

RESEARCH ARTICLE

# Gastroprotective activity of *Camellia sinensis* black tea brew in rats

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## Abstract

This study examined the gastroprotective potential of a black tea brew (BTB) of *Camellia sinensis* Linn. O. Kuntze (Theaceae) using Sri Lankan high grown Dust grade No: 1 tea in a rat ethanol-induced gastric lesion model. Three oral doses of BTB (84, 167, or 501 mg/mL) were used in evaluation of the gastroprotective activity. The results showed a strong dose dependent and significant ( $p < 0.05$ ) gastroprotective activity (in terms of number, length, and area of hemorrhagic lesions). The gastroprotective activity of BTB was superior to that of the reference drug cimetidine. The high dose of BTB (only dose tested) also offered gastroprotection in rat indomethacin- and serotonin-induced gastric lesion models. Intraperitoneal treatment of BTB and oral treatment of BTB following decaffeination suppressed its gastroprotective potential. However, indomethacin pretreatment did not reduce the gastroprotective potential of BTB in the ethanol-induced gastric lesion model. BTB also increased the gastric mucus content (by Alcian blue test), thickness of the gastric mucus layer (by histopathology), pH of the gastric contents, and possibly the gastric mucosal blood flow, and reduced the gastric acid output of the stomach. BTB also had antihistamine (by wheal test) and antioxidant activity (by the DPPH method) and impaired the gastric transit (by charcoal plug test). It is concluded that BTB of *C. sinensis* possesses strong oral gastroprotective action, which is mediated via multiple mechanisms. The results also justify the claim made by Sri Lankan traditional practitioners that BTB of *C. sinensis* has gastroprotective action.

**Keywords:** Black tea; *Camellia sinensis*; gastroprotection; gastric lesions

## Introduction

*Camellia sinensis* Linn. O. Kuntze (Theaceae), commonly known as the tea plant, is an evergreen shrub or tree (if not pruned) with alternate, chartaceous or coriaceous leaves. The leaves are typically 5–9 × 2–3 cm, obtuse or with a short, rounded point. The flowers are bisexual and solitary or 2–3 in a cluster (Dassanyake & Forsberg, 1981). Phytochemically, *C. sinensis* shoots contain flavanols (epigallocatechin gallate, epigallocatechin, epicatechin gallate, epicatechin, gallic acid, and catechins), flavonols and their glycosides, leucoanthocyanins, caffeine, amino acids including theanine, carbohydrates, organic acids, and volatile compounds (Modder & Amarakoon, 2002). *C. sinensis* is native to Southeast Asia and is extensively cultivated in tropical countries such as Sri Lanka, India, Java, China, Japan, Bangladesh,

Indonesia, Kenya, and Turkey for the manufacture of tea (Modder & Amarakoon, 2002). Tea is produced from freshly harvested tender shoots, comprising two or three of the topmost immature leaves and buds of the *C. sinensis* plant. Depending on the manufacturing technique there are three main types of tea: black (fully aerated or fermented), green (un-aerated or unfermented), and oolong (partially aerated or semi-fermented) (Modder & Amarakoon, 2002).

Sri Lankan traditional native physicians, who are reputed for treating disorders of the gastrointestinal tract, claim that drinking a black tea brew (BTB) of *C. sinensis* has a protective effect against the development of gastritis and peptic ulcer disease (Native Doctor Abraham Jayasekera, personal communication). Further, experimental studies have shown that triterpene saponins of the seeds of *C. sinensis* exert gastroprotective effects