Immobilization of yeast on dried raisin berries for use in dry white wine-making

Cell immobilization for wine-making has been extensively studied during the past three decades due to a number of technical and economic advantages over free cell systems. Taking into account that the raw material for wine-making is grapes, it was thought that it would be interesting to use grape products, such as residual grape skins, as a support for the immobilization in wine-making. Scientists from Greece and UK carried out studies to investigate the suitability of raisins as immobilization supports, suitable for wine-making at ambient and low temperatures, that would lead to a dry white wine of improved aroma profile that could be characterized as novel. Cells of a commercial Saccharomyces cerevisiae strain (Uvaferme 299) were immobilized on dried raisin berries (Sultanina variety) to produce an immobilized biocatalyst for use in dry white wine-making. The immobilized biocatalyst was found to be suitable for wine making at ambient temperatures (15-25 °C). The wines produced had low volatile acidities and low methanol and acetaldehyde contents, while volatile by-products showed no statistically significant differences from wines produced by free cells. The immobilized cell system had a good operational stability for more than 4 months. Sensory evaluation revealed differences between wines produced by immobilized and free cells.

Grape raisins are materials suitable for yeast immobilization. They are cheap, readily available, of food grade and their use needs no pretreatment. The immobilized biocatalyst shows good stability, which makes its use possible at industrial scale. The alcohol-tolerant yeast strain used was not negatively affected by the immobilization and the biocatalyst support produced wines with special flavour, improved quality due to low volatile acidity, low acetaldehyde and ability to decrease use of SO2 [Tsakiris A, Bekatorou A, Psarianos C, Koutinas AA, Marchant R and Banat IM, Immobilization of yeast on dried raisin berries for use in dry white wine-making, Food Chem, 2004, 87 (1), 11-15].

Effect of high pressure processing on Valencia and Navel orange juice

Today's consumers desire high quality foods that are convenient, nutritious, with freshly prepared flavour, texture and colour, with minimal or no chemical preservatives, and above all safe. Although conventional thermal processing ensures safety and extends the shelf-life of foods, it often leads to detrimental changes in the sensory qualities of the product. High pressure processing (HPP) is an attractive non-thermal process because the pressure treatments required to inactivate bacterial cells, yeasts and moulds have a minimal effect on the sensory qualities associated with 'fresh-like' attributes such as texture, colour and flavour.

Researchers at Food Science Australia, North Ryde, Australia carried out studies to determine a commercially suitable HPP that would allow production of a high quality orange juice with a refrigerated shelf-life sufficient to meet the requirements of the Australia export and domestic markets while ensuring product safety. The quality and shelf-life of high pressure processed (HPP) Valencia and Navel orange juices were compared to fresh and thermally pasteurized juices. The juices were pressure processed at 600 MPa, 20 °C for 60 s and stored at 4 and 10 °C for up to 12 weeks. The microbiological, physical, chemical and nutritional properties of the juices and pectin methyl esterase (PME) activity were analyzed at regular intervals. HPP of the juices reduced the microbial load to non-detectable levels immediately after processing. Storage of the juices at 4°C kept the microbial load below the limit of detection for at least the first 4 weeks of storage, and then to less than 2log10 cfu/ml for up to 12 weeks. PME was not completely deactivated in the Valencia juice (pH 4.3) by HPP or thermal treatment (65°C, 1 min). In the Navel juice (pH 3.7), PME was reduced significantly with thermal treatment (85°C for 25 s) and with HPP. Other orange juice quality parameters (°Brix, viscosity, titratable acid content, alcohol insoluble acids, browning index and color), ascorbic acid and β-carotene concentrations of the juices were not significantly affected by HPP.

The results suggest that high pressure processed orange juice is comparable to fresh juice in nutrient content and all other quality indicators but with significantly better microbiological stability and extended refrigerated shelf-life. Inactivation of PME by HPP at 600 MPa, 20 °C was dependent on juice pH being <3.7 and the duration of hold time [Bull Michelle K, Zerdin Katherine, Howe Effie, Goicoechea Dimitria, Paramanandhan Priscilla, Stockman Regine, Sellahewa Jay, Szabo Elizabeth A, Johnson Robert L and Stewart Cynthia M, The effect of high pressure processing on the microbial, physical and chemical properties of Valencia and Navel orange juice, Innov Food Sci Emerg Technol, 2004, 5 (2), 135-149].