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Short Communication

Protective effects of *Launaea procumbens* against $KBrO_3$-induced hepatic serum marker enzymes

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Launaea procumbens **(LP) traditionally has been used in hepatic disorders. In this study, protective effects of methanol extract (LP) were evaluated in male Sprague Dawley rats biweekly for 4 weeks against $KBrO_3$. $KBrO_3$ induced elevation of liver serum marker enzymes (alanine transaminase (ALT), amino transaminase (AST), alkaline phosphatase (ALP) and lactate dehydrogenase (LDH)) as well as the alteration of cholesterol profile total cholesterol, triglycerides low density lipoprotein (LDL) and high density lipoprotein (HDL). The results showed that the administration of LP significantly lowered the $KBrO_3$-induced serum level of hepatic marker enzymes (ALT, AST, ALP and LDH), total cholesterol, triglycerides low density lipoprotein (LDL) and high density lipoprotein (HDL). These results suggest that LP could protect liver against the $KBrO_3$-induced oxidative damage in rats.**

Key words: *Launaea procumbens,* amino transaminase (AST), potassium bromate ($KBrO_3$), low density lipoprotein (LDL)-cholesterol.

INTRODUCTION

Reactive oxygen species (ROS) exposure causes variation at biochemical level. It affect the level of liver marker enzymes in serum, antioxidant enzymes and non enzymatic antioxidant compounds like Vitamin C, E and other compounds which were recently investigated (Kamalakkannan et al., 2005; Khan et al., 2009, 2010a, b, 2011). Carbon tetrachloride increased serum membrane marker enzymes, such as alkaline phosphatase (ALP), amino transaminase (AST), gamma glutamyl transpeptidase (γ-GT), alanine transaminase (ALT) and biochemical, such as bilirubin, total serum protein, globulin and creatinine, while it decreases albumin and creatinine clearance showing abnormality of liver and kidney. They reported that when liver plasma cells are injured they cause the release of cytosolic enzymes into blood circulation. Sahreen et al. (2010, 2011) reported that administration free radicals in rats significantly elevated the serum marker enzyme level, including ALP, ALT, AST, acid phosphatise (ACP), serum total protein and bilirubin indicating severe necrosis of liver. They also reported that carbon tetrachloride depleted activity of catalase, superoxide dismutase, glutathione peroxidase and elevated thiobarbituric acid reactive substances (TBARS). Singh et al. (2008) studied the preventive possessions of potato peel extract against carbon tetrachloride toxicity. Concentration of liver marker enzymes was significantly increased in chemical treated rat which was recovered by various doses of extract. Similarly, secretion of antioxidant enzymes and TBARS was reversed to control level, proving the protective effects of potato peel extract against hepatotoxicity in rats. Medicinal plants play important role in various human ailments (Khan et al., 2010c, 2011). In this study, *Launaea procumbens* has protective effects against $KBrO_3$-induced liver oxidative serum marker enzyme and cholesterol profile.

MATERIALS AND METHODS

Plant collection

Plants of *L. procumbens* at maturity were collected from Wah Cantt district, Rawalpindi (Pakistan). Plants were identified and a specimen

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Table 1. Effect of *L. procumbens* on liver marker enzymes in serum of rat.

Treatment	ALT (U/L)	AST (U/L)	ALP (U/L)	γ-GT (nM/ min/mg protein	LDH (nM/min /mg protein)
Control	84.05 ± 2.1^{++}	138.38 ± 4.16^{++}	96.07 ± 2.16^{++}	134.00 ± 6.78^{++}	61.72 ± 2.25^{++}
20 mg/kg $KBrO_3$	504.1 ± 2.5**	231.63 ± 6.84**	174.22 ± 2.62**	252.67 ± 5.44**	125.45 ± 3.2**
100 mg/kg LPME + $KBrO_3$	150.9 ± 3.5**$^{++}$	168.6 ± 6.4**$^{++}$	121.50 ± 3.17**$^{++}$	186.33 ± 8.7**$^{++}$	93.5 ± 3.3**$^{++}$
200 mg/kg LPME + $KBrO_3$	93.2 ± 1.3**$^{++}$	143.8 ± 2.7^{++}	105.08 ± 1.54^{++}	172.33 ± 4.6**$^{++}$	80.50 ± 1.32^{++}

Mean ± SE (n = 6 number). **, significance from the control group at P < 0.01 probability level. $^{++}$, significance from the $KBrO_3$ group at P < 0.01 probability level.

specimen was submitted at the Herbarium of Pakistan, Quaid-i-Azam University Islamabad, Pakistan. Whole plant (leaves, stem, flowers and seeds) were shade dried at room temperature for two weeks, chopped and ground mechanically to a mesh size of 1 mm.

