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Preparation and characterization of proteinous film from lentil (*Lens culinaris*)
Edible film from lentil (*Lens culinaris*)

Fatemeh Bamdad, Amir Hossein Goli, Mahdi Kadivar *

Department of Food Science and Technology, College of Agriculture, Isfahan University of Technology, Isfahan 84156 83111, Iran

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Abstract

This study was conducted to extract protein from lentil seed and prepare edible film from the protein and to determine mechanical, optical and barrier properties of lentil protein concentrate (LPC) film. The film was prepared from LPC (5 g/100 ml water) and glycerine (50%, w/w of LPC). Hunter color value (*L*, *a* and *b*), tensile strength, percentage elongation at break (*E*), puncture strength, water vapor permeability (WVP), moisture content after conditioning at 50% RH and 25 °C for 48 h and total soluble matter after immersion in water, were measured. In regarding to WVP, in spite of difference in film thickness and relative humidity of experiment in different studies, lentil protein film is comparable with other protein films. Characteristics of the lentil protein-based edible films were comparable with other edible protein films. LPC film had more red and less yellow color; it seems that the film had good mechanical properties and water vapor permeability in concomitant with good solubility.

Keywords: Lentil (*Lens culinaris*); Lentil protein concentrate; Edible film; Mechanical properties; Water vapor permeability

1. Introduction

Coating and films have been used for many decades to protect food from microbial attack and to prevent water loss during storage. Consumer demands higher quality and longer shelf-life in foods, while reducing disposal packaging material and increasing recycleability (McHugh, Avena-Bustillos, & Krochta, 1993). In this regard, considerable research has been reported on edible films, which have many advantages over synthetic films (Tharanathan, 2003).

Several biopolymers, including polysaccharides, proteins and lipids have been used as a biodegradable film. In general, protein films are effective lipid, oxygen and aroma barriers at low relative humidity (RH) conditions, therefore, proteins are used widely to form edible films. Proteins such as gelatin (Arvanitoyannis, Psomiadou, Nakayama, Aiba, & Yamamoto, 1997), whey protein (Fang, Tung, Britt, Yada, & Dalgleish, 2002), wheat and corn proteins (Gennadios & Weller, 1990) and soy protein (Pol, Dawson, Acton, & Ogale, 2002) have been extensively studied.

Limited information is available on the use of legume seeds protein for packaging applications; although, pea (Choi & Han, 2001) and peanut (Jangchud & Chinnan, 1999) proteins along with soy protein have been studied for use as edible films.

Like most synthetic polymers, edible film materials require property modifiers to improve the physical and mechanical properties of the film. As with synthetic plastics, plasticizers are incorporated into the edible coating/film materials which overcomes the brittleness caused by extensive intermolecular forces. The most common edible plasticizers are polyols, mono/di or oligosaccharides, lipids and derivatives (Choi & Han, 2001).

* Corresponding author. Tel.: +98 311 3913343; fax: +98 311 3912254.
E-mail address: mak120@mail.usask.ca (M. Kadivar).

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