



Effect of limited irrigation and nitrogen levels on quality and oil yield of Indian mustard [*Brassica juncea* (L.)]

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Abstract : A field experiment was conducted for two consecutive *Rabi* season of 1999-2000 and 2000-2001 at Hisar to study the effect of limited irrigation and nitrogen levels on quality and oil yield of India mustard. The variety 'Laxmi' recorded higher oil yield over RH-9304 and also recorded significantly higher seed protein content and crude protein yield over RH-9304. Varieties did not differ significantly in respect of saturated and unsaturated fatty acid composition. Irrigation levels could not reach to the level of significance with regard to oil content, seed protein content and synthesis of fatty acids in Indian mustard. The increasing nitrogen levels decreased the oil content but increased concomitantly the oil yield upto 100 kg N ha⁻¹ nitrogen levels failed to cause any significant change in quality of oil during both the years.

Key Words : Limited irrigation, Nitrogen, Quality, Oil yield, Indian mustard

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INTRODUCTION

The high yield of Indian mustard can be achieved by optimizing irrigation and fertilizer doses for realizing high yield from newly released varieties. Combinations of irrigation and fertility levels have complementary and supplementary relationships and thus, have a direct impact on water use, yield and quality of Indian mustard. Oil content and composition of oil relative to fatty acids and iodine value have certain relationship with agronomic practices. Keeping this relationship in view, the seed oil content, oil yield and quality parameters of Indian mustard varieties were studied under limited irrigation and varying level of nitrogen.

MATERIALS AND METHODS

Field experiments were conducted during winter season (November-March) of 1999-2000 and 2000-2001 at the Agronomy Research Farm of C.C.S. Haryana Agricultural University, Hisar. The main plot treatments comprised of two Indian mustard varieties *viz.*, V₁-RH-9304, V₂-Laxmi and three

irrigation levels *viz.*, I₀- no post sowing irrigation, I₁-one irrigation (60mm) at flowering stage, I₂-one irrigation (60mm) at siliqua development stage and the sub-plot treatments comprised of six nitrogen levels *viz.*, No.-no nitrogen application N₁-40 kg Nha⁻¹, N₂-60 kg Nha⁻¹, N₃-80 kg Nha⁻¹, N₄-100 kg Nha⁻¹ and N₅-120 kg Nha⁻¹. The experiment was laid out in Split-plot design with 3 replications. The soil of the experimental site was sandy loam in texture with 172 and 168 kg ha available N, 16 and 14 kg ha available P and 381 and 371 kg ha⁻¹ available K during 1999-2000 and 2000-2001, respectively. All nitrogen through urea and phosphorus in the form of single super phosphate were applied at the time of sowing. The crop was sown in rows 30 cm apart on 14th November 1999 and 15th November 2000, respectively. Post sowing irrigation were of 60mm depth, each given as per requirement of treatments. A rainfall of 19 mm in 1999-2000 and 15 mm in 2000-2001 was received during the crop growth period. The crop was harvested on 1 April 2000 and 3 April 2001, respectively. Oil percentage in seed was determined by nuclear magnetic resonance (MKIII A new port Analyzer). Oil

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