Hindawi Publishing Corporation
International Journal of Agronomy
Volume 2012, Article ID 387407, 7 pages
doi:10.1155/2012/387407

Research Article

Changes in Protein, Nonnutritional Factors, and Antioxidant Capacity during Germination of *L. campestris* Seeds

C. Jiménez Martínez,[1] A. Cardador Martínez,[2] A. L. Martinez Ayala,[3] M. Muzquiz,[4] M. Martin Pedrosa,[4] and G. Dávila-Ortiz[1]

[1] *Departamento de Graduados e Investigación en Alimentos, Escuela Nacional de Ciencias Biológicas, Instituto Politécnico Nacional, Prol de Carpio y Plan de Ayala, 11340 México, DF, Mexico*
[2] *Biotecnología Alimentaria, Instituto Tecnológico y de Estudios Superiores de Monterrey, Campus Querétaro, Avenida Epigmenio González 500, Fraccionamiento San Pablo, 76130 Santiago de Querétaro, QRO, Mexico*
[3] *Centro de Investigación en Biotecnología Aplicada, IPN, Carretera Estatal Tecuexcomac-Tepetitla Km 1.5, 90700 Tepetitla de Lardizábal, TLAX, Mexico*
[4] *Departamento de Tecnología de Alimentos, INIA, Apdo 8111, 28080 Madrid, Spain*

Correspondence should be addressed to C. Jiménez Martínez, crisjm_99@yahoo.com and G. Dávila-Ortiz, gdavilao@yahoo.com

Received 11 May 2012; Accepted 23 November 2012

Academic Editor: Antonio M. De Ron

Copyright © 2012 C. Jiménez Martínez et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

The changes in SDS-PAGE proteins patterns, oligosaccharides and phenolic compounds of *L. campestris* seeds, were evaluated during nine germination days. SDS-PAGE pattern showed 12 bands in the original protein seeds, while in the samples after 1–9 germination days, the proteins located in the range of 28–49 and 49–80 kDa indicated an important reduction, and there was an increase in bands about 27 kDa. On the other hand, oligosaccharides showed more than 50% of decrease in its total concentration after 4 germination days; nevertheless after the fifth day, the oligosaccharides concentration increases and rises more than 30% of the original concentration. Phenolic compounds increased their concentration since the first germination day reaching until 450% more than the original seed level. The obtained results are related with liberation or increase of phenolic compounds with antioxidant properties, allowing us to suggest that the germination would be used to produce legume foods for human consumption with better nutraceutical properties.

1. Introduction

Legume seeds are important staple foods, particularly in developing countries, due to their relatively low cost, long conservation time, and high nutritional value; among these meals it is *Lupinus* seeds and their derivatives. This legume is one of the richest sources of vegetable protein, and although the protein content and amino acid profile vary between species, the intraspecies variability is low. In 2009, the FAOST reported that the area harvested was 662712 Ha, and *L. albus* and *L. angustifolius* were the most widely used. About 100 wild species have been reported throughout México [1]. These wild lupins have not been exploited at a commercial level. For this reason, in the present work we consider them as potential providers of vegetable proteins for human consumption. *Lupinus campestris* seed, like other *Lupinus* species, has high protein content (44%) [1, 2]. Lupin seeds offer some advantages in comparison with soy bean, since it contains only small amounts of trypsin inhibitors, tannins, phytates, saponins, α-galactosides, and so forth [3, 4]. However, a limitation for the wider use of lupins has been their high content of quinolizidine alkaloids [5, 6] as well as condensed tannins [7, 8]. Consequently, it is desirable to develop transformation processes which could improve the nutritional quality of legumes and also provide new derived products for the consumers. Germination is considered a potentially beneficial process for legume seed transformation which may decrease undesirable components such as alkaloids and phytates [9], and during germination, some grade of transformation of alkaloids to other more bioactive compounds, such as esters, occurs [7]. Cuadra et al. [3] and De Cortes-Sánchez et al. [7] found a slight increase in