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HEPATOPROTECTIVE EFFECT OF *ASPARAGUS RACEMOSUS* ON LIVER FUNCTION TEST OF RAT

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Abstract

Pesticide was used for increased agriculture productivity in last few decay due to meet increase demand of food. Chloropyrifos are widely used on these crops for their protection from insects. Chlorpyrifos is moderately toxic to animals and humans and it has been linked to developmental disorders and neurological effects. *Asparagus racemosus* is a used for prevent ageing, increase longevity, impart immunity, improve mental function, nervous disorders, dyspepsia, tumors, inflammation, neuropathy and hepatopathy. Thus the present study is designed to find hepatoprotective effect of *Asparagus racemosus* on liver function test of rats. The 'treatment' groups received chloropyrifos 10 mg/kg b.w by gavage method for four weeks for preparation of infertility model. *Asparagus racemosus* (400 mg/kg/b. w/day) administered to chloropyrifos exposed group for two, four and eight weeks. Serum was collected for liver function test study like SGPT, SGOT, Alkaline phosphate and Billirubin. SGPT, SGOT, Alkaline phosphate and Billirubin were increased more than 6 folds in chloropyrifos administered group. While *Asparagus racemosus* shows effective restoration in SGPT, SGOT, Alkaline phosphate and Billirubin after eight weeks of administration. It is

concluded from study that *Asparagus racemosus* causes effective restoration in SGPT, SGOT, Alkaline phosphate and Billirubin of rats. *Asparagus racemosus* has very potent hepatoprotective effect against pesticide induced hepatic toxicity.

Key Word: Hepatotoxicity, billirubin, dyspepsia, SGOT, SGPT

1. INTRODUCTION

Pesticide was used for increased agriculture productivity in last few decay due to meet increase demand of food. Chloropyrifos are widely used on these crops for their protection from insects. Crops were destroyed by rodents and insects in field. Pesticides are widely used for crop protection and preservation. These pesticides were entered and accumulated into humen being leading to deleterious effect on health[1].

Organochlorine pesticides like BPA, endosulfan, DDT are persistent organic pollutants (POPs) which are being implicated for many health hazards including cancer [2], increased incidence of infertility [3, 4], very lowered impotency, breast fibroids formation, early menopause, endometriosis and osteoporosis in females and azoospermia or oligospermia, testicular cancer, gynecomastia, sterility and prostatic problems in males [5, 6]. Chlorpyrifos is a broad spectrum organophosphate insecticide used for wide range of crops. Chlorpyrifos is moderately toxic to humans and chronic exposure has been linked to neurological effects and developmental disorders. Presence of organophosphorus pesticides in blood and breast milk of mothers has negative effects on newborns including mutagenic and neurotoxic disorders.[7, 8]

In Indian system of medicine *Asparagus racemosus* is an important medicinal plant and its root paste or root juice has been used in various ailments and as health tonic [9, 10]. *Asparagus racemosus* is a used for prevent ageing, increase longevity, impart immunity, improve mental

function, nervous disorders, dyspepsia, tumors, inflammation, neuropathy and hepatopathy. Literature review showed that root extract of *Asparagus racemosus* has antiulcer activity [11], antioxidant, anti-diarrhoeal, anti-diabetic and immune-modulatory activities [12, 13]. Thus the present study is designed to find hepatoprotective effect of *Asparagus racemosus* on liver function test of rats.

2. MATERIAL AND METHODS

2.1: Animals: The rat (*Charls foster*) were bring up in animal house. The age group of rat were selected for the study was 12 weeks old with 30±2 gm body weight (b.w). The rats were housed at controlled environmental conditions 20±2ºC, relative humidity 50±10%, and 12h dark-light cycle. All experimental were conducted as per the guidelines of CPCSEA (Committee for the Purpose of Control and Supervision of Experiments on Animals).

