Quality Evaluation of some Thailand and Vietnam Scented Rice

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Twenty-two scented rice varieties of Thailand and Vietnam were evaluated at Central Rice Research Institute, Cuttack, for their quality indices. The study revealed that Haw mki Xwai, TD-52, Xiang Gengli, Hsiang Nou-1 and Khao Jao Hawn from Thailand and Tam Thomthankhoa and TamQuthankhoa from Vietnam are good donors for major quality indices. These varieties can be exploited for hybridization programme to produce better quality scented rice.

Key Words: Germplasm, Quality Characters, Scented Rice

Scented rice varieties are very much popular for their grain quality and aroma. Aroma quality of scented rice is a major character which increases the value of rice in international market. The cooking quality are highly indexed by volume expansion, water uptake and linear elongation of kernel. For breeding programme it is essential to identify suitable donor parents to improve the quality status of existing scented rice. The scented rice varieties of Thailand and Vietnam are well known for their qualitative properties. Therefore, in the present study some scented rice germplasm from Thailand and Vietnam were evaluated for their quality performance to identify suitable donors for quality characters to improve the Indian scented rice varieties through hybridization.

Materials and Methods

Twenty-two scented rice varieties collected from Thailand and Vietnam through Directorate of Rice Research, Hyderabad, were evaluated at Central Rice Research Institute, Cuttack for their quality characteristics. Thirty-day-old seedlings were transplanted in a Randomised Block Design with three replications. Recommended package of practices were followed to raise the scented rice varieties. The quality characters were analysed for hulling, milling and head rice recovery percentage as described by Ghosh *et al.*, (1971), kernel length and breadth were measured by digital micrometer and length/breadth ratio was calculated. Alkali spreading value (Little *et al.*, 1958), water uptake and volume expansion (Beachell and Stansel 1963), cooked kernel length was recorded using graph paper, elongation ratio (Azeez and Shafi 1966) and amylose (Juliano 1971) content were measured.

Results and Discussion

The head rice recovery, kernel length and breadth mainly depends upon opaqueness in the endosperm in the grain causes loose packing of starch/protein. The low temperature after flowering is also responsible for grain length (Jennings *et al.*, 1979). The grain with long length and short breadth also affect the head rice recovery. Most of the varieties in the experiment exhibited head rice recovery more than 45% except Jawi Hitan, Khao Luang and Tamduaonghaiduaong (Table 1). RD-15, Xiang Gengli, Khao ManPet, Hawmkaikwai, TamQuthankhoa, Tam thomthankhoa showed higher hulling, milling and head rice recovery percentage. For kernel length and length/breadth ratio Khao Dwak Mali-105, Hsiang Nuo-1, Khao Jao Hawn, Khao Mali, Naipon No-1 and Hawmkikwai showed more than 7.0 mm and 4.0 mm for respective characters among the tested varieties (Table 1).

The alkali spreading value is a major quality parameter which is determined by the digestation of starch by 1.7% KOH in 23 hours. The intermediate digestation means intermediate alkali spreading value where the rice does not become very waxy or very hard. The intermediate alkali value rice are soft to consume. The high ambient temperature after flowering effects the alkali spreading value directly (Jennings *et al.*, 1979). The alkali spreading value ranged from 2.0 (TD 15, Khao Mali) to 7.0 (Patoon Tahni-60). TD 52, Siong Pelandok, Khao Luang, Tamthomthankhoa and Tamduonghaiduong showed intermediate (4.0 to 5.0) alkali spreading value (Table 1).

In basmati rice, water uptake and volume expansion are quality characters directly related with amylose content and these characters determine the cooking quality of rice. The water uptake for different scented rice varieties ranged from 190 (Tamduonghaidoung) to 352 (Patoon Tahni-60) and the volume expansion ranged from 3.5 (Patoon Tahni-60) to 4.81 (Kho Jao Hawn). Khao Manpet, Patoon Tahni-60, Jawi Hitan, Jasmine Scented, Thamthomnamdinh and Tamthomthankhoa

