# Effect of Different Cooking Methods on the Antioxidant properties of Tomato (*Lycopersicon esculentum*) and Bitter gourd (*Mormodica charantia*) Cultivated in Jaffna District

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**Introduction:** Antioxidants are the compounds which protects against free radical damage, thus, vital for maintaining good health.Vegetables contain myriad of antioxidants. Among vegetables, tomato (*Lycopersicon esculentum*) and bitter gourd (*Mormodica charantia*), which are commonly consumed by Jaffna people, are the richest sources of antioxidants such as phenolics, ascorbic acid, tocopherols and carotenoids. However, cooking influences the antioxidant properties of vegetables. Therefore, this study aimed to determine the effect of three cooking methods on the antioxidant properties of these two vegetables.

**Materials and methods:** Fresh vegetables were cut in to small pieces and subjected to different cooking methods (boiling, microwave cooking and stir-frying) until the vegetables become tender and palatable. Ethanol (70 %, v/v) was used to extract the antioxidants. Antioxidant properties of fresh and cooked vegetables were determined as total flavonoid content (TFC) [as catechin equivalent (CE)], total phenolic content (TPC) [as gallic acid equivalent (GAE)], antioxidant capacity [as ascorbic acid equivalent (AAE)] and antioxidant activity [2, 2-Diphenyl-1-picrylhydrazyl (DPPH) free radical scavenging activity expressed as $IC_{50}$value, which is inversely proportional to antioxidant activity] on dry matter basis. Statistical analysis was performed using one way analysis of variance using SAS (17)

**Results:** Fresh tomato showed highest TPC (22.55±1.26 mg GAE/g) and TFC (5.64±0.30mg CE/g) while, stir-fried tomato showed lowest TPC (7.20±0.82 mg GAE/g) and TFC (2.92±0.16 mg CE/g). TPC of tomato was reduced by boiling, microwave cooking and stir-frying by 1.21, 16.92 and 68.70%, respectively. Losses of TFC in boiled, microwave cooked and stir-fried tomato were 13.93, 31.01 and 48.23%, respectively. Antioxidant capacity of fresh tomato was 96.26±6.72mg AAE/g. Microwave cooking increased the antioxidant capacity of tomato by 70.74% compared to fresh, while, stir-frying and boiling reduced the antioxidant capacity (by 2.80 and 27.25%, respectively).The highest antioxidant activity was observed in stir-fried (0.15±0.001 mg/ml) tomato followed by microwave cooked and fresh tomato.

Boiling increased the TPC of bitter gourd by 48.63% compared to fresh bitter gourd (7.2±0.82 mg GAE/g), while, microwave cooking reduced the TPC by 38.70% loss. Boiling increased TFC of bitter gourd by 42.77% compared to fresh bitter gourd (2.92±0.16mg CE/g), while, microwave cooking reduced TFC by 40.13%. Stir-frying caused highest losses in TPC and TFC (77.94 and 75.88%, respectively) in bitter gourd. The fresh bitter gourd had highest antioxidant capacity (103.55±3.60 mg AAE/g). Stir-frying caused highest loses in antioxidant capacity (67.77%) followed by microwave cooking and boiling (23.55 and 17.84%, respectively). The highest antioxidant activity was observed in stir-fried bitter gourd (0.11±0.012 mg/ml) while least antioxidant activity was recorded in boiled bitter gourd (0.51±0.017 mg/ml).

**Discussion:** Loss of antioxidants due to leaching, degradation and oxidation of compounds could be the reasons for the above changes in the antioxidant properties during boiling, microwave cooking and stir-frying, respectively. The gain of antioxidants could be attributed to release of bound compounds and isomerization during boiling and microwave cooking, respectively.

**Conclusion:** Boiling and microwave cooking of tomatoand boiling of bitter gourd found to the better methods than the other methods studied to preserve as much of the antioxidant present in the fresh vegetable.

Keywords: Antioxidants, bitter gourd, cooking method, tomato