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Histopathological Studies of Some Indigenous Diuretic Medicinal Plants in Rats

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Abstract: Histopathological changes by the effect of some indigenous diuretic medicinal plants in the liver and kidney of rats is carried out. No morphometrical or histological changes were observed in these vital organs of test and control rats by these medicinal plants. So they are safe for common use.

Key words: Indigenous diuretic medicinal plants, histopathology, liver, kidney, rats

INTRODUCTION

Three indigenous medicinal plants namely *Cymbopogon citratus*, *Raphanus sativus* and *Zea mays* have been selected to study there effect on liver and kidney of rats by using histopathological technique.

Cymbopogon citratus commonly known as "Serai" lemon grass belongs to family Graminaceae[1,2]. It is one of the largest family of the flowering plants comprising 620 genera and 1000 species, and cosmopolitan in distribution. In Pakistan, this family is represent by 158 genera and 492 species[3]. Lemon grass which is a perennial grass also possesses a C_4 photosynthetic pathway (NADP-ME type)[4]. Lemon grass is reported to have many medicinal properties. It is used as sudorific, stimulant, antiperiodic and anticatarrhal[5]. A decoction made from the leaves is recommended as diaphoretic in fever[2].

An infusion of lemon grass is sometimes taken as refreshing beverage and this use gives it a local name "Hirvacha" or green tea[6]. In Java, it is used in preparation of highly spied "Sherbet"[7]. A number of studies are available regarding the antimicrobial activity[8] and antimutagenic properties of the plant extract towards chemically induced mutation in *Salmonalle typhimurium* strains TA 98 and TA 100[9].

Raphanus sativus Linn., commonly known as radish (Muli safe) belongs to family Cruciferae and cultivated throughout sub-continent Indo-Pak in gardens and plains for culinary purpose[11]. The plant is an excellent source of vitamin B and C. Particularly in India this plant is used as purgative, stimulant, antiscorbutic, diuretic and lithotriptic. The seeds have been used as emmenagogue and in treatment of gonorrhea and cancer[10].

Root is a reputed medicine for piles, gastrodynic, pains, urinary and syphilitic complaints, relieve dysuria and strangury[2,11]. Radish root eaten before meal improves appetite and increases the digestive power, while young radish (pods) is a diet for fistula in ano when there is no fever[11]. Seeds of radish are expectorant, diuretic, laxative, carminative[2,12].

Roots contain glycosides, enzyme and methyl mercaptan[10]. Fresh vegetable contains 91.00% moisture and seeds on extraction with petroleum ether yield 4.00% albuminoids 18.00%, soluble carbohydrates 52.66% woody fiber 9.34% and ash 16.00%[11]. Seed and root contains a fixed oil, essential oil, a sulphurated volatile oil which resembles mustard seed oil. This oil contains sulfur and phosphoric acids[10,11].

The seeds contain 30% fixed oil. The volatile oil is a sulfur oil. The seeds also contains sulfuric acid and erucic acid[10].

Zea mays belong to family Gramineae. Common name is "Bhutta"[5]. In English-Maize, Indian-Corn, it is locally called Makai[11,13,14]. Zea consists of the fresh or dried stigmas and styles obtained from *Zea mays* L. The styles and stigmas should be collected from the unripe corn. Zea (corn silk) contains a volatile, alkaloid, resins, maizeric acid, fixed oil and sugar. A yellow powder of styles consists of parenchyma with two vascular bundles composed of narrow annular or spiral tracheids, epidermal cells rectangular, often extended into multicellular hairs 0.2–0.8 mm in length, the basal portion consisting of two to five united cells, the upper portion usually unicellular. Purple red parenchyma cells contain a red cell sap[15].

The silky stigmata (corn silk) are used in decoction in diseases of the bladder and kidneys. It has marked diuretic action. It is given in lithiasis[10,12-14,16]. Corn silk contains 2% of maizenic acid, a fixed oil (Oleum maydis), resin, sugar, mucilage, salts and phlobaphene[10]. Corn silk (styles with stigma) is a chemical complex medicinal material having valuable properties. It has sitosterol,

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stigmasterol, fatty and volatile oil, saponin, a bitter glucoside substance, vitamin C, vitamin K. Corn silk is used as a choleretic and diuretic agents and as an astringent[17].

MATERIALS AND METHODS

Subchronic toxicological studies (six weeks) in albino rats (Sprague Dawley) of either sex weighing between 250–300 g. Two animals from each test group and control groups treated with hot water extract of Cymbopogon (lemon grass tea), ethanolic extracts radish seeds and corn silk of *Zea mays*. Control received the placebo and then autopsied to see any gross changes.

The small pieces of tissue 2 to 3 mm in size were subjected to fixative Bouin's fluid for 18 to 24 h. After the fixation, the tissue was treated each for an hour increasing grades of 70, 80, 95, 100% alcohol. Later the tissue was treated with xylene for 1 h in stage of 30 min duration. Finally the tissue is ready for embedding. The transverse sections of the tissue were prepared of 6 μm thickness. The sections of the tissue were stained in the following manner using Harris Haematoxylin and Eosin.

