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## Grain Quality Traits of a Candidate Rice Variety PB-95

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**Abstract:** Find rice candidate variety PB-95 was evaluated for its quality traits in comparison with shaheen Basmati and Super Basmati. The newly evolved cultivar PB-95 possesses extra long slender shape grain with higher degree of grain elongation, intermediate amylase content and gelatinization temperature. The candidate variety leads Super Basmati Shaheen Basmati for Kernal length, Kernal width, Kernal thickness and cooked grain length and elongation ratio with strong aroma.

**Key words:** Rice, food quality, kernal length

### Introduction

Rice is now the staple food of 2.7 billion people, almost half the world's population and is grown by more than half the world's farmers. (Fairhurst and Doberman, 2002). Rice grain size and shape, whiteness and translucency and elongation on cooking are the traits of keen interest of the consumer. Therefore, broken and colored chalky grain reduces the economic value of rice. Fourteen physicochemical traits are considered important in scoring grain quality (Khush *et al.*, 1979, Rani *et al.*, 1988). Pakistan produce fine rice known as basmati which is hardly comparable by any other in the world market for its strong aroma, slender and long kernal, intermediate amylase content and gelatinization temperature along with higher degree of grain elongation on cooking. All three traits are polygenically controlled and are difficult to transfer through breeding a new genotype. Rani *et al.* (1988) identified and used five Pakistani basmati varieties as donors for quality traits (Long slender group) in the first international fine grain aromatic rice observational nursery. The study of grain quality traits of 38 indo Pak aromatic and non-aromatic rice cultivars rated three famous Pakistani basmati varieties (Basmati *et al.*, 2001) reported that Shaheen Basmati excelled its parents' i.e. super Basmati and Basmati 385 in all grain quality characteristics with a strong aroma comparable to Basmati 370. Studies reported in the paper were conducted at Soil Salinity Research Institute Pindi Bhattian, Hafizabad, Pakistan to assess the quality traits of newly evolved candidate rice variety PB-95 in comparison with Shaheen Basmati. The objective was to further improve the grain quality traits of fine rice genetic stock evolving a superior variety.

### Materials and Methods

Grain quality studies were conducted at Soil Salinity Research Institute Pindi Bhattian, Hafizabad, Pakistan in collaboration with National Agriculture Research Center Islamabad, Pakistan. Rice varieties Super Basmati Shaheen

Basmati PB-95 Basmati were grown in RCBD layout with four repeats in 3 x 5 m<sup>2</sup> x 2 plots with 20 x 20 cm<sup>2</sup> spacing in a normal field during July to October 1997. Mineral fertilizers NPK@120-60-0 and ZN@10 kg ha<sup>-1</sup> were applied to all the plots crop protection measures and other agronomic practices were rendered as per requirement. Data were statistically analysed and LSD. Test was applied to compare the means at 5% level according to the Steel and Torrie (1984).

Observation regarding paddy length, width thickness were recorded with the help of vernier caliper on ten randomly selected three times of full healthy grain. Kernal length width and thickness of milled rice were also measured with the help of dial caliper on ten randomly selected full rice kernals. Shapes of milled rice was determined in terms of length width ratio as slender (more than 3.0), medium (2.1 to 3.0) bold (1.1 to 2.0) and round less 1.1). Quality index (Q. I) of raw rice was determined by dividing its length by width multiplying by thickness (Aziz and Shafi, 1966). Quality Index over 2 indicates fine rice and less than 2 indicates coarse rice. Cleaned basmati paddy samples were dried to 10% moisture contents and milled. Milling machines used were satake Rubber Roll Husker, Burrows Mc. Gill Polisher No.3 and Burrows Rice Grader. Rice sample were cooked after strong for four months. Elongation ratio was determined by dividing length of cooked rice by that of raw rice. Stickiness during cooking was observed by visual observation and rated between 1-5 scores (1 pasty and 5 well separated). Aroma was determined on boiling as well as using chopped leaves collected at 50% flowering stage (Sakila *et al.*, 1999) and rated between 1-5 scores (1 almost absent and 5 strong). Gelatinization temperature, a measure of cooking was determined by alkali spreading value as mentioned as alkali digestibility test using 1-7 scale. The amylase content (A.C) determined cooking behavior and eating quality of cooked rice was estimated and classified using Shen's method (1990). The gel consistency test is a reliable index for texture of cooked rice varieties were

analysed by Cagampang (1973) method. Above mentioned chemical traits were analysed with Co-ordination of National Agriculture Research Center Islamabad, Pakistan.

