristics of the haemoglobin molecule (Wood, 1988). Despite of pesticide action, the fishes had tried to overcome the suffocation during the moment of gills choking due to clogging of mucus. But could not recover higher oxygen tension. So, oxygen tension due to more decrease of haemoglobin consequences the mortality of the studied fishes (Banik & Chakraborty, 1995a).

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