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EFFECT OF MICROWAVE TREATMENT ON THE ANTINUTRITIONAL FACTORS AND PROTEINS OF FIELD BEANS

BY

Abd El-Rahman, A.A. and Abd El-Aleem, I.M.
Dept of Agric Biochemistry, Fac. of Agric. Moshtohor, Zagazig Univ., Egypt.

ABSTRACT

Whole seeds of two varieties of faba beans at 3 different moisture levels were microwaved for various periods (2, 4, 6, 8 and 10 min), to study its effect on trypsin inhibitor activity (TIA), tannins, vicine, pectein, protein solubility (PS) and subunit structure of proteins. Increase in faba bean moisture contents caused an increase in trypsin inhibitor destruction reached to 96.3% after microwave treatment for 8 min. at moisture content of 28.2%. On the other hand, vicin reduced by 36.79%, pectin by 52.85% and tannins by 44.92%.

The increase in faba moisture contents and microwave treatment periods significantly decreased protein solubility accompanied by an increase in its digestibility and free amino acids. Electrophoretic separation of soluble protein using SDS-PGAE showed 12 subunits with molecular weights ranged from 80,000 to 13,000 KD. Microwave treatment had great effect on protein subunits especially those of high molecular weights which disappeared and might be destroyed to lower molecular weight subunits.

INTRODUCTION

Field beans (*Vicia faba*) is an important source of high quality plant protein for human consumption, but the seeds contain various antinutritional factors which elicit adverse nutritional effects. Such antinutritional factors, namely eg. vicine, trypsin inhibitors and tannins play an important role in decreasing the nutritional value of legume foods. The hydrolysis of vicine and covicine (glycosides) to different constituents which, caused a rapid oxidation of glutathione (GSH) in glucose 6-phosphate dehydrogenase. Mager *et al.*, (1965).

Trypsin inhibitors stimulate pancreatic juice secretion and cause pancreatic hypertrophy and growth inhibition (Liener and Kakade, 1980). Tannins are known to have strong affinities for peptides or proteins and reported as inhibitors of trypsin or d-amylase (El-Morsi, 1996).