Table 1. Quality indicies in scented rice

Variety	Country	Hulling (%)	Milling (%)	Head rice recovery (%)	Kernel Length (mm)	Kernel length/ breadth ratio	Alkali spreading value	Water uptake	Cooked kernel length (mm)	Elongation ratio	Volume expansion	Amylose content %	Grain yield/ plant (g)
RD-15	Thailand	78.05	72.45	63.20	5.40	3.49	2.00	220.00	7.00	1.30	4.14	16.10	4.94
TD-52	Thailand	75.65	70.55	59.50	4.97	3.11	4.00	230.00	8.60	1.73	4.40	19.38	11.60
Khao Dwak Mali-105	Thailand	69.60	64.55	49.45	7.40	4.73	5.25	235.00	11.30	1.53	3.82	16.36	7.65
Hsiang Nuo-1	Thailand	69.20	63.85	48,65	8.33	4.82	2.50	210.00	12.40	1.49	4.62	19.86	4.10
Xiang Gengli	Thailand	80.50	75.30	57.30	6.40	4.14	2.25	230.00	10.90	1.70	4.36	21.92	1.60
Khao Jao Hawn	Thailand	75.85	70.45	51.80	7.82	4.30	6.75	245.00	12.25	1.57	4.81	16.53	4.78
Khao Mali	Thailand	70.40	63.60	50.20	7.22	4.36	2.00	225.00	10.70	1.48	4.23	20.58	7.32
Kaho Manpet	Thailand	78.40	68.10	55.65	6.76	3.70	6.25	347.50	10.25	1.51	4.40	17.08	5.61
Lon Yung	Thailand	63.05	58.20	46.55	6.45	3.90	6.50	250.00	10.20	1.58	4.22	16.35	4.20
Naipon No-1	Thailand	68.00	61.80	49.30	7.72	4.29	5.75	225.00	11.25	1.46	3.75	16.92	6.09
Hawmkikwai	Thailand	63.80	78.80	62.85	7.68	4.4	6.50	245.00	11.20	1.46	4.36	16.80	11.32
Patoon Tahni-60	Thailand	76.75	71.00	54.50	6.97	3.78	7.00	352.50	12.00	1.72	3.50	19.10	17.49
Jawi Hitan	Thailand	72.00	66.10	44.00	4.27	2.95	5.25	265.00	8.20	1.92	4.07	19.48	2.94
Siong Pelandok	Thailand	73.35	67.95	52.20	6.18	3.78	4.25	230.00	10.90	1.76	4.14	19.82	4.64
Jasmine Scented	Thailand	72.80	67.15	52.10	6.51	3.93	5.75	315.00	12.45	1.91	3.75	18.65	8.77
Khao Luang	Thailand	69.35	63.05	41.25	6.81	4.14	4.00	210.00	11.90	1.75	3.75	25.47	3.16
TamxoanHaiduang	Vietnam	71.80	65.80	53.25	5.94	3.55	2.50	192.00	9.10	1.53	3.94	24.29	8.80
TamQuthankhoa	Vietnam	77.85	72.00	59.95	5.39	3.44	2.75	222.50	8.70	1.62	3.94	23.63	6.21
Tamthomnamdinh	Vietnam	67.80	63.10	49.00	5.93	3.80	5.25	295.00	10.10	1.70	3.57	19.86	6.26
Tamthomthankhoa	Vietnam	77.05	72.00	59.70	6.84	4.15	4.25	295.00	9.45	1.38	3.72	19.30	5.81
TamthomNinhbinh	Vietnam	74.15	67.85	53.45	6.61	3.88	3.00	250.00	9.70	1.47	3.82	21.23	5.97
Tamduonghaiduong	Vietnam	59.55	55.05	42.75	6.11	3.59	4.25	190.00	8.80	1.44	3.82	19.86	7.24

for water uptake and TD-52, Hsiang Nuo-1, Xiang Gengli, Khao Jao Hawn, Khao Manpet and Hawmkikwai for volume expansion showed best performances among the varieties tested.

The cooked kernel length more than 12 mm and elongation ration greater than 1.7 are preferred in international market. Khaw Dwak Mali-105, Hsiang Nou-1, Khao Jao Hawn, Patoon Tahni-60, Jasmine Scented, Khao Luang for cooked kernel length and TD-52, Jawi Hitan, Siong Pelandok, Jasmine Scented and Khao Luang for elongation ratio are best among the varieties.

The quality performance of scented rice mainly depends upon the amylose content. RD-15 exhibited lowest amylose content (16.10%) where as KhaoLuang had highest amylose content (25.47%). Xiang Gengli, Khao Mali, Khao Luang, Tamxoanhaiduang, TamQuthankhoa, TamthomNinhbinh showed intermidiate amylose content (20-25%) which are preferred in international market. The varieties like TD-52, Hawmki kwai, Patoon Tahni-60, Jasmine Scented and Tamxaon Haiduang showed higher yield performance among the scented rice studied.

From the present experiment, it is deduced that Hawmkikwai, TD-52, Xiang Gengli, Hsiang Nuo-1 and Khao Jao Hawn from Thailand and Tamthomthankhoa and TamQuthankhoa from Vietnam are best quality performers among the scented genotypes studied for quality characters. These scented rice varieties can be used as donor parents for quality characters to improve

Table 2. Best donors for different quality characters

Character	Varieties
Hulling	RD-15, Xiang Gengli, Khao Manpet, Hawmkikwai, TamQuthankhoa, Tamthomthankhoa
Milling	RD-15, Xiang Gengli, Hawmkikwai, Patoon Tahni-60, TamQuthankhoa, Tamthomthankhoa
Head rice recovery	RD-15, TD-52, Xiang Gengli, Khao Manpet, Hawmkikwai, Tam Quthankhoa, Tamthomthankhoa
Kernel length	Khao Dwakmali-105, Hsiang Nuo-1, Khao Jao Hawn, Khao Mali, Naipon No-1, Hawmkikwai
Length/breadth ratio	Khao Dwakmali-105, Hsiang Nuo-1, Khao Jao Hawm, Naipon No-1, Hawmkikwai
Alkali spreading value	TD-52, Siong Pelandok, Khao Luang, Tamthomthankhoa, TamxounHaiduong
Water uptake	Khao Manpet, Patoon Tahni-60, Jawi Hitan, Jasmine Scented, Tamthomnamdinh, Tamthomthankhoa
Cooked kernel length	Khao DwakMali-105, Hsiang Nou-1, Khao Jao Hawn, Patoon Tahni-60, Jasmine Scented, Khao Luang
Elongation ratio	TD-52, Jawi Hitan, Siong Pelandok, Jasmine Scented, Kaho Lunag
Volume expansion	TD-52, Hsiang Nou-1, Xiang Gengli, Khao Jaw Hawn, Khao Manpet, Kawmkikwai
Amylose content	Xiang Gengli, Khao Mali, Khao Luang, Tamxoan Haiduang, TamQuthankhoa, TamthomNinhbinh
Grain yield/plant	TD-52, Hawmkikwai, Pantoon Tahni-60, Jasmine Scented, Tamxoan Haiduang

our Indian varieties by manupulating genes in hybridization programme. These varieties can be grown in coastal conditions and exported to earn foreign exchange.

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