ABSTRACT

There is a growing problem of worldwide contamination of the environment with mercury. Mercury poisoning can result by inhalation, ingestion, or absorption through the skin and may be highly toxic and corrosive once absorbed into blood stream. The fate and behaviour of mercury in the environment depends on whether it is organic or inorganic form. Inorganic mercury compounds enter by different ways and undergo a process of methylation. High exposure to inorganic mercury results in damage to gastrointestinal tract, nervous system, and kidneys. Symptoms of high exposure to inorganic mercury include skin rashes and dermatitis, mood swings, memory loss, mental disturbances and muscle weakness. Both inorganic and organic mercury compounds are absorbed through the gastrointestinal tract and affect other systems via this route. However, organic mercury compounds are more readily absorbed via ingestion than inorganic compound.

Methyl mercury accumulates in lower organisms, and is enriched along the food chain. Methyl and ethyl mercury compounds have been recognized as the cause of mercury poisoning and fatalities as a consequence of consuming contaminated foods. The toxicity signs and symptoms are non-specific at first, including paraesthesia's, malaise and blurred vision. These may develop later into visual field defects, deafness, dysarthria and ataxia followed by coma and death. Furthermore, mercury combines with proteins in the plasma or enters the red blood and other body organs but does not readily pass into the brain or foetus. The liver is a major site of metabolism for mercury and it can accumulate in the liver, resulting in severe hepatic damage. Studies have revealed that mercuric chloride caused histopathological and ultrastructural lesions in the liver evidenced by periportal fatty degeneration and cell necrosis. Advisories to reduce consumption of contaminated
fish have been issued by states since the early 1970s. Most women of child bearing age consume commercial fish and a substantial number also consume sport-caught fish containing mercury, linked to reproductive and developmental defects.

Plants are considered to be a promising source of medicine in the traditional health care system. They have stood the test of time for their safety, efficacy, cultural acceptability and lesser side effects. The chemical constituents present in them are responsible for the physiological functions of living flora and hence they are believed to have better compatibility with the human body. Keeping therefore in view, the growing interest of the use of herbal drugs, this study was undertaken with a view to evaluate the Protective effect of Root tuber of *Smilax china* against Mercuric Chloride intoxication.

The Root tuber of *Smilax china* was subjected to preliminary phytochemical analysis with various polarities of solvents such as Methanol, Ethanol, N-Hexane, Acetone which showed maximum yield of the extract and the activity present in the Methanol. The extract was subjected to HPTLC finger printing to exhibit its activity, followed by estimation of total alkaloid and phenolic content, DPPH Free radical Scavenging antioxidant activity to its pharmacological effects over the tissues.

The Male albino wistar rats (150-250gms) were used in this study, that was divided into phase I and Phase II. In Phase I, animals were divided into 5 groups each containing 12 animals Group I is control, Group II are the animals receiving Mercuric chloride 1mg/Kg/Bw, Group III are the animals receiving Mercuric chloride 0.5mg/Kg/Bw, Group IV are the animals receiving Mercuric chloride 1mg/Kg/Bw along with *Smilax china* 400mg/Kg/Bw and Group V are the animals receiving Mercuric chloride 0.5mg/Kg/Bw along with *Smilax china* 400mg/Kg/Bw for period of 30days. At the end of 30th day all
animals in Group I, IV and V are sacrificed, where as in Group II and Group III only 4 animals were sacrificed and the remaining 8 animals are taken into Phase II for the study.

The Phase II contains Group VI (Post treatment with *Smilax china* 400mg/Kg/Bw) and Group VII (Natural Recovery), both are from Group II of Phase I animals and Group VII (Post treatment with *Smilax china* 400mg/Kg/Bw) and Group IX (Natural Recovery), which is from Group III of Phase I animals.

Animals administered with Mercuric Chloride (Group II & III) showed marked decrease in the circulating blood testosterone levels and cortisol levels, which also showed marked decrease in the architecture of the spermatogonia in the seminiferous tubules. Animals treated along with *Smilax china* (Group IV & V) showed less marked changes, markedly less changes noted in animals with low dose Mercuric Chloride with *Smilax china* group (Group V). Also animals on Phase 2 where *Smilax china* was administered as post treatment showed marked increase in the circulating Hormones and the less Histopathological changes on the seminiferous tubules showing the steroidogenic action of *Smilax china* (Group VI & VII).

Animals treated with Mercuric chloride showed increased levels of SGOT, SGPT (Liver enzymes) and increase in Creatinine, Urea levels reflecting the impaired renal function. Histopathologically liver showed congestion in sinusoids, with macro and microvesicular changes within the hepatocytes, congestion in central vein, whereas animals treated with Mercuric Chloride and *Smilax china* in (group 4 & 5) showed markedly less changes on the liver enzymes and histologically denoting that *Smilax china* prevents damage in liver tissues. Animals treated with *Smilax china* on post treatment group showed markedly significant results proving its hepatoprotective activity specially on Group 8 (low dose mercury affected animals).
Animals treated with Mercuric chloride showed tubular necrosis in the kidney which is markedly low in the animals treated with *Smilax china* showing its nephro-protective activity. Thus *Smilax china* prevents changes in the testis, liver and kidney which when administered along with low dose Mercuric chloride. It is also effective in post treatment animal group with low dose of Mercuric Chloride rather than high dose of mercury.