

Research Article

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## Hepatoprotective activity of Sri Lankan black tea (*Camellia sinensis*) in rats

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### ABSTRACT

Scientific information on hepatoprotective potential of black tea of *Camellia sinensis* (L) O. Kuntz (Family: Theaceae) is scarce. This study therefore, investigated the hepatoprotective activity of black tea brew (BTB) of *C. sinensis* (using Sri Lankan high grown Dust grade No: 1 black tea), in rat carbon tetrachloride hepatic lesion model with two oral doses (501 and 1336 mg/ml given orally for 3 consecutive days). The results showed that both doses significantly ( $P < 0.05$ ) reduced SGPT level but not SGOT level on days 4 and 7 post treatment. It is concluded that heavy consumption of BTB of *C. sinensis* can induce mild hepatoprotective action with a quick onset.

**Keywords:** *Camellia sinensis*, hepatoprotective, black tea

### INTRODUCTION

Tea which is prepared from the two or three topmost immature leaves and the buds of the perennial evergreen shrub *Camellia sinensis* (L) O.Kuntz (Family: Theaceae) is the most widely consumed beverage in the world, beside water [1]. Depending on the manufacturing technique there are three main types of teas: black (fully aerated or fermented), green (unaerated or unfermented) and oolong (partially aerated or semi-fermented). Of these, black tea accounts for about 78% of world tea production and about 80% global tea consumption [2].

Although, tea beverages have been consumed for almost 50 centuries, several studies published recently suggest that green tea extract infusion are hepatotoxic [3, 4, 5, 6]. However, the mechanisms of toxicity is unclear and these investigations are based mainly on case studies [3, 4, 5, 6]. Further, in these studies contaminations by toxic compounds during manufacturing process can not be completely ruled out [3, 4, 5, 6]. On the other hand, another recent study has shown that green tea has mild to moderate oral hepatoprotective activity, which was primarily mediated via its antioxidant action [7]. In addition, green tea has been shown to be hepatoprotective against tamoxifen-induced liver injury [8]. However, as yet, hepatoprotective or hepatotoxic activity of black tea, which accounts for 80% of global tea consumption, has been poorly investigated [9, 10].

This study was therefore initiated to investigate whether

black tea has acute oral hepatoprotective activity. This was tested in rats using carbon tetrachloride hepatic lesion model and Sri Lankan high grown Dust grade No: 1 black tea, which is most widely consumed by Sri Lankan tea drinkers.

### MATERIALS AND METHODS

#### Source of tea:

Topmost immature leaves and buds of *C. sinensis* plus twigs were collected from the plantation of St. Coombs tea estate of the Tea Research Institute, Talawakelle, Sri Lanka (1382 m above sea level; high grown) in August 2005 were used to process Dust grade No: 1 black tea using orthodox-rotorvane technique at the estate factory. The tea sample was pure, unblend and typical to the grade as confirmed by sensory analysis, organoleptic profile, and physical and chemical analysis. Tea samples were packed in triple laminated aluminium foil bags (250 g each) and stored at -20°C until use. The *C. sinensis* leaves used for manufacture the black tea samples was identified and authenticated by Professor (Mrs.) A.S. Senaviratna, Department of Plant Science, University of Colombo. A voucher specimen (wdr/tspf 200) was deposited at the museum of the Department of Zoology University of Colombo.

#### Preparations of black tea brew (BTB):

BTB was made according to the ISO standards [11]: adding 2g of black tea to 100 ml of boiling water and brewing for 5 min. The tea contains 43.7% (w/w) tea solids in water as reported previously (Jayakody and Ratnasooriya, 2008). Based on this data, 501 mg (equivalent to 9 cups, 1 cup = 170 ml) of BTB in 2 ml was made by adding 8g black tea to 20 ml boiling water and brewing for 5 min. Similarly, 1336 mg/ml (equivalent to 24 cups) of BTB was made by adding

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