Preparation of plant extract

500 g powder of *L. procumbens* was extracted twice in 2 L of methanol with random shaking; after a week, the extract was filtered through Whatmann filter paper No. 45, filtrate was mixed and evaporated through rotary vacuum evaporator at 40°C to get methanolic crude extract (LP). The crude extract was stored at 4°C for further *in vivo* investigations.

Assessment of serum markers

Serum analysis of various liver marker enzymes, such as ALT, AST, ALP, LDH and biochemical markers; level of total cholesterol (TC), high density lipoproteins (HDL), low density lipoproteins (LDL) and triglycerides (TG) were estimated by using standard AMP diagnostic kits (Stattogger Strasse 31b 8045 Graz, Austria).

Statistical analysis

Data were expressed as mean and standard error (SE) and ANOVA test was used to analyze the difference among various treatments, with least significance difference (LSD) at 0.05 and 0.01 as the level of significance. SPSS version 14.0 (Chicago, IL, USA) and Microsoft Excel 2007 (Roselle, IL, USA) were used for the statistical and graphical evaluations.

RESULTS AND DISCUSSION

Effect of *L. procumbens* on liver marker enzymes in serum of rat

Oxidation is a necessary process for energy production by living things; however, during normal metabolism, oxygen consumption produces reactive free radicals through many enzymatic systems (RFR). In small amounts, these ROS are beneficial in signal transduction and growth regulation. However, large amount of ROS produced oxidative stress, attack many molecules such as protein, DNA and lipids (Halliwell and Gutteridge, 1999). In the present study the protective effects of various fractions of *L. procumbens* versus $KBrO_3$ on the activities of liver marker enzymes are presented in Table 1. Changes in serum level of ALT, AST, ALP, LDH and γ-GT show liver damages. Increase in serum level of these enzymes was observed in rats of $KBrO_3$-treated group (20 mg/kg body weight) as compare to non treated control group. Orally post-treatment of these rats with *L. procumbens* considerably (P < 0.01) reversed the activities of serum marker enzymes of liver near to control levels. The significant protections of these fractions might be the presence of bioactive phenolic compounds. Similar reports were observed by others (Sahreen et al., 2011; Bhadauria et al., 2008; Bhattacharya et al., 2005).

Effect of *L. procumbens* on serum LDH, triglycerides, total cholesterol, HDL cholesterol and LDL cholesterol in rat

The areas of nutritional alteration and chemoprevention demonstrate significant approaches for oxidative damages and are a focal point to explore nowadays. Many edible plant and their isolated fractions had protective effects against various disorders, including oxidative damages in serum markers (Aruoma, 2003). Cholesterol profile is very important in diagnoses of many diseases as well as in oxidative stress. Reactive oxygen species causes changes in cholesterol profile.

In the present study, the effect of $KBrO_3$ on the activity of LDH and cholesterol profile, including TG, TC, LDL and HDL are summarized in Table 2.

$KBrO_3$ administration significantly (P < 0.01) amplified the serum level of TG, TC and LDL cholesterol, while appreciably (P < 0.01) decreased HDL concentration in serum. These abnormalities were significantly (P < 0.01) attenuated with oral treatment of *L. procumbens* and increased HDL cholesterol concentration, while it depletes (P < 0.01) the serum level of LDH, TG, TC and LDL. The results of other experiments of Farombi et al. (2003) and Ogeturk et al. (2005) are in accordance with our investigation.

Table 2. Effect of *L. procumbens* on serum LDH, triglycerides, total cholesterol, HDL cholesterol and LDL cholesterol in rat.

