

**Title:****Microwave Assisted Freezing of Vegetables****Authors & affiliations:**

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**Abstract:**

Vegetables are an integral part of human's diet since they contain valuable nutrients such as vitamins, antioxidants, fibers, low glycemic index sugar moieties and others. Since the majority of the highly perishable vegetables are seasonal, a great need of good storage, transportation and preservation methods has been arisen over the last century. Several preservation methods have been investigated, developed and exploited over the last years but freezing still remains one of the most popular among them which offers fresh-like characteristics on the food matrix after long period of storage. Prior to freezing, a common pretreatment used is blanching aiming to inactivate deteriorative enzymes, decrease the microbial load and remove the air from the pores which subsequently can affect the quality characteristics of the fruits and vegetables upon storage and thawing. Common blanching and freezing methods although they are effective, they require high energy consumption. Novel methods with high efficiency in terms of quality, energy and use of resources deem to be necessary.

Herein, a tailored microwave blanching and microwave assisted freezing prototype equipment and the developed methodology will be presented. In this study potato (*Solanum tuberosum*, *Carolus var.*) was selected as a vegetable matrix. Impact on the quality attributes of both steps such as the enzymatic remaining activity (i.e. polyphenol oxidase) after microwave dry blanching and the microstructure of the potatoes after microwave assisted freezing will be discussed. The microstructure results, acquired by means of X-ray microphotography, showed that the size of the ice crystals was decreased in all the different microwave assisted freezing conditions tested compared to conventional.

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