

SUPPER RESEARCH

Microwave & Deepfrozen

The link between microwaves and health risks has been under the radar for many years. This consumer concern has been caused by media and reports, suggesting microwaves to chemically affect food. Many believe that microwaves make food radioactive, which has been declared impossible by many researchers and experts, however, is still believed by mainstream consumer (CSIRO, 2018).

A microwave works as followed: microwaves are waves of electric and magnetic energy, moving together through space and are a form of electromagnetic radiation (BBC, 2018; FDA, 2016; Harvard Health Publishing, 2019; World Health Organization, 2005).

Electromagnetic radiation comes in many forms, e.g. visible light, radio, X-ray. Due to the same naming of radiation, microwaves have been perceived to have a negative effect on health. A microwave uses a form of non-ionizing radiation. *'Non-ionizing radiation does not have enough energy to knock electrons out of atoms'* (FDA, 2016) whereas ionizing forms of radiation, as in X-rays, can alter atoms and molecules, that could cause cells in organic matters to get damaged at exposure (ibid).

Microwaves are produced inside the magnetron (the electronic cube) where the metal reflects the waves, causing water molecules in food to vibrate. The vibrating molecules produce heat that in turn warms the food. Due to higher content of water in vegetables, these can be heated much quicker than other foods. The electromagnetic microwaves are changed to heat as it is absorbed by the water molecules in food and do not make food 'radioactive', 'toxic' or 'contaminated' (FDA, 2016).

Another misperception of using a microwave is that it would 'zap out' nutrients in food. It is true that some nutrients are broken down when food is exposed to heat, whether one uses a microwave, conventional oven or any other way of heating food. *'The cooking method that best retains nutrients is one that cooks quickly, heats food for the shortest amount of time, and uses as little liquid as possible.'* - Harvard Health Publishing (2019)

Microwaves meet these criteria and allow food to retain more vitamins and minerals than almost any other method of heating food (ibid.).

Frozen food has had a similar, wrong negative customer perception as microwave cooking. Multiple studies do not support the common belief of consumers that fresh food has greater nutritional values than frozen food. A 2-year study published in the Journal of Food Composition and Analysis compared the status of targeted nutrients in three categories of food: fresh, frozen and fresh-stored; referred to as a mimic of typical consumer behavior, where food is stored up to five days of refrigeration (Li et al., 2017). The study is performed by a group of well-respected professionals in the field of Food Science & Technology, Nutrition and Food Studies and is therefore seen as a reliable source. Studies by the University of Chester, the University of Georgia and the University of Wageningen performed similar research, showing the same results.

Supply chains in the hospitality industry perform a similar pattern as fresh-stored: harvest - wholesaler - hotel - preparation - consumer. It is interesting to compare the nutritional values to that of a frozen supply chain, as developed for the concept of SUPPER harvest - preparation - shockfreezing - wholesaler - hotel - regeneration - consumer.

Based on the findings of the different studies, it is proven that the nutritional concentration found in fresh-frozen food generally resembled that of fresh produce. Whereas the nutritional value of fresh-stored and refrigerated produce decreases as storage time increases and reach lowest concentration after only three days. In fact,

Freezing food serves as a 'PAUSE' button, stopping nutritional concentrations to get lost. And is a method of preservation, where additives and preservatives are not needed to extend expiring dates (Bonwick and Birch, 2014; Li et al., 2017; Lienard and Torrens, 2017).