P-130

Antioxidant Activity and Inhibition of α-Glucosidase from the roots of *Tupistra nutan* Wall

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Objectives

The present study was undertaken to investigate antidiabetic, and potential antioxidant activity of extracts of *Tupistra nutan*. In addition, the total polyphenols and total flavonoids in extracts and fractions were also determined to examine the efficiency of different solvents for extraction of phenolics. Furthermore, correlations between total phenolic content and biological activity were examined to enhance the search for antioxidant and to understand possible mechanisms for antidiabetic effects of *Tupistra nutan*.

Materials and Methods

The bark of *Tupistra nutan* was obtained from the Bioherb Research Institute, Kangwon National University, Korea. The samples were dried at room temperature and powdered using a blender. The air-dried, powdered (200 g) bark was extracted with 80% methanol at room temperature. The solution was filtered through Whatmann No. 42 filter paper to remove debris, and the extracts were evaporated under reduced pressure at 40℃ using a rotary evaporator. The combined 80% methanolic extract was partitioned with organic solvents to yield *n*-hexane, ethyl acetate (EtOAc), *n*-butanol (BuOH; water saturated), and aqueous fractions. Different extracts were used to measure the radical-scavenging activity, Reducing power, total phenolic total flavonoid concentration, Inhibition assay for α-glucosidase.

Results

In this study, total antioxidant activity increased with increasing amount of extract. Also, the reducing power of all extracts gradually increased with increased concentration. We measured the inhibition of α-glucosidase using 4-nitrophenyl-a-D-glucopyranose. EtOAc fraction had a statistically significant ($P < 0.05$) inhibitory effect and that was higher than that found in other fractions. Phenolic acids have attracted considerable interest due to their powerful antioxidant properties and biological activity. Therefore, in this work, we determined the total phenolics using the Folin-Ciocalteu colorimetry method, with gallic acid as standard.

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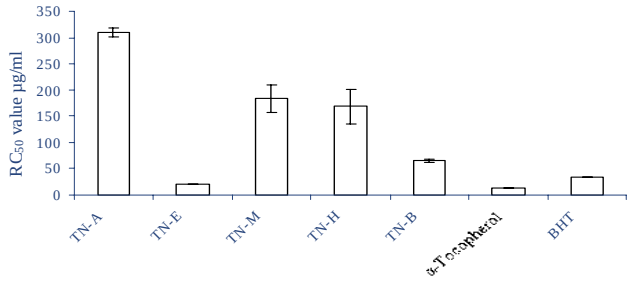

Fig. 1. Free radical scavenging activity of extract and fractions from *Tupistra nutan*. TN-A, aqueous fraction; TN-E, EtOAc fraction; TN-M, 80% methanolic extract; TN-H, n-hexane fraction; TN-B, BuOH fraction.

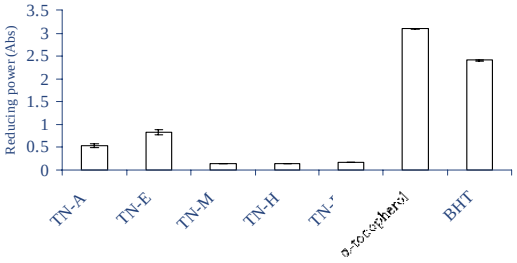

Fig. 2.Reducing power of extract and fractions from *T. nutan*.

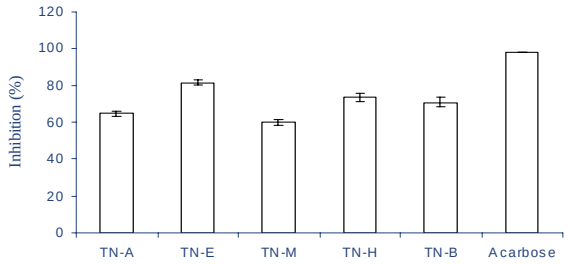

Fig. 4. α-glucosidase inhibition of extract and fractions from *T. nutan*.

Table 1. Total phenolic content and total flavonoid content of the extracts from *T. nutan*.

	TN-A*	TN-E*	TN-M*	TN-H*	TN-B*
Total phenolic content	5.50	51.20	5.80	11.50	11.20
Total flavonoid content	12.4	15.20	13.00	3.60	14.6

*Total phenol content analysed as gallic acid equivalent (GAE) mg/g of extract and fractions. Total flavonoid content analysed as quercitin equivalent (QE) mg/g of extract and fractions.