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Effect of short term mercury exposure on antioxidant enzymes and lipid peroxidation in different organs of rat

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Abstract

Male rats were treated orally with 0.0, 0.8, 8.0 and 80.0 mg/kg mercuric chloride (MC) twice per week for three weeks to evaluate the effect on lipid peroxidation (LPO), and on the activities of antioxidative enzymes (such as superoxide dismutase (SOD), glutathione peroxidase (GPx), glutathione reductase (GR), glutathione (GSH) in the brain, liver, kidney, testis and epididymus. The high dose caused high mortality (50%) and hence excluded from the study. In liver and brain, LPO, SOD, GPx, GR levels were significantly increased; in kidney LPO level increased and SOD, GPx, GR levels decreased at low and mid doses compared to their controls. However, the levels of LPO, SOD, GPx, GR in testis, epididymis; GSH content in all the tissues; body weight gain and feed efficiency of the rats were unaffected. Thus, mercury brought tissue-specific effects and kidney was found to be more susceptible. It is concluded that mercury could produce oxidative stress via lipid peroxidation and that increased antioxidant enzyme levels of brain and liver enhanced their potential to inhibit lipid peroxidation. The level of LPO increased and antioxidant activities decreased in kidney and hence this organ was more vulnerable to the oxidative stress.

Key Words: Mercury, antioxidant enzymes, rat, lipid peroxidation

Vol. 11, No. 1, 2004 pp 9-13

Role of sodium in oxidative stress induced by Monosodium Glutamate in adult male mice

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Abstract

Monosodium glutamate at dose level of 4 mg and 8 mg per gram body weight and sodium at dose level of 0.49 mg and 0.98 mg per gram body weight (equivalent to that present in MSG) were administered subcutaneously to adult male mice for six consecutive days and their effect was observed on glutathione and its metabolizing enzymes, namely glutathione reductase, glutathione peroxidase and glutathione-S-transferase. MSG treated animals showed significant increase in lipid peroxidation, glucose, ascorbic acid and a decrease in the glutathione content in the hepatocytes while sodium exerted little effect on these parameters. The administration

of sodium had no effect on glutathione metabolizing enzymes whereas MSG caused significant increase in the glutathione metabolizing enzymes. So, the oxidative stress and hyperglycemia observed after the administration of MSG at dose level of 4 mg and 8 mg per gram body weight seem to be due to metabolic products of MSG, and not due to sodium.

Keywords : Monosodium L-glutamate (MSG), sodium (Na), glutathione reductase (GSSG-R), glutathione peroxidase (GSH-Px), glutathione-S-transferase (GST), glutathione (GSH).

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Effects of *Cheilanthes farinosa*, *Onychium contiguum* and their combined effects on tissue enzymes in laboratory rats

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Abstract

Tissue enzymes were estimated in *Onychium contiguum*, *Cheilanthes farinosa* and their mixture fern fed rats. Significant decrease in lipid peroxidation in ileum of *Cheilanthes* fed group and kidneys of *Onychium*-fed group on 90 days post feeding (DPF) and increase in kidneys of *Cheilanthes* and Mixture groups and liver of *Onychium* fed group on prolonged feeding was observed. Significant decrease in acetyl-cholinesterase in fern fed groups was observed, which is tissue and fern specific. Significant decrease in protease activity in ileum of mixture-fed group and increase in ileum and liver of *Onychium* and mixture fed group on prolonged feeding was observed. Antitrypsin was significantly increased in ileum of *Cheilanthes* and *Onychium* fern fed groups and significantly decreased in kidneys of mixture-fed group at 90 and 180 DPF. Significant increase in liver arginase was observed in *Onychium* and *Cheilanthes* fern-fed groups on prolonged feeding. Results on protease and antitrypsin activity indicate that target organ of *Onychium* toxicity may be ileum.

Key words: *Onychium*, *Cheilanthes*, toxicity, biochemistry, rats.

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Thermostability of organochlorine pesticides in chevon

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Abstract

In present study the effect of cooking i.e. boiling and pressure cooking on levels of organochlorine insecticide residues in chevon (goat meat) was studied and almost similar pattern of reduction of residue levels was observed by both methods of cooking. On boiling, residue levels of various HCH isomers viz., α -, β -, γ - and δ -HCH decreased by 25.0, 14.0, 22.0, and 11.5 per cent, respectively, while on pressure cooking residue levels

decreased by 30.0, 23.0, 23.0 and 15.0 per cent, respectively. Residue levels of DDT metabolites viz., o,p' DDE, p,p' DDE and p,p' DDT decreased by 11.0, 8.0 and 60.0 per cent, respectively, on boiling while on pressure cooking residue levels of o,p' DDE, p,p' DDE and p,p' DDT decreased by 10.0, 12.0 and 62.0 per cent, respectively, with concomitant increase in the levels of p,p' DDD by 70.0 and 71.1 per cent on boiling and pressure cooking. Residues of cyclodiene group of insecticides viz., dieldrin, endosulfan and heptachlor were decreased by 17.0, 57.0 and 15.2 per cent on boiling and 21.0, 60.1 and 17.1 per cent on pressure cooking.

