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BIOEFFICIENCY OF EXTRACT FROM CAPSICUM ANNUM ON LIPID CONTENT IN VARIOUS TISSUES OF FRESH WATER BIVALVES, LAMELLIDENS CORRIANUS AFTER ARSENIC INTOXICATION

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ABSTRACT:
Investigate the bioefficency of extract from Capsicum annum on lipid content in tissues of gills and digestive glands of fresh water bivalves, Lamellidens corrianus after heavy metal (As2O3) intoxication.The bioefficency is studied on bivalves were studied under five groups. Group A bivalves was maintained as control, B group bivalves were exposed to chronic dose (LC50/10) of arsenic trioxide (2.120ppm) and Group C bivalves were exposed to respective chronic concentration of As2O3 along with extract of capssicum annum (5mg/l) upto 12 days. Lipid contents in selected tissues from each group were estimated after 6 and 12 days. Bivalves from group B were divided for recovery into two groups such as group D and E after 12 day exposure to arsenic. D group bivalves was allowed to cure naturally in normal water while E group bivalves was exposed to extract of capsicum annum (5mg/l) up to the 12 days. From each of recovery groups, gills and digestive glands of bivalves were removed and lipid contents were estimated after 6 and 12 days. The lipid level was significantly decreased on exposure to arsenic while the decrease in presence of extract was less when exposed simultaneously than when exposed individually. During recovery lipid contents recovered and the rate of recovery was faster in extract exposed bivalves as compared to those recovered in normal water.The bioefficency of extract of C.annum is discussed in the paper.

Keywords:- Lipid content,arsenic trioxide, Lamellidens corrianus and capsicum annum.

INTRODUCTION :

Arsenic (As), an environmental pollutant, is extremely toxic to living organisms at high concentrations. The occurrence of As in aquatic systems is of great concern due to its high bioavailability, bioaccumulation, and trophic transfer from the bases of aquatic food chains through to higher trophic levels (Rahman,2012).Exposure to toxic compounds has not only lethal but also important sublethal effects upon affected individuals. Successful identification of molecular mechanisms underlying response to toxic exposure depends upon development and use of a suitable set of assays, and several approaches are potentially available. While various biomarkers (Damiens et al,2004 and Milanet et al,2013) However, investigations of sublethal effects of As on bivalves have generally focused on As(III). Exposures of bivalves to As(III) have demonstrated histological effects including increased damage to digestive gland tissue(Chakraborty et al,2013) and biochemical effects including alteration of levels of adenosine triphosphate and (Wu et al,2013).Some of the biochemical responses, which indicated specific relation and other pathological effects, and therefore can provide information on the mode of toxicity (Thomas et al.1987).

Capsicum is the genus of plants from the solanaceae family the common peeper name is chilli or peeper. Now a day's chilli is an important vegetables crops and used world-widely as for flavour, aroma and add colour to foods (Zhuang, et al., 2012). Scientific research has proven that, capsicum annum, is the only crop that produce alkaloid compound called capsaicinoids, which is responsible for the hot

test. Capsaicinoids are alkaloids that are important in the pharmaceutical industry for their neurological effectiveness (Hayman & Kam, 2008). In peppers, there are phytochemical property that have many biochemical and pharmacological properties which includes antioxidants, anti-inflammatory, antiallergenic and anti-carcinogenic activities (Lee et al., 2005).

Lipids, being energy reserves and raw materials for membrane system of the cells, play a very vital role in pysiological activities of the orgnisms. Membrance structure and function point towards the complex role of lipid in environmental adaptation. Shigmastus and The cadmium chloride and summer induced changes in the biochemical composition of the freshwater bivalve L. Marginalis (Kulkarni,1993 and Patil ,1993). In the aim of present work is the study of bioefficency of extract from Capssicum annum on lipid content on various tissues of Lamellidens corrianus after arsenic intoxication.

MATERIAL AND METHODS :

Attempts will be made in this study bioefficiency of extract of Capsicum annum on lipid content in gills and digestive glands of fresh water bivalves, lamellidens corrianus.The bivalves were collected from Hartala dam ,jalgaon districtct (M.S). First they were made acclimatized to laboratory condition for 2-3 days . The water in the aquarium was changed regularly after every 24 hours. After the acclimatization, The healthy active bivalves of approximately medium size and weight were chosen.

Preparation of aqueous extract of Coriandrum sativum

The plant Capsicum annum L (1 kg) was collected from a local market in Bhusawal (M.S.), India. The dried green chillis were ground to a fine powder and were extracted with boiling water (5 L) for 30 min by Soxhlet technique. The filtrate was evaporated at < 70 0C in a vacuum dryer to give a final yield of 128.69 g. was stored at 4 0C. It was dissolved in distilled water whenever needed for experiments.

Treatment of heavy metal salt

These bivalves were divided into three groups, such as group A,B and C . The bivalves of group A were maintained as control. The snail's from group B were exposed to chronic concentration (LC 50 value of 96 hr/10) of heavy metal Arsenic trioxide (2.120ppm) and the bivalves from group C were exposed to chronic concentration (LC 50 value of 96 hr/10) of heavy metal, As2O3(2.120ppm) along with 5ml/lit. Extract of Capsicun annum upto 12 days. After 12 days bivalves expose to As2O3,bivalves from group B divided into two groups viz D and E. The group D group of bivalves released in normal water and E groups of bivalves exposed to 5ml/lit.extract of Capsicum annum up to12 days.During experimentation bivalves were fed on fresh water algae. The gills and digestive glands of all group's were collected after every 6 days and tissues of gills and digestive glands were dried in oven at 75 0C to 80 0C till constant weight was obtained and blended into dry powder. The total lipids from the tissues were esstimated by vanilline reagent method as given by Barnes and Blackstock (1973) using Cholesterol as standard.All values are the averages of three repeats and are expressed as percentage of dry weight.

