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Role of *Prunus persica* Bark on Liver Marker Enzyme and Its Antioxidant Potential against Paracetamol Induced Liver Toxicity in Wistar Rats

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Abstract: *Prunus persica* a well-known plant commonly called as 'Peach Fruit', belonging to the family Rosaceae. The Ethanolic bark extract of *Prunus persica* (EBPP) was investigated for hepatoprotective and antioxidant activity against paracetamol induced liver damage in rats. Male Wistar albino rats intoxicated with paracetamol showed liver damage and oxidative stress as indicated by increased serum levels of aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, total bilurubin and lipid peroxidase. Simultaneously, there were decreased activities of total protein, superoxide dismutase, and catalase and glutathione capacity compared with the control group. Combined oral administration of silymarin and EBPP (200mg/kg) with paracetamol reversed the elevated levels of aspartate aminotransferase, alanine aminotransferase, alkaline phosphatase, total bilurubin, lipid peroxidase and restored the decreased levels of total protein, superoxide dismutase, catalase and glutathione. The effect produced by the EBPP was comparable with that of silymarin. From the result it was concluded that, the ethanolic bark extract of *Prunus persica* exhibited hepatoprotective and the probable mechanism of action may be due to its antioxidant property.
Keywords: *Prunus persica,* Hepatoprotective, Paracetamol and Antioxidant.

INTRODUCTION

Ever since ancient times, in search for rescue for their disease, the people looked for drugs in nature. The beginnings of the medicinal plants' use were instinctive, as is the case with animals [1].

In view of the fact that at the time there was not sufficient information either concerning the reasons for the illnesses or concerning which plant and how it could be utilized as a cure, everything was based on experience. In time, the reasons for the usage of specific medicinal plants for treatment of certain diseases were being discovered; thus, the medicinal plants' usage gradually abandoned the empiric framework and became founded on explicatory facts. Until the advent of iatrochemistry in 16th century, plants had been the source of treatment and prophylaxis [2]. Nonetheless, the decreasing efficacy of synthetic drugs and the increasing contraindications of their usage make the usage of natural drugs topical again. *Prunus persica* (Aaru) belongs to the family Rosaceae is a deciduous tree grows up to 10 m. high. Generally cultivated for edible fruits from sub-Himalayan region up to 2400 m. Commonly called as peach (*Prunus persica* L.), from the family Rosaceae, are one of the most widely consumed fruits during the summer season. The fruits, with mild sour and astringent taste, are low in caloric content but have high nutritive value [3]. The leaves are anthelmintic, insecticidal, sedative, diuretic, demulcent, expectorant, vermicidal and are used in leucoderma and in piles. Leaf paste is used to kill worms in wounds and fungal infections. The treatment of gastritis, whooping cough and chronic bronchitis is carried out internally with leaves. The flowers are considered as laxative and diuretic and are used to treat constipation and oedema. The fruit is used as a demulcent, an anti-scorbutic and a stomachic. Fruit being aphrodisiac, anti-pyretic, act as a tonic to the brain, enhance the blood, removes bad smell from the mouth. The seeds are used as an anthelmintic and emmenagogue. The oil extracted from

seeds is known as "kapha", used as an abortifacient, good in deafness, piles, stomach troubles of children and earache. Peach kernels are used for blood diseases, menstrual disorders, coughs and rheumatism in China and Malaya [4]. The kernel oil is applied to impetigo. The bark is used in leprosy and jaundice. Only few of the ethnobotanical uses of *Prunus persica* were scientifically proven. Current study was undertaken to validate the hepatoprotective activity by estimating the liver marker enzymes of ethanolic bark extract of *Prunus persica* (EBPP) and study its antioxidant potential against paracetamol induced hepatic damage in rats.

MATERIALS AND METHODS

Plant Material

The bark of Prunus *persica* was collected from Ooty, in the month of September. The plant were identified as *Prunus persica* and authenticated by the botanist, Botanical Survey of India, Agricultural University, Coimbatore. The voucher specimen (BSI/SRC/11/72/2017-18/Sci/01284) had been deposited in the herbarium for future reference.

Preparation of Extract

The collected barks were washed in running water to remove the adhering foreign matter and shade dried. The dried plant materials were coarsely powdered by mechanical blender. The coarse powder of *Prunus persica* bark was soaked in 70% ethanol for 24 h followed by cold maceration for further 48 h with occasional shaking. The mixture was filtered using muslin cloth followed by removal of excess of solvent by rotatory evaporator. The dried extract of *Prunus persica* bark was used for further pharmacological studies.

Animals

Wistar albino rats of either sex weighing between 180 – 200 gms of 8 weeks were used in this study. The animals were obtained from animal house, Sri Lakshmi Narayana Institute of Medical Sciences, Puducherry. On arrival, the animals were placed at random and allocated to treatment groups in polypropylene cages with paddy husk as bedding. Animals were housed at a temperature of 24±2^{o}C and relative humidity of 30 – 70 %. A 12:12 light: day cycle was followed. All animals were allowed to free access to water and fed with standard commercial pelleted rat chaw (M/s. Hindustan Lever Ltd, Mumbai). All the experimental procedures and protocols used in this study were reviewed by the Institutional Animal Ethics Committee and were in accordance with the Institutional ethical guidelines.

