



STUDY OF THE TURBO-TECHNOLOGY POTENTIAL IN THE PRODUCTION OF GLUTEN-FREE INGREDIENTS AND POTATO-BASED PASTA

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New market opportunities for pasta producers, especially in the sector of fresh products, are nowadays opening thanks to the consumers' demand for healthier and innovative foods and the increase in dietary restrictions. In grain-based foods, contemporary trends include the quality improvement of pasta for people suffering from celiac disease or other allergic reactions to gluten. However, the absence of gluten represents a challenge for good quality products, mainly in terms of structure [1, 2, 3, 4]. In this context, new technologies able to improve the techno-functionalities of gluten-free (GF) flours and/or to better texturize GF pasta products are very important for food industries. The turbo-technology patented by VOMM® Impianti e Processi S.p.A. (Rozzano, Italy) is a treatment combining heat and shear that can be used for modifying technological properties of different types of flours and for potato-based pasta (i.e., gnocchi) production. This technology, thanks to a specially designed turbine and a centrifuge, guarantees a rapid and uniform treatment of the product by creating strong turbulence in a thin layer of material in contact with a heated surface [5]. For flour treatment, a turbo-cooker and a turbo-dryer are installed in a cascade-configuration, whereas for pasta only the turbo-cooker is needed.

This work aims at presenting the results of systematic studies focused on the evaluation of the turbo-technology performances in modifying the technological properties of rice flour and in the production of GF potato-based pasta (i.e., gnocchi). The case study of rice flour considered turbo-cooking temperature (120-200 °C), added water (30-40%), and turbo-drying temperature (160-200 °C) as experimental factors. As for GF gnocchi, besides the turbo-cooking temperature (85 and 93 °C), also formulation changes were considered (i.e., corn flour, rice flour, and dried potato ratios; amount of water) [3].

The most important factor in modifying rice flour techno-functionality was the added water, significantly ($p < 0.001$) affecting all the treated flour characteristics (i.e., moisture, damaged starch, pasting properties, and cold viscosities). A pre-wetting of flour (40% water), followed by turbo-treatment at 200 °C resulted in high damaged starch values (49.5 ± 1.5 g/100 g db) and high levels of cold viscosities (from 6213 to 21436 cP), thus providing rice flour with improved technological properties, suitable for GF food production.

As for GF gnocchi production, quality descriptors (i.e., gnocchi cooking behaviour and texture) very similar to those of conventional gnocchi containing wheat flour were obtained by applying the turbo-technology, especially at the highest temperature. However, the amount of water added in the formulation and the ratio between corn and rice flour proved to be the critical parameters as well [3].

Based on the results of these studies, the turbo-technology can be considered a valuable tool for food industries producing GF ingredients and/or products to tailor techno-functionalities.

References

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