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RESEARCH ARTICLE

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Genetic analysis of fatty acid profile in cross of Indian Mustard [*Brassica juncea* (L.) Czern and Coss]

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ABSTRACT

Six generations (P_1 , P_2 , F_1 , F_2 , BC₁ and BC₂) of the cross GM 3 x NUDHYJ 3 of Indian mustard [*Brassica juncea* (L) Czern and Coss] were analyzed for palmitic, stearic, oleic, linoletic, linolenic and erucic acid content using gas liquid chromatography during 2005-06 to study their genetic architecture. The F_1 mean for erucic and oleic acid were near to the mid-parental value suggesting partial dominance of gene(s) controlling higher content over low one. F_1 was intermediate between the mean values of both the parents and also significantly differed with both the parents, these finding indicated the additive gene action was governed the expression of oleic and erucic acid, while, F_1 mean were significantly higher than both the parents indicated presence of over dominance for stearic, linoleic and linolenic acid appeared to be controlled by dominance, additive x additive and dominance x dominance interactions, whereas, dominance for oleic, additive x dominance for linolenic and additive x additive for erucic acid were predominant.

KEY WORDS : Brassica, Fatty acid, Gene effect and Indian mustard

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INTRODUCTION

Fatty acid profiles determine the quality of Indian mustard [Brassica juncea (L.) Czern and Coss] oil, which is an important component of Indian diet. Present available mustard varieties oil having low (about 7%) saturated fatty acids (palmitic + stearic acid), high erucic (about 50%), low oleic (9-18%) and linoleic acid (13-25%). The preferred oil should have low saturated fatty acids (around 4%), low erucic acid (<2%) and appreciable amount of unsaturated fatty acids (oleic and linoleic). Low erucic $(C_2:1)$ and intermediate level of linoleic $(C_1:2:2)$, an essential fatty acid improve the nutritional quality of the oil and high oleic $(C_1 8:2)$ imparts thermo stability to the oil and also lowers cholesterol, a major component associated with coronary heart diseases (Grundy, 1986). It is, therefore, imperative to breed Indian mustard varieties with increase level of both oleic (about 50%) and linoleic acid (20-25) and low erucic acid (<2%) to improve its

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nutritional quality. Genetic enhancement of a character is primarily dependent on its genetic architecture, which is ultimately decides the success of the conventional breeding programme. Therefore, the present investigation was attempted to study genetics of oleic, linoleic and erucic acid in Indian mustard so as to devise appropriate breeding methodology for their improvement.

MATERIALS AND METHODS

The materials for the present investigation consisted of six generations viz., P_1 , P_2 , F_1 , F_2 , BC_1 and BC_2 of the cross GM 3 x NUDHYJ 3 of Indian mustard. GM 3 is a high yielding variety having low linoleic and high erucic acid content and NUDHYJ 3 is a low erucic (<2%), relatively high oleic and linoleic acid strain received from the Main Castor and Mustard Research Station, Sardarkrushinagar Dantiwada Agricultural University, Sardarkrushinagar by hand crossing using standard technique during Rabi 2005-2006, this hybrid was selfed and backcrossed to obtain their F_2 , BC₁ and BC₂ generations. All the crosses along with their parents *i.e.*, all six generations were grown in the Compact Family Block Design with three replications in *Rabi* 2006-07. Each net plot had one row for parents and F₁, two rows for each of the BC₁ and BC₂ generations and four rows for

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