The sections were treated with xylene for 2 min to deparaffinised and then subjected to hydration were washed to remove alcohol with distilled water. They were stained using haematoxylin stain for 1½ or 2 min. Later they were washed with tap water for 10 min and dehydrated with 70, 80% alcohol. Then sections were transferred to eosin 5% and again treated 95% alcohol to wash excess stain. This was subjected to 100% alcohol two changes and xylene two changes and finally mounted in Canada balsam[1,18,19].

RESULTS AND DISCUSSION

After discontinuation of test drugs gross behavioural changes, morbidity and mortality were observed. At the completion of study autopsy of sampled rats were made to observe gross-pathological changes then microtomical study conducted for histopathological changes in the vital organs of the above said rats.

There was no gross changes found in heart, lungs, liver, spleen, G.I. tract, kidneys, ovaries and testes. The vital organs (liver and kidneys) were taken out and the mean weights (mg/g) of weight) of these organs of each treated and control animals group (Table 1). The value has been presented as mean±standard error with their significance levels and prepared for histological examination.

Histological examination of the fixed tissues showed that there were no histological changes seen in the vital

Table 1: Organ weights of rats treated with *Cymbopogon* (Lemon Grass Tea), radish seeds and corn silk of *Zea mays* and control corresponding for histological studies

		Mean organ weight (mg g^{-1} ±S.E)	
Groups	No. of rats autopsied	Liver	Kidney
Control	6	31.1±1.3	8.2±0.2
Test	6	32.0±1.0	8.1±0.3

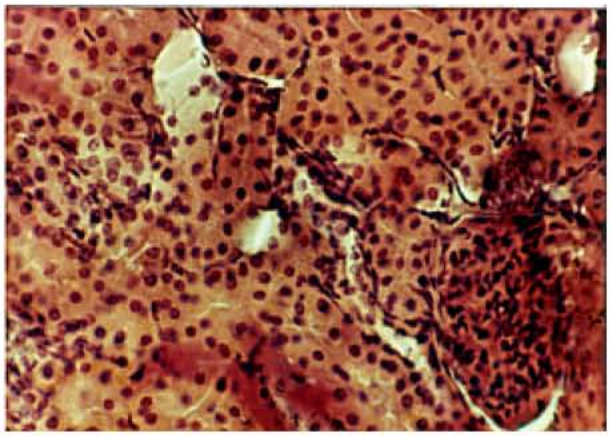

Fig. 1: Control/Normal kidney section showing Bowman's capsule proximal convulated tubules (40X)

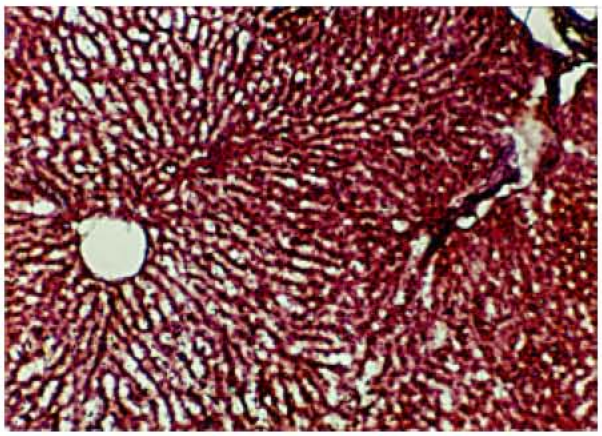

Fig. 2: Control/Normal liver showing central vein and bile duct portion (20X)

organs (liver and kidneys) of the test animals of each group as compared to the control group animals. There were no changes in the liver lobes (Fig. 2, 4, 6 and 8) showing central vein, portal area, interlobular bile duct, radiating hepatic cells, hepatic sinusoids, nucleus and cytoplasm Fig. 1, 3, 5 and 7 are of kidneys, showing glomerulus, Bowman's capsules, medullary rays, proximal convoluted tubules and arcuate artery. No morphometric and histological changes were observed in the livers and kidneys of the test rats as compared with control. Histological studies on sections of livers and kidneys

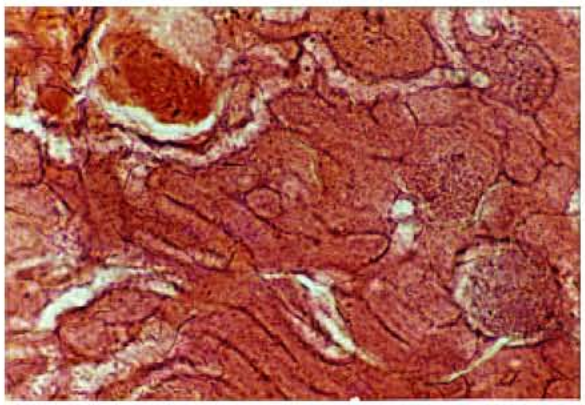

Fig. 3: *Cymbopogon citratus* (DC) Stapf. Kidney showing convuluted tubules and Bowman's capsule, but no changes in cells (20X)