Treatment	Total cholesterol (mg/dl)	High density lipoprotein (mg/dl)	Low density lipoprotein(mg/dl)	Triglyceride (mg/dl)
Control	17.017 ± 0.174^{++}	23.40 ± 0.610^{++}	13.717 ± 0.352^{++}	37.27 ± 1.22^{++}
20 mg/kg $KBrO_3$	25.083 ± 0.284**	34.283 ± 0.967**	18.117 ± 0.386**	56.9 ± 1.63**
100 mg/kg LPME + $KBrO_3$	20.16 ± 0.23 **$^{++}$	27.800 ± 0.505**$^{++}$	14.367 ± 0.24^{++}	44.6 ± 1.1**$^{++}$
200 mg/kg LPME + $KBrO_3$	17.867 ± 0.112^{++}	24.717 ± 0.544^{++}	13.3 ± 0.239^{++}	37.9 ± 0.84^{++}

Mean ± SE (n = 6 number). ** Indicate significance from the control group at $P < 0.01$ probability level. $^{++}$ Indicate significance from the $KBrO_3$ group at $P < 0.01$ probability level.

REFERENCES

Bhadauria, M, Nirala, KS, Shukla S (2008). Multiple treatment of *Propolis* ameliorates carbon tetrachloide induced liver injuries in rats. Food Chem. Toxicol., 46: 2703-2712.

Bhattacharya H, Lun L, Gomez R (2005). Biochemical effects to toxicity of CCl_4 on rosy barbs (*Puntius conchonius*). Our Nature, 3: 20-25.

Farombi EO, Alabi MC, Akuru TO (2003). Kolaviron modulates cellular redox status and impairment of membrane protein activities induced by potassium bromate ($KBrO_3$) in rats. Pharm. Res., 45: 63-68.

Khan MR, Haroon J, Khan RA, Bokhari J, Rashid U (2011). Prevention of $KBrO_3$-induced cardiotoxicity by *Sonchus asper* in rat. J. Med. Plants Res., 5(12): 2514-2520.

Khan MR, Rizvi W, Khan GN, Khan RA, Sheen S (2009). Carbon tetrachloride-induced nephrotoxicity in rats: Protective role of *Digera muricata*. J. Ethnopharmacol., 122: 91-99.

Khan RA, Khan MR, Sahreen S (2010a). Evaluation of *Launea procumbens* use in renal disorders: a rat model. J. Ethnopharmacol., 128: 452-461.

Khan RA, Khan MR, Sahreen S (2011a). Protective effect of *Sonchus asper* extracts against experimentally-induced lung injuries in rats: A novel study. Exp. Toxicol. Pathol., doi: 10.1016/j.etp.2011.01.007

Khan RA, Khan MR, Sahreen S, Bukhari J (2010b). Prevention of CCl_4-induced nephrotoxicity with *Sonchus asper* in rat. Food Chem. Toxicol., 23: 1304-1321.

Khan RA, Khan MR, Sahreen S, Bukhari J (2010c). Antimicrobial and Phytotoxic activity of various fractions of *Sonchus asper*. Afr. J. Biotech., 47: 3877-3683.

Khan RA, Khan MR, Sahreen S, Jan S, Bokhari J, Rashid U (2011b). Phytotoxic characterization of various fractions of *Launaea procumbens*. Afr. J. Biotech., 10: 5377-5380.

Ogeturk M, Kus I, Colakoglu N, Zararsiz I, Ilhan N, Sarsilmaz M (2005). Caffeic acid phenyl ester protects kidney against carbon tetrachloride toxicity in rats. J. Ethnopharmacol., 97: 273-280.

Sahreen S, Khan MR, Khan RA (2010). Evaluation of antioxidant activities of various solvent extracts of *Carissa opaca* fruits. Food Chem., 122: 1205-1211.

Sahreen S, Khan MR, Khan RA (2011). Hepatoprotective effects of methanol extract of *Carissa opaca* leaves on CCl_4-induced damage in rat. BMC Compl. Alter. Med., 11: 48 doi: 10.1186/1472-6882-11-48.