**Results and Discussion**

Observations regarding physicochemical characteristics of Basmati PB-95 in comparison with Shaheen Basmati and Super Basmati are given in Table 1. Basmati PB-95 is statistically higher than checks varieties in 1000 grain weight and at par for other paddy characteristics. Kernal length (KL) of Basmati PB-95 (7.48 mm) is statistically higher than that of Shaheen Basmati (6.82 mm) and Super Basmati (7.08 mm). Kernal width, Kernal thickness and Kernal length width ratio of Basmati PB-95 are at par with those of check varieties. The candidate variety PB-95 showed higher elongation ratio (ER) of 1.93 and strong aroma with 3.25 score (Rani *et al.*, 1998) classified several Basmati rice varieties possessing kernal length 6.53 to 7.38 mm and elongation ratio (ER) 1.8 to 2.5 as long slender group and donars for quality traits in international Aromatic Rice Nursery. Santha *et al.* (1997), Sakila *et al.*,

and Shafi (1966) who stated that quality index over 2 indicates fine rice. PB-95 is statistically at par with Shaheen Basmati and Super Basmati for milled (67.65%) and head rice (61.2%) recovery which meets the standard (more than 60% milled rice) as quite good for release of commercial variety (Santha *et al.*, 1997, Rani *et al.*, 1999). Similar results were reported in rice grain quality studies of three Basmati varieties by Bhatti *et al.* (2001).

Table 1 showed that candidate variety PB-95 possesses 22.79% amylose content which is similar to that of Shaheen Basmati and Super Basmati. The value is within the most desirable range of 20-25% Rani *et al.* (1999) for fine rice. The PB-95 is classified as intermediate for gelatinization temperature (G.T) in accordance with Sakila *et al.* (1999) and Bhatti *et al.* (2001).

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Table 1: Grain Quality analysis

Quality Trait	Basmati PB-95	Shaheen Basmati	Super Basmati
Paddy length (mm)	11.82	10.87	11.25
Width (mm)	2.34	2.18	11.25
Thickness (mm)	2.12	1.75	1.79
Thousand grain weight (g)	23.487	20.7089	20.5015B
<b>Rice Kernal</b>			
Length (mm)	7.48 a	6.82 b	7.08 b
Width (mm)	1.85	1.82	1.74
Thickness (mm)	1.66	1.82	1.74
Length with ratio	4.1	4.0	4.1
Quality Index	2.5	2.55	2.75
Shape	Slender	Slender	Slender
<b>Milling</b>			
Brow rice (%)	78.0	78.25	79.9
Milled rice (%)	67.65	68.4	70.3
Head rice (%)	61.2	62.75	62.60
<b>Boiling</b>			
Grain length (mm)	14.94	13.65	13.54
Elongation ratio	1.93	1.90	1.92
Stickiness scrod (1-5)	4	4	4
Aroma (1-5)	3.25	3.25	3.0
<b>Chemical Traits</b>			
Amy lose content (%)	22.78	23.28	23.48
Alkali spreading value	4.25		4.5
Gelatinization temperature	Intermediate	Intermediate	Intermediate
Gel consistency coded type	58.0	57.5	56.5

The means followed common letter are not significantly different at 5% level stickiness score: 1 pasty and 5 were spread. Aroma score: 1 absent and 5 strong alkali spreading value of 4-5 is classified as intermediate.

(1999) also mentioned that long slender and high elongation ratio on coking is unique feature of Basmati rice which makes varieties readily acceptable to the growers and consumers. Therefore Basmati PB-95 falls in long slender group of aromatic rice quality index of candidate variety PB-95 (2.5) validates the results of Aziz