2.2: Chemicals: Chloropyrifos, manufactured by Durshan chem Pvt. Ltd., Mumbai was utilized for the experimental design. Chloropyrifos were administered at the rate of 10 mg/kg. b.w. intraperitoneally for induction of diabetes.

2.3: Medicinal plant used: Root extract of *Asparagus racemosus* was orally administered to chloropyrifos administered group of rat at the rate of 800 mg/kg b.w for 8 weeks. Fresh root of *Asparagus racemosus was* purchased from herbal store in Patna, India.

2.4: Study groups & sampling: The control group of six rats received distilled water orally. The 'treatment' groups (n=6) received chloropyrifos 10 mg/kg b.w by gavage method for four weeks for preparation of infertility model. *Asparagus racemosus* (400 mg/kg/b. w/day) administered to chloropyrifos exposed group orally through Gavage method. Rats were sacrificed after the scheduled treatment. Serum was collected for SGPT, SGOT, ALP and billirubin estimation.

3. OBSERVATION

SGPT level in control group was 17.00 ± 1.15 U/ml, while after 4 weeks administration of chloropyrifos it was 126.7 ± 4.05 U/ml. In chloroprifos 4 weeks followed by administration of *Asparagus racemosus* 2 weeks, 4 weeks and 8 weeks it was 84.67 ± 5.92 U/ml, 65.33 ± 6.36 U/ml and 34.00 ± 3.46 U/ml respectively (Graph - 1)

SGOT level in control group was 22.33 ± 2.96 U/ml, while after 4 weeks administration of chloropyrifos it was 142.0 ± 7.23 U/ml. In chloroprifos 4 weeks followed by administration of *Asparagus racemosus* 2 weeks, 4 weeks and 8 weeks it was 101.7 ± 6.17 U/ml, 78.00 ± 4.61 U/ml and 38.00 ± 4.35 U/ml respectively (Graph - 2)

Alkaline Phosphatase level in control group was 7.333 ± 1.45 KA/Unit, while after 4 weeks administration of chloropyrifos it was 28.00 ± 3.46 KA/Unit. In chloroprifos 4 weeks followed by administration of *Asparagus racemosus* 2 weeks, 4 weeks and 8 weeks it was 19.33 ± 1.45 KA/Unit, 12.33 ± 1.45 KA/Unit and 10.00 ± 1.15 KA/Unit respectively (Graph - 3)

Billirubin level in control group was 0.700 ± 0.11mg/dl, while after 4 weeks administration of chloropyrifos it was 6.867 ± 0.20 mg/dl. In chloroprifos 4 weeks followed by administration of *Asparagus racemosus* 2 weeks, 4 weeks and 8 weeks it was 2.333 ± 0.17 mg/dl, 1.333 ± 0.14 mg/dl and 0.966 ± 0.06 mg/dl respectively (Graph - 4)

