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Use of Hyper Spectral Imaging to Estimate the Soy Flour Content in Dried Pasta

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ABSTRACT

Pasta is a very popular food obtained by extrusion, lamination or shaping, generally followed by drying, of a mixture of semolina and/or wheat flour and water. Since traditional pasta is in the maturity stage of its life cycle, price can be secondary to quality in consumer choice. In order to increase purchase and expand consumer targets, new pasta products have been developed. Among these new types, functional pasta is gaining the favor of consumers interested in wellness since it contains bioactive components able to enhance health or reduce risk of disease. Pasta enriched with soy flour can be considered as a functional food, due to its content in nutraceutical compounds such as isoflavones and other antioxidants. The quantification of a functional ingredient is an important step in the food authenticity assessment since it contributes both to the nutritional and economical value of the products. The availability of non-destructive techniques for quantitative and qualitative analyses of foodstuffs is therefore desirable. Hyperspectral imaging (HSI) integrates conventional imaging and spectroscopy to obtain spatial and spectral information of an object. This research was aimed to investigate the feasibility of hyperspectral imaging in the reflectance mode for the evaluation of the soy flour content. Samples of dried pasta in shape of spaghetti were produced with durum wheat semolina and soy flour at increasing percentages (0, 10, 15, 25 and 50%). Significant differences among pasta samples were highlighted at wavelengths between 480-505 and 515-530 nm. The reflectance at 520 nm, which was correlated to the carotenoid content, was used to estimate the percentage of soy flour in the dried pasta. The hyperspectral imaging technique in the reflectance mode was able to correctly assign the percentage level of semolina-soy replacement.

Keywords: Authenticity assessment, Hyperspectral imaging, Soy, Spaghetti, Mathematical modeling, Reflectance

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