

Antioxidant and antibacterial properties of green, black, and herbal teas of *Camellia sinensis*

Eric W.C. Chan, Eu Ying Soh, Pei Pei Tie, Yon Peng Law

Faculty of Applied Sciences, UCSI University, Cheras, Kuala Lumpur, Malaysia.

ABSTRACT

Background The role of non-polymeric phenolic (NP) and polymeric tannin (PT) constituents in the antioxidant and antibacterial properties of six brands of green, black, and herbal teas of *Camellia sinensis* were investigated. **Materials and Methods** Total phenolic content (TPC) and ascorbic acid equivalent antioxidant capacity (AEAC) were assessed using the Folin-Ciocalteu and 2,2-diphenyl-1-picrylhydrazyl (DPPH) assays, respectively. Minimum inhibitory dose (MID) against Gram-positive *Micrococcus luteus*, *Staphylococcus aureus*, and *Bacillus cereus*, and Gram-negative *Escherichia coli*, *Salmonella typhi*, and *Pseudomonas aeruginosa* was assessed using the disc-diffusion method. Teas were extracted with hot water successively three times for one hour each time. The extracts were fractionated using Sephadex LH-20 column chromatography to obtain the NP and PT constituents. **Results** Extraction yields ranged from 12 to 23%. Yields of NP fractions (70-81%) were much higher than those of PT fractions (1-11%), suggesting that the former are the major tea components. Ranking of antioxidant properties of extracts was green tea>black tea>herbal tea. For all six teas, antioxidant properties of PT fractions were significantly higher than extracts and NP fractions. Extracts and fractions of all six teas showed no activity against the three Gram-negative bacteria. Green teas inhibited all three Gram-positive bacteria with *S. aureus* being the least susceptible. Black and herbal teas inhibited the growth of *M. luteus* and *B. cereus*, but not *S. aureus*. The most potent were the PT fractions of Boh Cameron Highlands and Ho Yan Hor with MID of 0.01 and 0.03 mg/disc against *M. luteus*. **Conclusion** Results suggested that NP constituents are major contributors to the antioxidant and antibacterial properties of teas of *C. sinensis*. Although PT constituents have stronger antioxidant and antibacterial properties, they constitute only a minor component of the teas.

KEYWORDS

Extracts . fractions . minimum inhibitory dose . non-polymeric phenolics . polymeric tannins

REFERENCES