ID-11-P-2364 Detection of non-enzymatic browning in fruit fillings by auto-fluorescence of melanoidin precursors

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Fluorescence detection of the products of Maillard reaction under blue light excitation represents a promising technique for rapid visualizing the degree of browning of fruit fillings and sensory analysis. The main goal of this study was to evaluate the possibility of using auto-chemifluorescence of melanoidin precursors for evaluating non-enzymatic browning in fruit fillings with a wide range of soluble solids. The fruit filling samples were produced from apple puree with different amounts of sugar, inulin, low-metoxyl pectin, low acyl gellan gum and citric acid, sterilized, stored during 6 months and further observed in a thin layer by means of fluorescence microscopy without using special fluorescent substances. In confectionary products browning process generally takes place after an induction period, characterized by the creation of fluorescent uncolored intermediates. Fluorophores are considered precursors of brown pigments and permit to detect the Maillard reaction development before any visual change occurs. It was revealed that the intensive source of the autofluorescence in fillings' compositions is generally localized in polysaccharide structures partially destroyed during thermal treatment and storage, thus melanoidin precursors are mainly formed in these parts. The obtained fluorescent micrographs of the analyzed fruit fillings were compared to the results of color and hydroxymethylfurfural content. The total area of highly fluorescence compounds under blue light excitation in fruit fillings with high soluble solids and significant amount of added polysaccharides (inulin, pectin and gellan gum) was much bigger than in low-sugar samples with low amount of polysaccharides and also statistically significant differences among this value and browning process were revealed.
Fig. 1: Fluorescent micrograph of a fruit filling with 30 Brix and 8% inulin

Fig. 2: Fluorescent micrograph of a fruit filling with 70 Brix and 4% inulin