Shelf-Life of an Extruded Blend of Peanut, Soybean and Corn

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Abstract: The Shelf-Life (SL) of peanut, soybean and corn blend extruded without (A) and with butylhydroxytoluol (B) and extract of Rosmarinum sp (C) was determined. Only B significativaly increased SL. In function of temperature would be defined by: A- SL = $e^{-0.0465x + 5.1762}$, B- SL = $e^{-0.0421x + 5.3332}$, C- SL = $e^{-0.581x + 5.626}$

Introduction

In order to attain a nutritional, low cost and consumer accepted food, Bustamante et al (1998) developed an extruded blend of peanut, soybean and corn. The main chemical deterioration, that could limit the extrudate stability, is oxidation due to its low water activity and its proportion of unsaturated fatty acids: >80%. The objective of this study was to determine the shelf-life of the extrudate with and without antooxidants (natural and synthetical) in function of temperature.

Experimental

Treatments: *A*- Extrudate of peanut, soybean and corn, *B*- *A* + butylhydroxytoluol, *C*- *A* + extract of *Rosmarinum sp*. The extrudates were accomplished in a prototype extruder of the INIQUI (UNSa) and were subjected at different times and temperatures.

Chemical analysis: The oil matter was extracted with n-hexane in a Soxhlet apparatus for 4 h. On this fraction were performing the following assay: Peroxide index (PI) and acidity index (AI) according to *AOAC* (1980), and unsaturated fatty acids (uFA) according to Maestri and Guzmán (1995).

Sensory evaluation: Preselection, training and selection of panelists were performed through ranking test, and the assay of *A*, *B* and *C* through triangle test (*IRAM*, Jellinek 1985).

Shelf-Life and value Q_{10}: were determined working at 30 and 40°C (Fennema 1993).

Statistical analysis: ANOVA, Duncan and lineal regression ($n = 3$, $P \leq 0.05$) were used. The results of the triangle test were analysed according to Jellinek (1985).

Results and Discussion

Chemical analysis: **PI**- Only *B* offered significant protection against oxidation. **AI**- The free acids of *B* increased in less proportion than *A* and *C*. **uFA**- Its proportion decreased in time function, being less evident to *B* and more evident to *A*.

Sensory evaluation: From 40 participants, 11 panelists were selected. The treatment did not detected was: 40 days, 40°C of *A*, *B* and *C*. Few panelists detected it, they defined it like "the more *soft*". The shelf-life could be established for detriment of its organoleptic characteristics, rather than presence of minimal intensity of rancidity.

Shelf-Life (*SL*) and value Q_{10}: The *SL* of *A*, *B* and *C* was determined from lineal tendency of the PI in time function at 30 and 40 °C. The PI of *B*, 40 days, 40°C was used like threshold. Therefore, *SL* in function of the temperature resulted: *A*- $SL = e^{-0.0465x + 5.1762}$, *B*- $SL = e^{-0.0421x + 5.3332}$, *C*- $SL = e^{-0.581x + 5.626}$. Value Q_{10}: 1.59, 1.52 and 1.79 to *A*, *B* and *C*, respectively. Theoretical *SL* of each extrudate at 60°C was estimated and was compared with experimental *SL*: resulted resembling, specially *A* and *C*.

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References and Notes

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