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The potential of instant pumpkin based soup in diabetic treatment

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Diabetes mellitus is one of the most challenging public health problems in this century as the prevalence continues to increase. According to WHO, the number of people with diabetes dramatically rose from 108 million in 1980 to more than 400 million in 2014, and it is projected to be 700 million in 2045[(1)]. Pumpkin is one of popular functional foods rich in vitamins, minerals, and bioactive compounds. Several studies show the biological properties of pumpkin including antioxidant, anti-tumor, immunoregulatory, hypoglycaemic, and hepatoprotective activities[(2)]. Pumpkin is a starchy vegetable that commonly used in food product development to improve its acceptability. Providing an instant healthy food has been taken an interest as healthy lifestyle becomes a need in this era of globalization. However, food processing that employs heat may cause nutrient loss and lowered biological activities. This study aimed to evaluate the potential of instant pumpkin-based soup (IPS) in diabetic treatment by determining proximate composition, the content of fibre, chromium, antioxidant activity, and α-glucosidase inhibition activity.

Pumpkin (*Curcubita moschata*) (40%) was used to develop IPS along with other materials including carrot (20%), rice flour (20%), stock (10%), onion (4%), fresh cream (2%), pepper (1%), leek (1%), celery (1%), and salt (1%). Pumpkin and carrot were boiled using stock and then homogenously mashed. The mashed pumpkin-carrot was simmered together with the other materials to produce fresh soup. The fresh soup was then dried using drum dryer and grounded to obtain IPS. Subsequently, IPS was used to analyse proximate composition (AOAC), fibre content (enzymatic gravimetry), antioxidant (2,2-diphenyl-1-picrylhydrazyl method) and α-glycosidase inhibition activity (enzymatic assay). All analysis were performed in two replications.

The proximate analysis of IPS revealed the presence of carbohydrate (74.4 ± 2.4 %), protein (2.1 ± 0.4 %), fat (15.7 ± 2.1 %) ash (2.9 ± 1.5 %), and moisture (4.9 ± 0.8 %). Our study found the remarkable fibre (9.21 ± 0.04 %) and chromium (73.2 ± 0.01 μg/100 g) content of IPS. However, IPS demonstrated low antioxidant activity (IC_{50} = 38642,4 ± 17,9 ppm), but notably high in α-glucosidase inhibition activity at a concentration of 5 μg 210 μL reaction^{-1} (94.9 ± 0.2%) even after several heating processes.

The present study demonstrated IPS could be the promising food in diabetic treatment. Although we found low antioxidant activity, IPS exhibited high α-glucosidase inhibition activity. Furthermore, the fibre and chromium content were found in significant amount which could meet almost 30% and 200% daily values, respectively. In addition, our previous study also reveals IPS as source of β-carotene (3380 μg)[(3)]. The present study implies IPS might become an alternative ready-to-serve healthy food in diabetic prevention. Future study should focus on investigating the efficacy of IPS in blood glucose control among people with elevated blood glucose.

References

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