Key words: Organochlorine insecticides, chevon, boiling, pressure cooking, cooking effects, residues

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Hepatobiochemical response in albino rat following oral administration of cybil and hafen

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Abstract

The LD₅₀ of cybil and hafen calculated by probit analysis has been observed to be 618.8 and 1532.5 mg/kg body weight, respectively. The sublethal doses selected for acute and subacute intoxication of pyrethroids (*vide supra*) have been responsible for alteration in the glycogen, cholesterol, total lipids and free fatty acid contents of the hepatocytes. The fall in glycogen level has been attributed to be increased glycolysis and adrenal activity, whereas elevation in the cholesterol, total lipid and free fatty acid have been assessed to be due to decreased oxidation of fat, which inturn, gets accumulated in the hepatocytes. However, maximum alterations have been observed after cybil intoxication, such alterations have been correlated with their chemical structure.

Key words : Cybil, hafen, albino rat, cholesterol, free fatty acid, glycogen, total lipid.

Vol. 11, No. 1, 2004 pp 27-31

Biological activity of azadirachtin on certain reproductive aspects of female moth of *Bombyx mori* L.

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Abstract

In the current investigation the foliar spray of a biocide azadirachtin on mulberry leaves which has been fed on the silkworm *Bombyx mori* yielded substantial information regarding the reproductive potential of ovary. The mulberry plants were exposed to azadirachtin treatment with two different time intervals viz., 48 hrs and 13 days. The ovary of silkworm moth *Bombyx mori* before mating was subjected for the analysis of biochemical,

nucleic acids and enzymatic profiles. The results of the biochemical, nucleic acids and enzymatic activities of the ovary reveal that the impact of azadirachtin varies according to the duration and concentration. In a dose-and-stage dependent manner, azadirachtin interfered with specific activities of ovarian development. The observed results were statistically analyzed and discussed with relevant literature.

Keywords : *Bombyx mori* L. azadirachtin, nucleic acids, enzymes.

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Effect of aflatoxin B₁ on phosphorus, alkaline phosphatase and some haematological parameters in white leghorn breeders (*Gallus gallus domesticus*)

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Abstract

Aflatoxin B₁ toxicity was evaluated by assessing phosphorus, alkaline phosphatase and some haematological parameters in 24 breeders (females) which were 48 weeks old, by incorporating aflatoxin B₁ at 1 ppm level into the feed, and fed them for 42 days. The results revealed a gradual decrease in serum phosphorus, haemoglobin (Hb) and erythrocyte content during third week compared to the control group. There was a gradual increase in serum alkaline phosphatase activity and leucocyte count. A significant decrease in packed cell volume of experimental birds ($P \leq 0.01$) was observed only after fourth week. Erythrocyte count was increased after the withdrawal of aflatoxin from feed whereas leucocyte count was significantly decreased.

Keywords : Aflatoxin B₁, white leghorn breeders, serum phosphorus, serum alkaline phosphatase.

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Studies on calcined arsenic preparations used in indian system of medicines for effects on anxiety and depression

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Abstract

Environmental and toxicological aspects of heavy metals are well documented. In Unani-Tibb (Greco-Arab system of medicine), calcined forms of these metals are, however, used for therapeutic effects. It is claimed that repeated calcination and trituration and incorporation of herbal juices detoxifies the metal making it safe for medicinal use. The therapeutic claims of Unani arsenic preparations in various neurological disorders have not been looked into. These two arsenic preparations KS-A and KS-Q exhibited anxiolytic effects as evidenced by increase in punished drinking episodes in anxiometer test, more time spent in open arm of elevated plus maze

and significant reduction in isolation induced behavioural deficit in mice. These findings are very interesting of a toxic metal like arsenic.

Key words : Arsenic, Unani-Tibb, calcination, trituration, anxiometer test

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Comparative sensitivities of *in vitro* acetylcholinesterase inhibition by novel organophosphorus compounds in broiler chicken

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Abstract

In the present investigation, *in vitro* effect of RPR-II and RPR-V, two novel phosphorothionates were compared with monocrotophos (MCP) in RBCs, brain and liver of broiler chicken (*Gallus gallus*) with special reference to acetylcholinesterase (AChE). The purpose of the study was to quantify "*in vitro*" by means of the 50 percent inhibition (IC_{50}) using novel organophosphorus compounds as inhibitors. Cholinesterase activities with acetylthiocholine iodide as substrate in different tissues of chicken were measured photometrically in the presence of different concentrations of pesticides. As the concentration of the pesticides increased, the inhibition was also induced in a linear pattern. The IC_{50} observed for RBC AChE was 1.92 mM by MCP, whereas the inhibition was greater than 20 mM in case of RPR-II and RPR-V. In case of brain AChE, the IC_{50} obtained was 1.21, 5.76 and 0.97 mM for RPR-II, RPR-V and MCP, respectively. Similarly, with regard to liver AChE the IC_{50} observed were 7.69, 8.63 and 0.18 mM for RPR-II, RPR-V and MCP, respectively. Besides, MCP was found to be 48 times more potent inhibitor than RPR-V. The kinetic constants (V_{max} and K_m) showed a decrease with all the three compounds in RBCs, brain and liver of chicken, indicating non-competitive inhibition. The current study suggests that RPR-II and RPR-V having P=S moiety in their structure are less neurotoxic than MCP, which has a P=O moiety in its structure. From the present study, it can be concluded that the *in vitro* AChE assay is a sensitive assay and can be used as biochemical marker for the exposure of organophosphorus compounds.

Key Words: Organophosphorus compounds, *in vitro* acetylcholinesterase, chicken