Attenuating properties of naloxone on enzymological parameters against exposed to atrazine herbicides in the fresh water fish *Cyprinus carpio* (Linn)

K. Sasikala¹, G.M.D. Hussain Us Zaman²

¹ Department of Zoology, Manonmaniam Sundaranar University, Tirunelveli.
²Department of Biotechnology, Islamiah College, Vaaniyampadi, Tamil Nadu, India

Correspondence to: Dr. G.M.D. Hussain Us Zaman, Professor, Department of Biotechnology, Islamiah College, Vaaniyambadi-2, Thiruvaluvar University.

Abstract

The protective effect of *Naloxone* against atrazine toxicity stress and enzymological parameters was evaluated in fresh water fish *Cyprinus carpio* (Linn). Exposure to atrazine along with Naloxone for 120 hours by an acute toxic dose 0.5 mg/L showed variation in the haematological parameters. Naloxone treatment showed marked elevation in the haematocrit and the recovery was noticed. Atrazine induced enzymological change were also minimized with the treated atrazine along with Naloxone. The observed level of SOD CAT GSHPx, and LPO, is increased (group II), when compared with control. Another group (III) of fish treated with atrazine in 120 hours, after that fish was exposed to dry Naloxone pellet (2 gram). The group IV fish was exposed to Naloxone alone for 5 day. After the treatment, fish was dissected out the organs like, gill, liver and kidney were analyzed enzymological parameters like Catalase (CAT) Superoxide dismutase (SOD), Lipid peroxidation (TBARS) level. Antioxidant enzymes are biomarkers used to indicating the atrazine toxicity. The SOD, CAT and LPO are increased during the atrazine exposure period (P<0.05). In the group III, atrazine along with Naloxone exposure the antioxidant enzymes was recovered (P<0.05). The present study was undertaken to test the effect of atrazine on *Cyprinus carpio* fish and chelating property of Naloxone. These results suggest the Naloxone algae might play a role in reducing the toxic effect of atrazine and Sits enzymological effects seem to mediate such a protective effect.

Key words: Naloxone, atrazine, enzymological parameters, *Cyprinus carpio*.

1. INTRODUCTION

Pesticides are one of the most effective weapons discovered by man to protect agricultural products from the pests. But, the extensive use of pesticides pose a constant threat to the aquatic life by altering the habitat, behaviour pattern, growth and reproductive potential [2]. Atrazine (2-Chloro-4-ethylamino-6-isopropylamino-s-triazine) is one of the most widely used herbicides which control the weeds and grasses in corn, sorghum, sugarcane and crops. [2] reported that atrazine could alter ion levels and Na⁺, K⁺, ATPase activity in gill of Atlantic salmon (Salmo salar), which cause disturbance of osmoregulation. Atrazine increases chromosomal abnormalities in lymphocytes of farm workers exposed to atrazine[10] suggested that many chlorinated pesticides including atrazine, trigger breast cancer development by effecting the metabolism. Estradiol is metabolized 16-alpha-hydroxysterone (C₁₆), which strongly activates the estrogens receptor, prompting breast cell proliferation, and 2-hydroxysterone which weakly interacts with the estrogens receptor without triggering the growth-promoting genes. Herbicides induce hepatotoxicity which is a major site detoxification components. To prevent oxidation induced damage which are effective antioxidant systems in organisms. Some components of these systems are certain antioxidant enzymes including free radicals scavenging enzymes, such as Lipid peroxidation, superoxide dismutase (SOD) and Catalase. [11] studied the effect of dichlorvos on antioxidant enzymes and other oxidative and red ox parameters of carp (*Cyprinus Carpio*) and Cat fish (*Trachurus nebulosus*). Naloxone is a cycobacterium classified as blue green algae. It has been used as a food [3] because of its quantity of proteins, vitamins, essential amino acids, minerals and essential fatty acids [3]. It has been reported it some reviews that Naloxone have several pharmacological activities. [1] reported that Naloxone have antioxidant properties, especially some phytochemical proteins such as Cphylloeoycin (CP) and allpohyoeycin [18]. Hence, an attempt has been made to investigate the impact of atrazine on antioxidant enzyme activities and chelating properties of Naloxone in the freshwater fish *Cyprinus carpio*.

2. MATERIALS AND METHOD

The freshwater fish *Cyprinus carpio* were obtained from Navarathna fish farm from Punalur village and introduced into large cement tank (1x3) disinfected with potassium permanganate and washed thoroughly prior to introduction of fish (to prevent the fungal infection). Fish were acclimatized for about 15 days before the commencement of the experiment. They were fed on commercial fish feed which given daily at morning hours. LC₅₀ of atrazine was calculated by the log - dose / Profit regression line. The test fishes were classified into four groups whereas Group I control, Group II atrazine, Group III Atrazine + Naloxone, Group IV Naloxone alone. Each group
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