

## Thermal studies on protein isolates of white lupin seeds (*Lupinus albus*)

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**Abstract** This study used TG, DSC, and SDS-PAGE techniques to study protein isolates (PIs) in the powder form obtained from lupin seeds flour *Lupinus albus*. Different methods of preparing PIs were tested, resulting in final products that were different only in relation to the yield and protein content. The results of the protein analysis by SDS-PAGE showed that the same protein fractions were present in the lupin seeds and in the obtained PIs. This result shows that the process of extraction was not damaging to the composition of the original protein. On the other hand, the results of the thermal analysis (DSC and TG-DTG curves) obtained for the different PIs, led to the detection of changes in the protein conformation through

the  $\Delta H$  values, which in general decreased with increasing values of pH and ionic strength in the experimental conditions of extraction.

**Keywords** *Lupinus albus* · TG · DSC · Protein isolate · SDS-PAGE

### Introduction

Legumes have been consumed for a long time, essentially in the form of grain. Nowadays, these plants are also utilized in other forms such as flour, concentrates, and protein isolates [1, 2]. The consumption of legumes and their components is growing due to, among other factors, several recent studies indicating beneficial effects to human health of legume when compared to animal protein consumption, and the availability of varieties with low contents of anti-nutritional factors [3, 4].

Lupin is a more versatile legume than soybean, since it grows better in low fertility soils and in regions with mild winters and/or colder and wetter summers. This legume has been consumed by humans for more than 3,000 years in the Mediterranean region [5]. The protein-rich lupin has an amino-acid profile similar to that of soybean and a high potential to be exploited in the manufacture of food products [1, 6]. Nevertheless, the use of protein isolates by the food industry is not only conditioned by their nutritive quality, but also by other factors affecting their functional properties, such as solubility and emulsifying properties [6].

The increasing use of lupin proteins by the food industry is stimulated mainly by the beneficial effects of these macromolecules and their major globulin components (beta- and alpha-conglutins) on human health and

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