

Microwave Blanching- A reliable alternative in vegetable processing industry

Vegetables are generally low acid foods ($\text{pH} > 6.0$) and blanching is an efficient method of preserving vegetables (& fruits). Blanching is a unit operation prior to freezing, canning, or drying in which fruits or vegetables are heated for the purpose of inactivating enzymes; modifying texture; preserving color, flavor, and nutritional value; and removing trapped air. Hot water and steam are the most commonly used heating media for blanching in industry. However, conventional blanching and pre-drying have the drawbacks of having low energy efficiency, long processing time and increased leaching of minerals and nutrients such as vitamins (Tajner-Czopek et al., 2008).

Studies on the results of microwave blanching versus boiling water blanching on retention of selected water-soluble vitamins in vegetables have shown microwave blanching to be more effective in the retaining the selected water-soluble B and C vitamins and nutrients in vegetables (Osinboyejo, Walker, Ogutu, & Verghese, 2003).

In another recent study comparing traditional hot-water and microwave blanching on quality of green beans (*Phaseolus vulgaris L.*), the microwave treatment of pods, in addition to an effective peroxidase (POD) enzyme inactivation in less processing time, led to a better retention of ascorbic acid (Ruiz-Ojeda & Peñas, 2013). Research in the assessment of microwave methods in blanching of broccoli has also proven that microwave blanching uses less energy on an industrial scale to conventional blanching. **Microwave blanching consumption and energy cost of production is almost of the half in compare with the conventional** (Patricia, Bibiana, & José, 2011). The investigation of the results of microwave pre-treatment on the kinetics of vitamin c loss and peroxidase deactivation in various parts of green asparagus and turnip greens (fig 1) during water blanching proved that microwaves could

be an reliable pre-treatment method for use before water blanching to reduce the loss of vitamin c and to speed up the deactivation of peroxidase and therefore preserve quality (Zheng & Lu, 2011). (Osinboyejo et al., 2003). Another study highlights the potential application of microwave blanching in reducing the loss of valuable nutrients during the blanching of spinach, carrot and bell peppers. (Ramesh et al., 2002).

Therefore, **microwave blanching of vegetables has been shown to be a reliable alternative to the conventional heating process used in the vegetable processing industry.** Only when more research is carried out to allow for better designed more readily available equipment, we may see an increase in their use in the freezing and canning industry.

References

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