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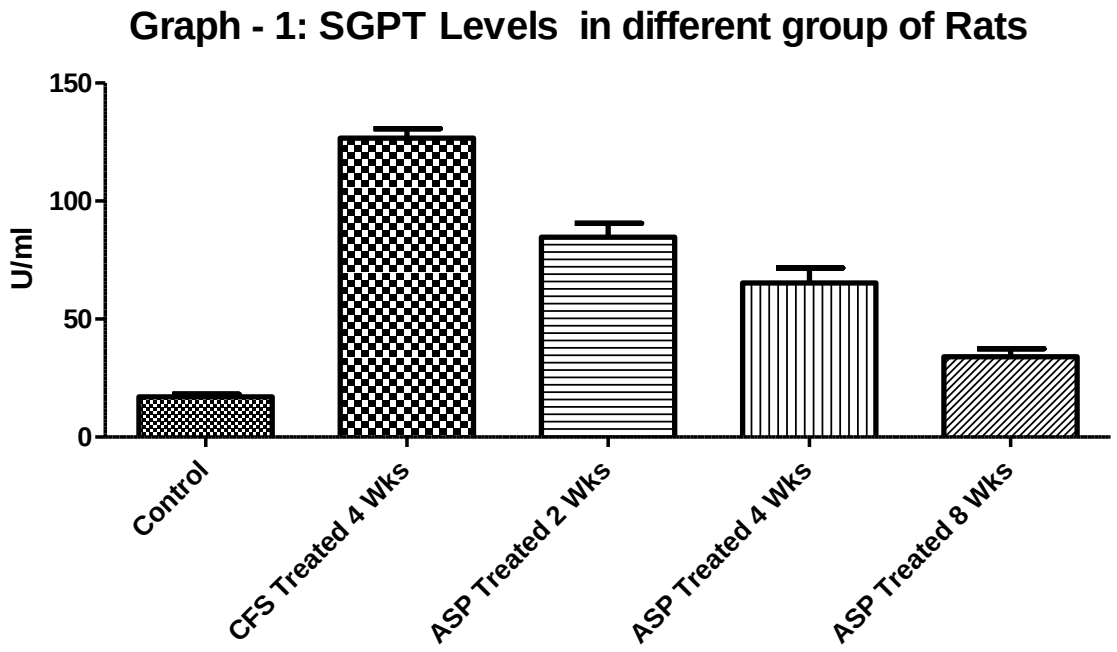
