Effects of Oil Extraction on Functional Properties of Protein in Pennycress (Thlaspi arvense L.) Seed and Press Cake

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INTRODUCTION
Pennycress (Thlaspi arvense L.) is a common agricultural weed in temperate North America; also known as foxtail, pennycress, or stinkweed. Advantages include high seed yield, high oil content in seeds, suitable for two-crop rotation with soybeans [1]. Pennycress is a weed in temperate North America; its biological properties should be examined to identify novel potential uses of the seed and its oil.[1]

METHODOLOGY

Materials and Oil Processing

Advantages: high seed yield, high oil content in seeds, suitable for two-crop rotation with soybeans [1]. Pennycress is a weed in temperate North America; its biological properties should be examined to identify novel potential uses of the seed and its oil.[1]

FOOD PROCESSING OF PENCYCRESS

Materials and Oil Processing

Press cake

Pause pressing

Grinding Pennycress Seeds and Press Cakes (PC)

SDS-PAGE

Method: Wu et al. [5]
Sample: 0.1 M NaOH, 3X, 15 min shaking

PROTEIN FUNCTIONALITY TESTS

Foaming properties
Method: Myers et al. [6]
Sample concentration - 10 mg protein/mL

Emulsification properties
Method: Wu et al. [6]
Emulsion preparation - 2 mL corn oil + 6 mL sodium caseinate + 0.5 M NaCl

Protein Functionality Tests (continued)

Fouling properties
Method: Myers et al. [6]
Sample concentration - 10 mg protein/mL

Emulsification properties
Method: Wu et al. [6]
Emulsion preparation - 2 mL corn oil + 6 mL sodium caseinate + 0.5 M NaCl

RESULTS

Proximate Analyses

Sample: 0.1 M NaOH, 3X, 15 min shaking

Soluble extracts from all samples had the highest NaOH-soluble protein and that left in the spent solids were greater than in the seed or cold-pressed cake. Ground pennycress seed and cold-pressed cake had very low NaCl-soluble protein classes in pennycress seed protein.

Solubility Profile
Pennycress seed meal protein showed poor solubility at pH 7-10 (Fig. 2), being least soluble at pH 7 and most soluble at pH 10. Protein from both press cakes showed similar solubility behavior, but the cold-pressed cake proteins had slightly higher NaOH-soluble protein amounts, especially at pH 10.

Proteins in pennycress seed and press cake proteins were highly soluble at pH 7-10. These protein properties are very comparable to that of soy protein (135 mL, framing capacity and 90% foam stability).

REFERENCES