

## Mechanism(s) of action involved in the gastroprotective activity of *Muntingia calabura*

### ABSTRACT

Ethnopharmacological relevance: *Muntingia calabura* L. (Muntingiaceae) is locally known as kerukup siam. Its leaves, flowers, barks and roots have been used traditionally in East Asia and South America to treat various diseases including ulcer-related diseases. The present study aimed to investigate the mechanism(s) of gastroprotective effect of methanol extract of *Muntingia calabura* leaves (MEMC) using the pylorus ligation induced gastric ulceration in rats. Materials and methods: Five groups of rats (n=6) were administered orally once daily for 7 days with 8% Tween 80 (negative control), 100 mg/kg ranitidine (positive control), or MEMC (100, 250 or 500 mg/kg), followed by the ulcer induction via ligation of the pyloric part of the rat's stomach. This was followed by the macroscopic analysis of the stomach, evaluation of gastric content parameters, and quantification of mucus content. The antioxidant (measured using the superoxide anion and 2,2-diphenyl-1-picrylhydrazyl (DPPH)-radical scavenging, oxygen radical absorbance capacity (ORAC) and total phenolic content (TPC) assays), anti-inflammatory (evaluated using the in vitro lipoxigenase and xanthine oxidase assays), phytoconstituents and HPLC analysis of MEMC were also carried out. Results: The MEMC significantly ( $p < 0.05$ ) reduced gastric lesion in this model. Furthermore, the extract also significantly ( $p < 0.01$ ) reduced the volume of gastric content whereas the total acidity was significantly ( $p < 0.05$ ) reduced in the doses of 100 and 500 mg/kg MEMC. Moreover, the mucus content increased significantly ( $p < 0.01$ ) in MEMC-treated rats. The extract also showed high antioxidant and anti-inflammatory activities in all assays tested, and demonstrated the presence of high tannins and saponins followed by flavonoids. Conclusion: The MEMC exerted gastroprotective effect via several mechanisms including the anti-secretory, antioxidant and anti-inflammatory activities. These activities could be attributed to the presence of tannins, saponins and flavonoids (e.g. rutin, quercitrin, fisetin and dihydroquercetin).

**Keyword:** *Muntingia calabura*; Muntingiaceae; Gastric ulcer; Anti-secretory; Antioxidant; Anti-inflammation