

# Comparing Oil Color and Oxidative Stability among Mustard Genotypes under Nitrogen Fertilization

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**Abstract:**

CORE IDEAS: The oxidative stability index (OSI) which is the ratio of monounsaturated fatty acid/polyunsaturated fatty acid was slightly improved under N-fertilization ( $N_{80}$ ). It is worthy to mention this is the first report on Brassica juncea studying the effect of fertilizer application on oil quality and a comparison among genotypes. Under the control ( $N_0$ ), the oxidative stability of oil was contributed by  $\beta$ -carotene and at  $N_{80}$  application it was contributed by pheophytins. The change in the contents level of pigments and the rate of transformation of chlorophyll a to pheophytin a is was high compared to chlorophyll b to pheophytin b under  $N_{80}$ . The oil with a shift in  $L^*$  coordinate from 78 to 72 at  $N_{80}$  application showed a reduction in  $\beta$ -carotene and an increase in pheophytin a. Effect of N fertilization ( $N_{80}$ ) on oil color was investigated in 24 genotypes of Indian mustard (Brassica juncea). Most of the genotypes were found to have oil color coordinates of  $L^*$  72 to 78, while  $a^*$  and  $b^*$  color coordinates did not vary. Genotypes with a shift in  $L^*$  coordinates from 78 to 72 under  $N_{80}$  had lower  $\beta$ -carotene content, which decreased from 11.3% (IC212031) to 68% (Maya). Among the two classes of pheophytins, pheophytin a was dominant under  $N_{80}$ . Chlorophyll a was absent in almost all oil samples. In  $N_{80}$ , the rate of degradation of chlorophyll a into its product pheophytin a was greater over that of the control ( $N_0$ ) as evident from the negative correlation of chlorophyll a and pheophytin a ( $r = -0.54$ ). Peroxide value (PV) was negatively correlated to all pigments under  $N_0$ . In the case of acid value (AV), under  $N_0$ , the stability of oil seems to be more contributed by  $\beta$ -carotene, whereas under  $N_{80}$ , the oxidative stability of oil indicated by AV and PV appears to be contributed more by pheophytins. There was also improvement in oil stability index (OSI) under  $N_{80}$  as compared to  $N_0$  application. It is inferred that N fertilization does influence the oil pigmentation and its stability which is important for good quality oil.