RESULTS AND OBSERVATIONS :

Bioefficency of extract of Capsicum annum on lipid content in various tissues in bivalves, L.corrianus studied from control and experimental groups are presented in respective tables. Thus from the above investigation the results obtained indicates that there was severe alteration in the lipid metabolism in the fresh water bivalves, L.corrianus after exposure to arsenic trioxide. In the present study, significant decrease in the lipid content was observed in

the gills and digestive glands of experimental bivalves as compared to those of the control bivalves. There was increase in the lipid content in heavy metal with extract exposed bivalves as compared to those exposed to only arsenic trioxide.

The bivalves show fast recovery in gills and digestive glands lipid level in presence of extract of C.annum than those allowed to cure naturally. When the bivalves exposed for 12 days to arsenic was allowed to recover, lipid recovery was at a very slow rate in naturally curing bivalves in normal water as compared to those allowed to cure with extract of C.annum. Lipid contents recovered faster in all tissues in extract as compared to normal water.

DISCUSSION :

The effect of heavy metals on the alterations in the biochemical substances of the body is profusely studied by many investigators in bivalves. The lipid alterations in various animals after exposure to toxicants were studied by (Caley and Jenson, 1973; Coopage et.al; 1975; Bhagyalakshmi, 1981; Patil 1986; and Chaudhary 1988; Zambare 1991).

The change in biochemical composition of an organ due to heavy metal stress indicates the change in activity of an organism . It reflects light on the utilisation of their biochemical energy to counteract the toxic stress. Heavy metal salts affect the metabolism of the fresh water bivalves,Lamellidens corrianus. Alterations in metabolic pocesses, following exposure to heavy metal stress have been always used as an indicator of stress. But there is a vast difference in the pattern & metal induced physiological alterations from metal to metal & animal to animal.Foods or food materials are an important source of antioxidant compounds for human consumption.

Natural antioxidants present in the diet increase the resistance to oxidative damage. Fruits and vegetables are immensely valuable not only for their nutritional value but also for their potential health functionality against various degenerative diseases (Deepa et al,2007 and Dimitrios et al,2004) .On the other hand, many other studies have shown that heating process has both negative and positive effects on total phenolic content of plant materials including fruits and vegetables, depending on the type of raw materials and the groups of compounds present (Odriozola-Serrano et al, 2007) .Banerjee(2005) reported that the phenolics of green pepper (Piper nigrum L.) has higher DPPH radical scavenging capacity than the acetone extract of nutmeg mace (Myristica fragrans).The substances such as capsaicin and sulfur compounds may also be associated with the antioxidant properties of chilli and garlic (Kogure et al,2002)

The extract of capsicum annum has antioxidant properties,because it contains carotenoids, phenolic contents,therefore extract has ability to realeased of heavy metal ions. Dissolved heavy metal ions are positively charged and caffeine contains uncharged and negatively charged molecules. Metal ions might bind to negatively charged groups. This reduces the charged active heavy metal ions which indicates that C.annum extract have capacity to remove the heavy metal from the living organism. Lipids are also one of the most important energy reservoirs and these are stored and transported in the form of di and tri glycerol's and esters.

CONCLUSSION :

In conclusion the current study suggests that aqueous extracts of Capsicum annum can prevent or slow down the oxidative damage induced by Arsenic trioxide in Lamellidens corrianus. The effect of arsenic on lipid content is variables were decrease by treatment with chillies extracts. Rate of recovery was better in extract of C.annum than in normal water recovery. This is indicates to that, The

Capsicum annum extract posses antioxident activity.

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Table: Lipid content in gills and digestive glands of *Lamelidens corrianus* after chronic exposure of heavy metal, As_2O_3 with and without extract.

Treatment	Sr No.	Body Tissue	The Lipid Content (%) ± S.D.	
			6 Days	12 Days
(A) Control	i	G	9.45 ±0.036	9.69±0.023
	ii	D.G	16.60 ±0.045	16.96±0.37
(B) As_2O_3(2.120ppm)	i	G	6.36 ± 0.037, -32.69 •	4.31 ± 0.046 -55.52 •
	ii	D.G	12.34 ± 0.080, -25.66 •	10.23 ± 0.074 -39.68 •
(C) As_2O_3(2.120ppm)+ 5ml/lit Extract	i	G	7.43 ± 0.029, -21.37 •, +16.82 Δ	5.68 ± 0.036, -41.38 •, +31.78 Δ
	ii	D.G	13.31 ± 0.024, -19.81 •, +7.86 Δ	11.25 ± 0.015 , -33.66 •, +9.90 Δ

D.G- Digestive gland, G-Gills , • -Compared with respective A/Δ-Compared with respective B

B) After 12 days exposure to bivalves in As_2O_3 2.120ppm concentration allowede for cure naturally and with extract up to 24 days

Treatment	Sr No.	Body Tissue	The Lipid Content (%) ± S.D.	
			18 Days	24 Days
(D) Noral water	i	G	4.98 ± 0.006 15.54 •	5.24 ± 0.003 , 21.57 •
	ii	D.G	10.89 ± 0.005, 6.45 •	11.63 ± 0.004 , 13.68 •
(E) Normal water + 5ml/lit Extract	i	G	5.23 ± 0.004, 21.34 •, +5.02 Δ	6.57 ± 0.003, 32.43 •, +25.38 Δ
	ii	D.G	11.45 ± 0.002, 11.92 •, +5.14 Δ	12.43 ± 0.004 , 21.50 •, +6.87 Δ

D.G- Digestive gland, G-Gills , • -Compared with respective 12 days of B/Δ-Compared with respective D