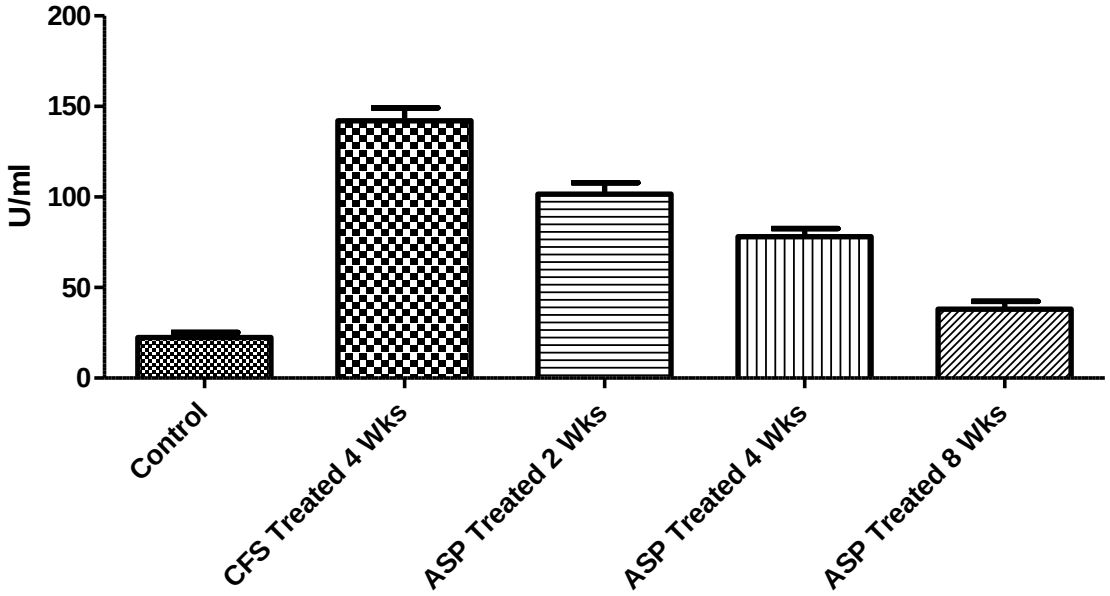
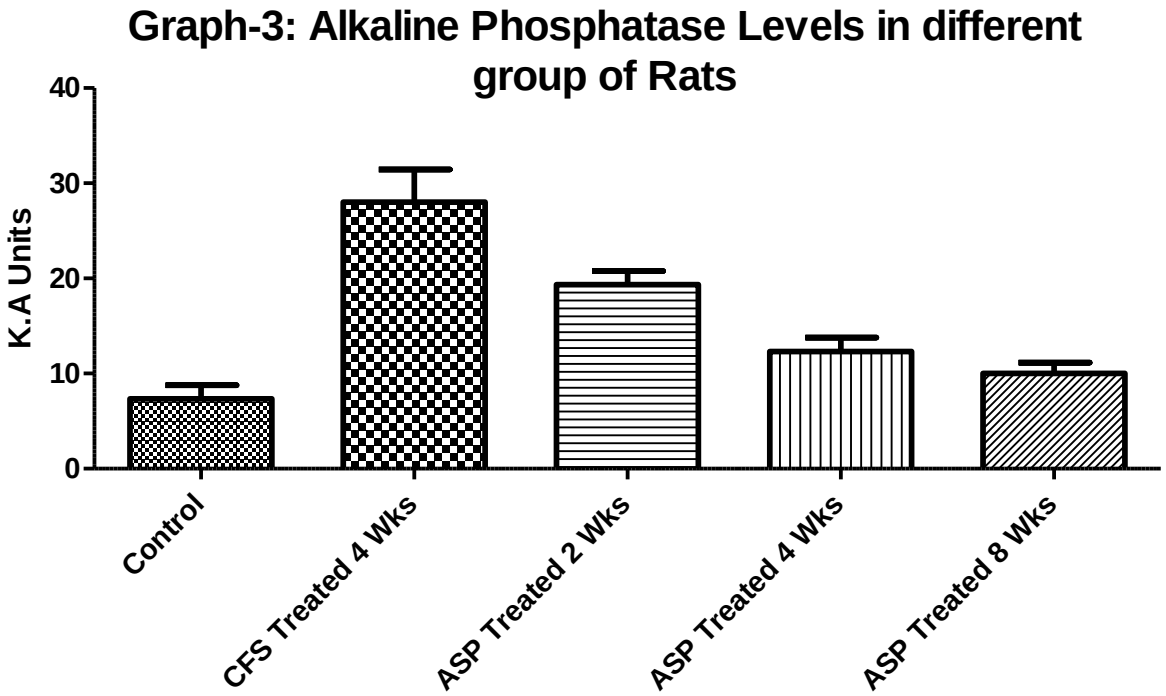
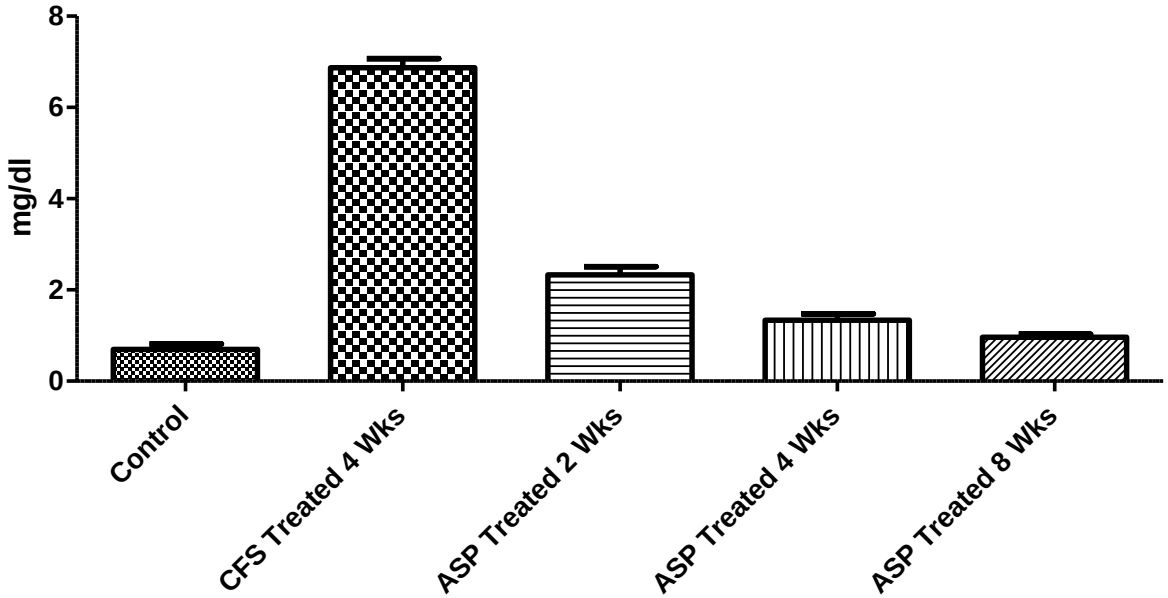


