

## **Influence of Different Cooking Methods on the Antioxidant Activity of Local Pumpkin Variety (*Cucurbita maxima*) Cultivated in Jaffna District, Sri Lanka**

S. Thanuja, S. Sivakanthan and S. Vasantharuba

Department of Agricultural Chemistry, Faculty of Agriculture, University of Jaffna, Kilinochchi, Sri Lanka

### **ABSTRACT**

Antioxidants play major role in maintaining good health. Pumpkin (*Cucurbita maxima*) is one of the richest sources of  $\beta$ -carotene, a powerful antioxidant. However, the antioxidant activity of vegetables is influenced by the cooking methods. Therefore, this study aimed to determine the effect of three cooking methods on the antioxidant properties of pumpkin. The antioxidant activity was determined in terms of total flavonoid content (TFC), total phenolic content (TPC), antioxidant capacity and antioxidant activity [2, 2-Diphenyl-1-picrylhydrazyl (DPPH), radical scavenging activity expressed as  $IC_{50}$  value]. Fresh pumpkin was cut into small pieces and subjected to different cooking methods (boiling, microwave cooking and stir-frying) until pumpkin became tender and palatable. Ethanol (70 %, v/v) was used as the solvent to extract antioxidants. Results showed that TPC of fresh pumpkin was  $9.18 \pm 0.05$  mg GAE/g DM. Higher loss of TPC was observed during stir-frying (37.36% loss) than microwave cooking (10.89% loss) and boiling (6.54% loss). The highest TFC obtained from boiled sample ( $5.11 \pm 0.91$  mg CE/g DM) compared to microwave cooking ( $2.05 \pm 0.03$  mg CE/g DM) and stir-frying ( $2.72 \pm 0.32$  mg CE/g DM). Microwave cooking minimally destroyed antioxidant capacity ( $53.54 \pm 8.02$  mg AAE/g DM) than stir-frying and boiling compared to fresh pumpkin ( $64.02 \pm 3.20$  mg AAE/g DM). Fresh pumpkin showed significantly ( $p < 0.05$ ) lower  $IC_{50}$  ( $0.54 \pm 0.02$  mg/mL) than microwave cooked ( $0.65 \pm 0.01$  mg/mL) and stir fried pumpkin ( $0.66 \pm 0.02$  mg/mL). Boiled pumpkin showed the lowest DPPH radical scavenging activity (highest  $IC_{50}$  value;  $0.77 \pm 0.02$  mg/mL). There was a positive but weak correlation ( $r = 0.23$ ) between TPC and total antioxidant capacity in fresh and all cooked samples of pumpkin. The reduction in TPC, antioxidant activity and total antioxidant capacity of pumpkin could be attributed to the breakdown of some heat labile phenolic compounds; temperature induced chemical oxidation and the release of oxidative and hydrolytic enzymes that can destroy the antioxidant compounds. However, boiling of pumpkin increased the TFC, which could be due to increased level of free flavonols during boiling. Less loss of antioxidant capacity during microwave cooking than boiling and stir-frying could be due to less leaching and oxidation of antioxidant compounds. From this study, it can be concluded that, even though all these cooking methods studied have significant effect on antioxidant activity of pumpkin, microwave cooking has less effects on antioxidant activity than boiling and stir-frying.

**Keywords:** Cooking, free radical scavenging activity, pumpkin, total flavonoid content, total phenolic content

Abbreviations: DM: dry matter; GAE: gallic acid equivalent; CE: catechin equivalent; AAE: ascorbic acid equivalent