



MOLECULAR AND THERMAL CHARACTERIZATION OF WHITE LUPIN (*Lupinus albus*) PROTEIN ISOLATES

G. G. Fontanari¹, J. M. Martins², M. Kobelnik³, I. A. Pastre⁴, F. L. Fertoni⁴, J. A. G. Arêas⁵, J. P. Batistuti¹

¹Faculdade de Ciências Farmacêuticas – Departamento de Alimentos e Nutrição – Cep 14801-902, Unesp – Araraquara, SP, Brasil. ²Departamento de Zootecnia-Universidade de Évora, Portugal. ³Instituto de Química, Unesp – Araraquara, SP. ⁴IBILCE, São José do Rio Preto. ⁵Faculdade de Saúde Pública - Departamento de Nutrição – USP – São Paulo – SP.

*E-mail: guganari@fctfar.unesp.br

In this work differential scanning calorimetry (DSC) and SDS-PAGE techniques were used to study protein isolates from white lupine seeds flour (*Lupinus albus*). The white lupine seeds flour was obtained with a protein content of $(49.88 \pm 0.08)\%$. Samples solubility curves were obtained by pH adjustment in the interval $1 \leq \text{pH} \leq 12$, both in the presence and absence of salts (NaCl, 0.3, 0.5 mol L⁻¹ and in Na₂SO₃ 0.25%, w/v), followed by protein isoelectric precipitation. Protein isolate (PIs) obtained in the pH range of **(a)** $7 \leq \text{pH} \leq 10$, in the presence of NaCl 0.3 mol L⁻¹, showed protein content (PC) in the range of $83.7 \leq \% \text{ PC} \leq 92.6$, while **(b)** for pH 10, in the presence of NaCl 0.5 mol L⁻¹, followed by dialysis, a protein content of $96.6 \pm 1.6 \%$, was obtained. These PIs and the white lupine flour were submitted to SDS-PAGE and thermal analysis. The protein migration patterns in SDS-PAGE from all white lupine samples tested were identical, presented 8 electrophoretic bands with molecular masses ranging from ~14 to 71 kDa. No differences were observed between the protein migration patterns of white lupine flour and protein isolate samples, independently of the isolation method used. This suggests that the experimental conditions used to obtain the protein isolates did not alter the white lupine native protein profile. However, the DSC curves for PIs extracted at pH 7 showed that ΔH values were ~15 % superior to those found for PIs extracted at pH 10 and in the absence of salts. This suggests the obtaining of a protein isolate of higher stability in neutral conditions and the maintenance of the original conformation. The T_{peak} of PIs obtained at pH 7 (NaCl 0.3 mol L⁻¹) and alkaline conditions ($10 \leq \text{pH} \leq 11$, in the absence of NaCl salt) did not significantly changed maintaining the values approximately at 70°C. For PIs extracted in pH values from 8 to 9, in the presence of NaCl 0.3 mol L⁻¹, T_{peak} was displaced towards smaller temperatures ($\Delta T_{\text{peak}} \sim 5 \text{ }^\circ\text{C}$). This temperature difference could be due to differences in the protein structure.

Keywords: DSC; protein isolate; SDS-PAGE.