Graph-2: SGOT LEVELS in different group of Rats




Graph-3: Alkaline Phosphatase Levels in different group of Rats
K.A Units
40
30
20
10
0
Control
CFS Treated 4 Wks
ASP Treated 2 Wks
ASP Treated 4 Wks
ASP Treated 8 Wks

Graph-4: Bilirubin Levels in different group of Rats



4. DISCUSSION

Chloropyrifos induces of oxidative stress and increases hepatotoxicity [14]. Recent studies have demonstrated significant associations between maternal and paternal exposures to chloropyrifos and associated testicular damages. The chloropyrifos causes marked reduction in LFT of males rats exposed to chloropyrifos. Further, histopathological examinations of liver showed mild to severe degenerative changes in hepatic cells at various dose levels of chloropyrifos [15]. In our study we have also observed six fold increase in SGPT and SGOT in chloropyrifos exposed group. While ALP and billirubin are increased eight folds in chloropyrifos administered group.

Crude extract aqueous fraction of *Aspergilus racemosus* have shown effective restoration in antioxidant enzymes [16]. The antioxidant activity was tested in rat liver cell mitochondrial membrane damage induced by generated free radicals. The lipid peroxidation level was observed highly restored in aspergillus administered group[17]. In our study we have also observed effective restoration in SGPT and SGOT level in *Aspergilus* administered group.

The crude and purified extracts indicated protection against radiation induced loss of protein thiols and inactivation of superoxide dismutase [18]. A similar study indicated that an increase in the antioxidant defence owing to the significant increase in the enzymes superoxide dismutase, catalase, and ascorbic acid and significant decrease in lipid peroxidation upon treatment with A.racemosus root extract. Anti-oxidant study was carried out on the basis of scavenging activity of the stable DPPH (1, 1diphenyl-2-picrylhydrazyl) free radical. The antioxidant property observed was due to their redox property of the phenolic compounds present in the ethanolic root extract [19]. We also observed restoration in alkaline phosphate and billirubin in *A. racemosus* administered group in our study. Antioxidants are intimately involved in the prevention of cellular damage - the common pathway for cancer, aging, and a variety of diseases. *Asparagus racemosus* possess antioxidant properties.

Methanolic extract (100mg/kg BW p. o.) given to orally for 15 days and it increase the antioxidant defense, that is, enzymes superoxidase dimutase, catalase and ascorbic acid, increase significantly whereas a significantly decrease in lipid peroxidation. The mice treated with *Asparagus racemosus* extract showed an enhancement in GPx activity and GSH content, and reduction in membranal lipid peroxidation and protein carbonyl. From the study it was concluded that the plant extract plays the role in reducing hepatotoxicity and also reduces oxidative damage [20]. In our study we observed that Aspergilus causes marked restoration in liver function test of rats

5. CONCLUSIONS

It is concluded from study that *Asparagus racemosus* causes effective hepatoprotection through restoration of SGPT, SGOT, ALP and billirubin very effectively. It may be used as antidote against pesticide induced hepatotoxicity. It was evident from study that it protect liver very effectively after eight weeks of administration.

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