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The use of fennel polyphenols based ingredients as natural preservers for cottage cheese

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There is a growing interest in the development of foods containing natural preservers that could replace synthetic additives associated to some toxic effects for consumers [1]. In the present work, it was demonstrated the antioxidant (free radicals scavenging activity, reducing power and lipid peroxidation inhibition) and antimicrobial (against bacteria such as *Salmonella typhimurium* and *Bacillus cereus*, and fungi such as *Aspergillus niger*, *A. versicolor* and *Penicillium funiculosum*) potential of a *Foeniculum vulgare* Mill. (fennel) decoction extract, highlighting the opportunity of using this ingredient as natural preserver. Chemical characterization of the extract, performed by HPLC-DAD-ESI/MS, revealed the presence of five flavonoids (mainly quercetin-3-O-glucoside) and twelve phenolic acids (mainly 5-O-caffeoylquinic acid). It was then incorporated (at EC₂₅ value=0.35 mg/mL, previously determined by DPPH assay; [2]) in cottage cheese (prepared by Queijos Casa Matias Lda.) with the purpose of increasing the shelf life of the mentioned dairy product. The results showed that the use of the fennel polyphenols extract as a natural ingredient did not alter significantly the nutritional characteristics of control cottage cheese (including macronutrients, energetic value and fatty acids), but it seems to prevent the increase in yellowness (*b** color parameter) after 7 days of storage, and the decrease in lactose content observed after 14 days of storage in control samples (without the fennel-based ingredient). Actually, after two weeks of storage control samples were the only ones showing signs of degradation. Furthermore, the incorporation of the fennel polyphenols extract improved the antioxidant properties of cottage cheese. The obtained results supported the use of the polyphenols extract obtained by fennel decoction as a natural preservative for cottage cheese.

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