

Effect of processing and storage on the chemical quality markers of spray-dried whole egg

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Abstract

Hen eggs are a primary source of high quality proteins at low cost and offer a balanced distribution of minerals and vitamins, particularly vitamin E, A, B₁₂, B₂ and folate, as well as high amounts of lipids such as triacylglycerols, phospholipids and cholesterol.

The dried eggs are widely used in food preparations because of their microbiological safety and their reduced volume with respect to unshelled or liquid eggs. Moreover, the appeal of dried eggs is the apparent easy and long shelf life; in fact, this product is usually stored without particular care. However, the quality of the raw material, the processing and storage conditions strongly influence the quality and safety of egg powder. The aim of the present work was to assess the quality of egg powder after heating and during storage using two types of chemical reactions: 1) degradation, denaturation and inactivation of heat-labile components and 2) formation of new compounds which are not present, or only at trace level, in an unprocessed product.

Chromatographic techniques were used in order to determine the modifications induced in egg by a spray-drying treatment on the native constituents and on the formation of cholesterol oxidation products (COPs) and early Maillard reaction products. A powdered egg sample was stored 12 months at room temperature and at 4 °C, and sampled at 1, 3, 6 and 12 months. The spray drying treatment did not affect tocopherol and retinol composition, but caused a severe Maillard reaction and accelerated cholesterol oxidation. Only slight modifications were registered in powdered egg stored at 4 °C. During storage at room temperature, however, COPs increased significantly, tocopherols and retinols decreased, whereas furosine was not significantly modified.