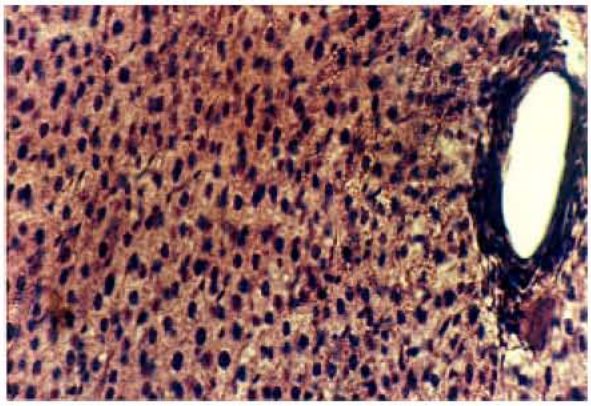

Fig. 6: *Raphanus sativus* Linn. Liver showing interlobular bile duct, no changes in cells (40X)

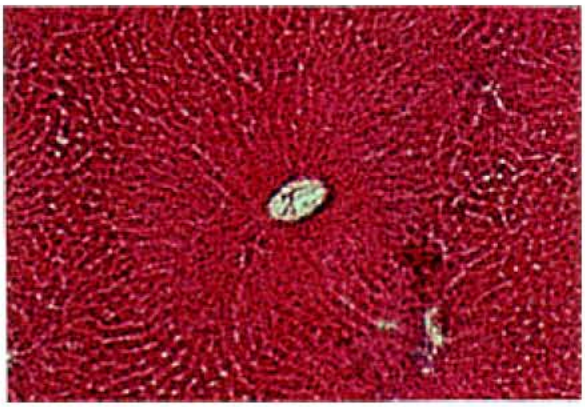

Fig. 4: *Cymbopogon citratus* (DC) Stapf. Liver showing central vein and normal cellular organization (10X)

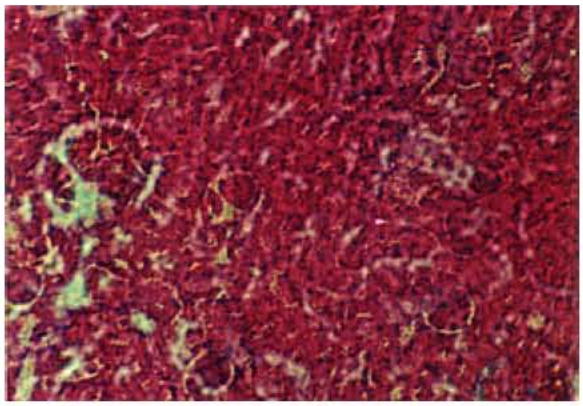

Fig. 7: *Zea mays* Linn. Kidney showing nomal Bowman's capsule, tubules and cells (20X)

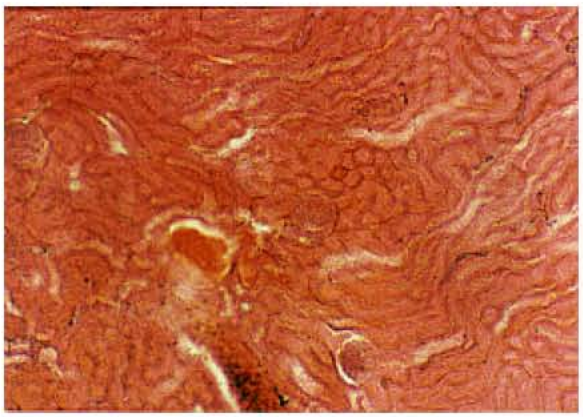

Fig. 5: *Raphanus sativus* Linn. Kidney showing Bowman's capsule, medullary ray and convoluted tubules (10X)

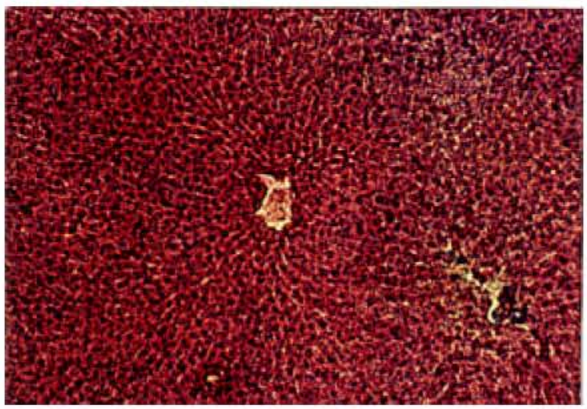

Fig. 8: *Zea mays* Linn. Liver showing nomal central vein, bile duct and hepatocytes (10X)

showed normal morphology and cellular structure[20]. These figures show no significant differences between the tissues of test/treated and control rats.

The physico-chemical properties of these diuretic indigenous plants has already been reported by Maryam *et al.*[21] and revealed that principal constituents of these plants are quite harmless and in the light of the present histopathological results it can be concluded that common use of these indigenous diuretic plants is safe.

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