MICROWAVE COOKING TECHNOLOGY AND ITS IMPLICATIONS IN FOOD PROCESSING: A REVIEW

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ABSTRACT
Microwaves are a form of non-ionizing electromagnetic radiation with a frequency higher than ordinary radio waves but lower than infrared light. Microwaves refer to the electromagnetic waves in the frequency range of 300 to 300,000 MHz. A microwave oven heats food by passing microwave radiation through it. Penetration depth of microwaves is dependent on food composition. Lower microwave frequencies with longer wavelengths have more penetrating effect.

Key Words: Food, Food Composition and Microwave Cooking

INTRODUCTION
The use of microwave oven provides a convenient way to thaw, cook and reheat foods. However, the safety of the microwaved food has on and off aroused some public interest. Once microwave energy is absorbed, polar molecules and ions inside the food will rotate or collide according to the alternating electromagnetic field and heat is subsequently generated for cooking (Risk Assessment Studies, 2005).

Efficiency of heating
For cooking or reheating small amounts of food, the microwave oven may use less energy than a cook stove. Although microwave ovens are touted as the most efficient appliance, the energy savings are largely due to the reduced heat mass of the food’s container.

Influence on food composition and nutritional value
Several studies have shown that microwaves negatively impact food’s nutritional value. Other studies show that, if properly used, microwave cooking does not affect the nutrient content of foods to a larger extent than conventional heating, and that there is a tendency towards greater retention of many micronutrients with microwaving, probably due to the reduced preparation time (Lassen and Ovesen, 1995). Microwaving human milk at high temperatures is contraindicated, due to a marked decrease in activity of anti-infective factors (Quan et al., 1992).

Any form of cooking will destroy some nutrients in food, but the key variables are how much water is used in the cooking, how long the food is cooked, and at what temperature. Nutrients are primarily lost by leaching into cooking water, which tends to make microwave cooking healthier, given the shorter cooking times it requires. Like other heating methods, microwaving converts vitamin B_12 from an active to inactive form (Fumio et al., 1998). The amount inactivated depends on the temperature reached, as well as the cooking time. Steamed vegetables tend to maintain more nutrients when microwaved than when cooked on a stovetop. Microwave blanching is 3-4 times more effective than boiled water blanching in the retaining of the water-soluble vitamins folic acid, thiamin and riboflavin, with the exception of ascorbic acid, of which 28.8% is lost (vs. 16% with boiled water blanching) (Osinboyejo et al., 2011).

REFERENCES
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