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The influence of baking conditions on tocopherols degradation kinetics

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In Portugal and many other countries, there is a high potential market for enriched baking products. Tocopherols are natural antioxidants found mainly in vegetable oils. These compounds have vitamin E activity shown to reduce the risk of coronary heart disease and heart attacks. The main objective of this work was to determine the effect of baking conditions (time, temperature, profile) in the vitamin E retention, in pão deló. Pão deló is a typical Portuguese baking product with sugar, wheat flour, baker's yeast, and eggs. This recipe was enriched with α and δ - tocopherol standards to a final concentration of 1 mgKg^{-1} . The product was submitted to a baking process using temperatures from 180°C to 210°C and processing times from 20 to 45 minutes. For each temperature, samples were collected during the baking process to establish the degradation kinetics of both α and δ - tocopherol. Temperature data loggers were used to determine the temperature profile in the cake by placement on the crust and in the center of the product. Tocopherols quantification was made by HPLC using a Pinnacle II silica column under UV detection after an extraction process using n-hexane. The quantifications to determine the degradation kinetics and the optimal baking conditions were made considering the total tocopherols quantification and also the degradation profile of these compounds inside the cake. Depending on the oven temperature, the degradation of the tocopherols is a reality. This should not hinder the possibility of including such compounds in future formulations of this (and other) baked product. In the future, these results could establish a mathematical model to estimate the final concentration of tocopherols in similar baking products as a function of baking conditions.