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Lipid content and fatty acid composition of mustard (*Brassica juncea*.L) during seed development

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ABSTRACT

The changes in lipid contents and fatty acid profile of mustard seed during development were studied. Lipid content in mustard seed increased gradually with the development of seeds and the fatty acid showed tremendous variation during seed development. Among the polar and non polar lipids linoleic acid, linolenic acid, palmitic acid and stearic acid showed the decreasing trend until maturity, while oleic acid and erucic acid increased regularly with maximum accumulation at maturity.

Key words : Lipid content, Fatti acid, Mustard, Seed development.

Mustard (*Brassica juncea*.L) is an important oilseed crop of northern india (Parti *et al.*, 2003). It occupies a prominent place being next in importance to groundnut, both in area and production, meeting the fat requirement of about 50 % population in the state of Uttar Pradesh, Punjab, Haryana, Rajasthan, Madhya Pradesh, Bihar, Orissa, West Bengal and Assam. (Parmar *et al*., 2005) The world's total production of mustard is around 43 million tones per annum, out of which contributing 14 percent, India holds the third portion.

Nutritional and industrial value of mustard oil is largely determined by the presence and proportion of individual fatty acid it contains. Currently, the research is oriented towards the development of cultivars with fatty acids compositions which more closely meet market needs without adversely affecting seeds or oil yield. However, the knowledge of fatty acid composition of various lipid classes during seed development is essential for any oil quality improvement programme. Although few reports are available on the fatty acids composition of total lipids, but no attempt has been made so far to determine the fatty acid composition of various lipid classes during seed development. Keeping this in view, the present investigation has been undertaken to study changes in the contents of various lipid classes and their fatty acid composition during seed development.

MATERIALS AND METHODS

Mustard crop (*Brassica juncea*.L .cv. RH-30) was raised in the earthenware pot filled with 5 kg of sandy loam soil in a naturally lit screenhouse and pots were lined with polyethylene bags to avoid contamination. A recommended dose of nitrogen (60ppm) and phosphorous was also given in the form of urea and potassium dihydrogen orthophosphate. A basal dose of micronutrient Zn, Mn, Cu, and Fe at the rate of 5, 2.5, 2.5, 10 ppm, respectively was also supplied.

After the emergence of seedling, three uniform plants per pot were retained. About three hundred plants were tagged at the initiation of flowering and seed samples were collected at 20, 40, 60 days after flowering and at maturity. Seed samples were dried in a hot air oven maintained at 70^0C.

Total lipids were extracted according to the methods of Folch *et al*. (1957) and separated into polar and non polar lipid fraction (Nicholas, 1964).These were then estimated gravimetrically after evaporating the solvents. Total, non polar and polar lipids fractions were methylated by the method of Luddy *et al*. (1968) and fatty acid were estimated in a Hewlett Packard (model No-5730 A) gas chromatography equipped with a flame ionization detector. A stainless steel column (305cm x 3.175mm) packed with 20% diethylene glycosuccinate (DEGS) on 60-80 mesh chromosorb was used. The column temperature of 185^0C and a nitrogen (carrier gas) flow rate of 35 ml min^{-1} were maintained. The individual peak was identified by comparison of their retention times with those of the standard fatty acid methyl esters obtained from Sigma Chemicals Company, St. Louis, USA. The area under the individual peak was calculated and converted directly into relative percentage.

RESULTS AND DISCUSSION

Lipid composition of mustard during seed