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LOCAL TORIA CULTIVARS WITH HIGHER OIL AND BETTER SEED QUALITY

A. S. TIWARI* AND ASHA ARORA

Jawaharlal Nehru Krishi Vishwa Vidyalaya College of Agriculture, Gwalior 474002

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ABSTRACT

Two local toria cultivars having brown and yellow seed colour were collected from Bhind (M.P.). Both flower earlier than T-9 and mature in 80–90 days. Both have 48.5% oil with 46.0 and 48.2% erucic acid and 104.1 and 115.4 μmol/g seed meal glucosinolates in the brown and yellow seeded cultivars, respectively.

Key words: *Brassica campestris* var. *toria*, oil content, glucosinolates, erucic acid.

Among the oilseed Brassicas, *B. campestris* variety *toria* is the earliest maturing. It is grown under varying cropping systems mainly as a pure crop. It is grown after early maize or jowar fodder, and sometimes after early paddy.

The improved and notified variety T-9 with brown seed matures in 90–95 days. Two local cultivars having brown and yellow seed colour were collected from Bhind (M.P.). They flowered earlier than T-9 and matured in 80–90 days in the trials conducted at Gwalior. The seed yield of 777 kg/ha was obtained from these local toria cultivars as against 611 kg/ha in T-9.

The oil content of both the local cultivars with yellow as well as brown seed was 48.5% while T-9 had 46.7% oil (Table 1). The oil content of the yellow and brown seeded cultivars and T-9 was found to be 21.2 and 16.7% higher than that of cvs. Varuna and 13.8 and 9.4% higher than Pusa Bold of *B. juncea*.

The rapeseed mustard oils are unique among edible vegetable oils because of their high content of the long-chain 20- and 22-carbon monoenoic acids, eicosenoic and erucic acid. These long-chain fatty acids have been found to be less digestible in test animals as the coefficient of digestibility decreased with increasing chain length [1]. The erucic acid content

*Present address: Dean Faculty of Agriculture, J. N. Krishi Vishwa Vidyalaya, Jabalpur 482004.

of mustard and rapeseed oil lies between 45–50%. The erucic acid content of T-9 and the brown and yellow seed local cultivars was 47.5, 46.0 and 48.2% respectively. The local brown seeded strain had the lowest erucic acid content (46.0%), but a small quantity of erucic acid in the oil (less than 5%) is desirable to improve its quality. Carrol while studying the nutritional effects of rapeseed oil and erucic acid in the diet of rats since 1949 found that both resulted in reduced weight gain, increased cholesterol content and increased the weight of the adrenal gland. In 1970 Dutch, French and Canadian nutritionists linked the erucic acid to fat accumulation in the hearts of young test animals and to heart related problems in older animals. Although there is no evidence of its harmful effect in human in under limited use, erucic acid content in rapeseed-mustard oil needs to be reduced through breeding to improve its nutritional quality and export value.

Table 1. Oil, erucic acid and glucosinolates contents in toria cultivars

Variety	Oil content (%)	Erucic acid (C 22:1)	Glucosinolates (μ mol/g in oil extracted meal)	
			total	3-butenyl
T-9	46.7	47.5	103.1	93.9
Bhind Brown	48.5	46.0	104.1	96.6
Bhind Yellow	48.5	48.2	115.4	105.3

Mustard contains only one kind of glucosinolate, viz. sinigrin, whereas rapeseed contains several different kinds of glucosinolates, the most prominent being 3-Butenyl glucosinolate or gluconapin. The glucosinolates are hydrolysed by the enzyme myrosinase to their constituents such as glucose, sulphate and thiocynates, isothiocynaates or nitrates (Fig. 1). The enzyme and substrate are distributed in different parts of the seed. Hydrolysis

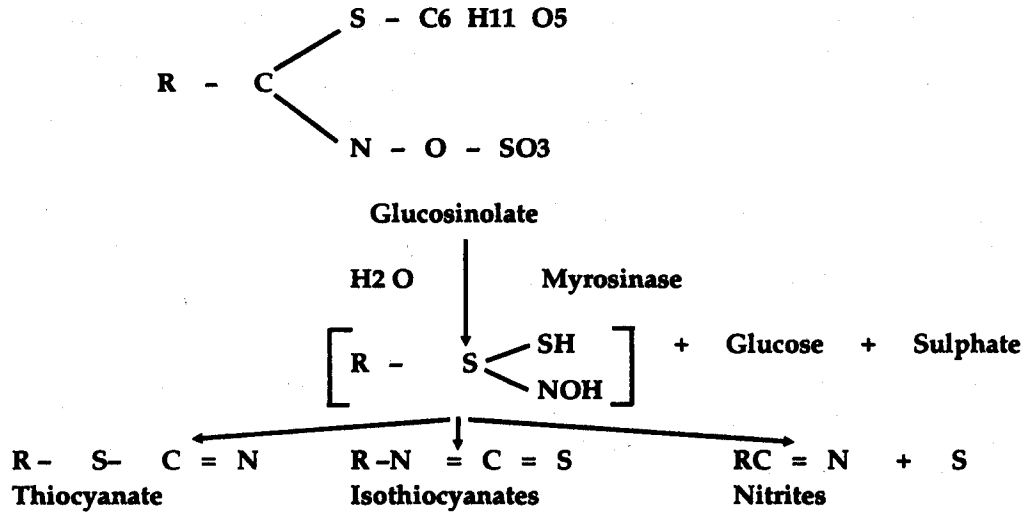

Fig. 1. General structure of glucosinolates and their enzymatic hydrolysis products.

of glucosinolates take place when the seeds are crushed and the enzyme comes in contact with glucosinolates in presence of adequate quantity of water.

3-Butenyl glucosinolate was the most prominent glucosinolate in both the local cultivars as well as T-9. The glucosinolate content of T-9 was lowest. Lower glucosinolates content was recorded in the brown seeded as compared to yellow seeded cultivar. The hydrolytic products of glucosinolates are toxic compounds and affect the palatability of mustard cake as well as functioning of the thyroid gland in nonruminants [2], but in ruminants, they are destroyed during digestion.

The mustard cake contains 40-45% protein with fairly balanced amino acid composition. Therefore, low glucosinolate rapeseed mustard meal with an amino acid profile comparable to that of soybean meal is a good source of proteins for livestock [3].

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