

EVALUATION OF JAPANESE RAPESEED (*Brassica napus* L.) GERMPLASM FOR FATTY ACID COMPOSITION AND GLUCOSINOLATE CONTENTS.

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ABSTRACT

The fatty acid composition and glucosinolate concentration on 843 germplasm of Japanese rapeseed (*Brassica napus* L.) were determined by gas chromatography and Tes-tape methods, respectively. Large variations were found on several fatty acid contents. On the other hand, one strain showed the lowest glucosinolate score of 0.5. These cultivars may possess the possibility of novel genetic resources for the increase of erucic acid content and the reduction of glucosinolate content in seed.

INTRODUCTION

A major object of our breeding group is to genetically improve the fatty acid composition and the glucosinolate content of rapeseed (*Brassica napus* L.) In Japan, rapeseed germplasm is composed of more than 1,200 strains (including about 850 Japanese strains). we has been investigating the agricultural characters of the germplasm in Tohoku Nat. Agr. Exp. Station. Though fatty acid composition and glucosinolate content were determined on some Japanese cultivars (Lee *et al.*, 1974; Endo *et al.*, 1986; Ishida *et al.*, 1994), those of almost strains have not been investigated.

In this study, we report the variations of fatty acid composition and glucosinolate content on 843 Japanese rapeseed germplasm.

EXPERIMENTAL

Mature dry seeds of 843 accessions of the Japanese rapeseed (*B. napus*) collections at National Institute of Agrobiological Resources, were used in this study.

Fatty acid composition

Fatty acid composition was analyzed using gas chromatography method (Endo *et al.*, 1986). Each fatty acid content was expressed as a percent of total fatty acids. Japanese rapeseed germplasm showed a great variation in fatty acid composition (Table 1). The contents of major fatty acids varied from 8.4 to 23.8% in oleic acid, 9.2 to 18.2% in linoleic acid, 3.3 to 13.1% in linolenic acid and 34.2 to 57.3% in erucic acid. In this study, zero or low erucic acid strains were not found, but 9 strains contained more than 56% erucic acid. These strains are considered to be novel genetic resources to breed high erucic acid rapeseed.

Table 1. Range and mean contents of fatty acid composition in 843 Japanese rapeseed germplasm.

	Palmitic C16:0 (%)	Stearic C18:0	Oleic C18:1	Linoleic C18:2	Linolenic C18:3	Eicosenoic C20:1	Erucic C22:1
Max	5.3	1.6	23.8	18.2	13.1	13.9	57.3
Min	2.0	0.4	8.4	9.2	3.3	5.0	34.2
Mean	3.1	0.9	14.3	12.5	8.5	9.1	48.0
Range	1.3	1.2	15.4	9.0	9.8	8.9	23.1
S.D.	0.4	0.2	2.6	1.2	1.2	1.5	3.5

Glucosinolate content

Glucosinolate content was estimated using Tes-tape method (McGregor and Downey, 1975) in which we expressed the content as scores of 0 (less or lowest content) to 4 (high content) based on the tape color changed. A large variation of glucosinolate content was found in the 843 Japanese germplasm (Table 2). Though, a great number of accessions had high level (1<) of glucosinolate, 7 ones contained low glucosinolate showing less than 1 score. Particularly, one strain of No. 84526 showed 0.5 of the lowest score. On the other hand, European and North American low glucosinolate cultivars were also estimated as the lowest score of 0-1.

The Bronowski genotype has been used world-wide to reduce glucosinolate levels of rapeseed (Downey and Röbbelen, 1989). Low score strains found in this study may be novel resources decreasing the seed glucosinolate content. Now, we are investigating the glucosinolate content and composition of the strains by high performance liquid chromatography.

Table 2. Variation of seed glucosinolate content based on Tes-tape score in 843 Japanese rapeseed germplasm and low glucosinolate cultivars.

	Tes-tape score							Total
	~0	~0.5	~1	~1.5	~2	~3	~4	
Japanese cv.	0*	1	6	72	280	394	90	843
Low GSL cv.	17	13	8	0	0	0	0	38

* : Number of cultivar

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