

## Investigation of Dry-Blanching and Freezing Methods of Fruits

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**Abstract :** Fruits and vegetables are characterized as perishable food matrices due to their short shelf life as several deterioration mechanisms are being involved. Prior to the common preservation methods like freezing or canning, fruits and vegetables are being blanched in order to inactivate deteriorative enzymes. Both conventional blanching pretreatments and conventional freezing methods hide drawbacks behind their beneficial impacts on the preservation of those matrices. Conventional blanching methods may require longer processing times, leaching of minerals and nutrients due to the contact with the warm water which in turn leads to effluent production with large BOD. An important issue of freezing technologies is the size of the formed ice crystals which is also critical for the final quality of the frozen food as it can cause irreversible damage to the cellular structure and subsequently to degrade the texture and the colour of the product. Herein, the developed microwave blanching methodology and the results regarding quality aspects and enzyme inactivation will be presented. Moreover, heat transfer phenomena, mass balance, temperature distribution, and enzyme inactivation (such as Pectin Methyl Esterase and Ascorbic Acid Oxidase) of our microwave blanching approach will be evaluated based on measurements and computer modelling. The present work is part of the COLD $\mu$ WAVE project which aims to the development of an innovative environmentally sustainable process for blanching and freezing of fruits and vegetables with improved textural and nutritional quality. In this context, COLD $\mu$ WAVE will develop tailored equipment for MW blanching of vegetables that has very high energy efficiency and no water consumption. Furthermore, the next steps of this project regarding the development of innovative pathways in MW assisted freezing to improve the quality of frozen vegetables, by exploring in depth previous results acquired by the authors, will be presented. The application of MW assisted freezing process on fruits and vegetables it is expected to lead to improved quality characteristics compared to the conventional freezing. Acknowledgments: COLD $\mu$ WAVE has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grand agreement No 660067.

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