Hepatoprotective Activity [5]

The animals were divided into four groups of six animals in each group. Group I served as controls received vehicle 0.1% Carboxy Methyl Cellulose (CMC) solution (1ml/kg). Group II received paracetamol (750 mg/kg) at every 72 h for 21 days through oral route. Group III served as reference control, received silymarin 50 mg/kg for 21 days through oral route and simultaneously administered paracetamol 750 mg/kg every 72 h. Group IV received EBPP (200 mg/kg) for 21 days through oral route and simultaneously administered paracetamol 750 mg/kg every 72 h. all the test drugs were administered orally using gastric gavage by suspending in 0.1% CMC On 22nd day , blood was collected through retro orbital sinus puncture under anaesthesia using thiopentone sodium. The collected blood samples were centrifuged for 10 minutes at 2000 r.p.m. and serum was separated. The separated serum was subjected to various biochemical tests like Serum Glutamate Oxaloacetate Transaminase (SGOT), Serum Glutamate Pyruvate Transaminase (SGPT) [6], Serum Alkaline Phosphate (SALP) [7], serum bilurubin [8] and total protein [9].

After 24 hrs all the animals were sacrificed and the liver was rapidly excised, rinsed in ice-cold saline, and a 10% w/v homogenate was prepared using 0.15M KCI, centrifuged at 800 g for 10 min at 4°C. The supernatant obtained was used for the estimation of antioxidants like Glutathione [10], superoxide dismutase [11], Catalase [12] and Lipid peroxidase [13].

STATISTICAL ANALYSIS

The values were expressed as mean ± SEM. The statistical analysis was carried out by one way analysis of variance (ANOVA) followed by Dunnett's *'t'* – test using graph pad version I. *P* values <0.05 were considered significant.

RESULTS

Table-1: Effect of ethanolic bark extract of *Prunus persica* (EBPP) on paracetamol induced liver damage in rats

Drug Treatment	Liver Function Test				
	SGOT (IU/L)	SGPT(IU/L)	SALP(IU/L)	Total Bilirubin (mg/dl)	Total Protein (mg/dl)
Group I Vehicle Control 0.1% CMC	41.66±3.37	62.50±3.30	42.63±2.24	1.75±0.02	8.43 ±0.38
Group II Paracetmol (750 mg /kg)	195.41 ±6.55	111.70 ±7.24	197.37±5.55	4.63 ±0.07	4.22 ±0.28
Group III Silymarin (50mg/kg)	44.22±2.07***	62.40 ±4.53***	46.28 ±3.38***	2.24 ±0.10***	7.63 ±0.33***
Group IV *EBPP* (200mg/kg)	59.80 ±2.75***	74.28 ±3.22***	65.73±5.37***	2.84±0.11***	6.72 ±0.26**

Values are in mean ± SEM (n=6),
*P<0.05, **P<0.01, ***P<0.001 Vs Paracetamol Control

Table 1, shows the effect of EBPP on paracetamol treated liver damage in rats. The hepatic enzymes SGOT, SGPT, SALP in serum and total bilirubin were increased and total protein was decreased in paracetamol treated animals when compared to vehicle control. The reference control silymarin reversed the levels of serum enzymes, total bilurubin and total protein on the paracetamol induced hepatic injury by significantly (P <0.001) reduced the serum hepatic enzymes, total bilirubin and decreasing the total protein. Similar effect was produced by the EBPP against paracetamol induced hepatic damage in rats.

Table-2: Antioxidant effect of ethanolic bark extract of *Prunus persica* (EBPP) *in* liver homogenate of paracetamol induced liver damage in rats

Drug Treatment	Liver Homogenate			
	LPO Mm/100 g of Tissue	SOD U/mg of Protein	CAT µM of H_2O_2 consumed/min/mg protein	GSH µg of GSH consumed/min/mg protein
Group I Vehicle Control 0.1% CMC	0.19± 0.002	1.64± 0.021	0.94± 0.017	0.74± 0.010
Group II Paracetmol (750 mg /kg)	0.65± 0.020	0.95± 0.012	0.62± 0.053	0.31± 0.030
Group III Silymarin (50mg/kg)	0.27± 0.016***	1.39± 0.022***	0.93± 0.010***	0.64± 0.013 **
Group IV EBPP (200mg/kg)	0.28± 0.020***	1.24± 0.09***	0.79± 0.002***	0.60± 0.012**

Values are in mean ± SEM (n=6),
*P<0.05, **P<0.01, ***P<0.001 Vs Paracetamol Control

Table 2, shows the antioxidant effect of EBPP in liver homogenate of paracetamol induced liver damage in rats. The result showed that the activities of SOD, catalase, glutathione were decreased and lipid peroxidase was increased in paracetamol alone treated groups. Co-administration of EBPP markedly reversed the change in antioxidant enzymes brought by paracetamol in rats. Standard drug silymarin treated group also significantly increased the level of glutathione, SOD, catalase and decreased the lipid peroxidase level in the paracetamol challenged animals.

CONCLUSION

From the results of the present study, it may be concluded that the ethanolic bark extract of *Prunus persica* possess significant hepatoprotective activity by reversing the liver marker enzymes against paracetamol induced hepatotoxicity. Additionally ethanolic bark extract of *Prunus persica* exhibits antioxidant property.

The hepatoprotective activity of ethanolic bark extract of *Prunus persica* may be due to its free radical scavenging property.

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