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Furan content and non-enzymatic browning in starchy food model systems

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The presence of furan a "possibly carcinogenic compound to humans" in a broad range of foods is related to its multiple routes of generation, involving mainly the thermal degradation of food building blocks such as carbohydrates, ascorbic acid, amino acid and poly unsaturated fatty acids.

Considering that non-enzymatic browning in foods is also a consequence of these reactions, we decided to explore the existence of some relation between the furan content and color development in low moisture starchy foods processed at high temperature (e.g. bread).

The present work studied the effect of baking process and ascorbic acid concentration over furan occurrence and non-enzymatic browning in a starchy food model system.

For this purpose, two formulations of wheat flour dough (WF: wheat flour and WF-AA: wheat flour and ascorbic acid) were prepared and cut in circle chips (d: 40 mm h: 2.3 mm) which were baked at 200°C for 5, 7 and 9 minutes. Furan contents and color were determined in samples after baking.

For present model conditions AA increases furan generation (e.g. 75 % more in WF-AA samples than in WF ones baked during 9 minutes).

Color represented by the parameters L^* (luminosity component) and a^* (red component) showed linear correlations with furan content of WF (r^2 of 0.88 and 0.87 respectively) and WF-AA chips (r^2 of 0.72 and 0.89 respectively), suggesting a relationship between the furan formation and color development during baking.

For both WF and WF-AA samples L^* tended to decrease with the baking time since the samples get darker. On the other hand, a^* showed an increase during the baking process due to samples get more red coloration.

As for Maillard reactions in general, for all samples, an increase in furan level and in the degree of non-enzymatic browning were observed when the moisture content decreased.

Keywords

furan formation, non-enzymatic browning, starchy food model system



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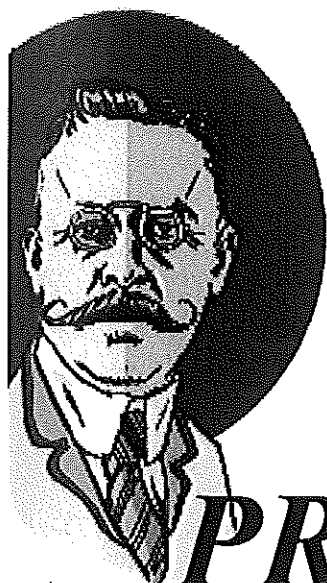
Centenary of the Maillard reaction discovery (1912 - 2012)

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ABSTRACTS

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