

## Inter-relationship among quality characters in aromatic rice

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**Abstract:** The coefficient of correlation among different quality characters from the experiment are showed that Milling outturn ( $r = -0.684$ ), head rice outturn ( $r = -0.822$ ), grain elongation ratio ( $r = -0.740$ ), protein content ( $r = -0.705$ ) were negatively but volume expansion ratio ( $r = 0.986$ ) was showed significant positive correlation with amylose. The head rice outturn had significant negative correlation with grain length ( $r = -0.862$ ), length: breadth ratio ( $r = -0.692$ ), volume expansion ( $r = -0.717$ ), cooking time ( $r = -0.943$ ) and amylose content ( $r = -0.822$ ) but positive relation with protein content ( $r = 0.983$ ) and grain elongation ratio ( $r = 0.991$ ). Grain elongation ratio showed significant positive correlation with protein content ( $r = 0.999$ ) but negatively related with grain length. From the regression studies, it was clear that volume expansion and grain elongation ratio showed significant association with amylose content. The quality parameters grain length, length breadth ratio and cooking time showed insignificant in multiple regressions co-efficient with amylose.

**Key words:** Aromatic rice, quality characters, inter-relationship

### Introduction

Next to yield quality is the major part of aromatic rice. The cooking and eating quality of aromatic rice mainly depends upon its quality characters like head rice outturn, grain size, shape, elongation ratio, volume expansion ratio, protein, amylose content etc. The quality of rice is a complex character that directly or indirectly related with other characters and amylose content is the main determinant of cooking and eating quality of milled rice (Juliano, 1979). The major quality of rice depends upon the ratio of amylose to amylopectin, which frame the quality of rice. Other quality characters directly or indirectly influence the amylose content. Amylose content showed significant positive association with elongation ratio and volume expansion (Nayak *et al.*, 2003). It correlates positively with volume expansion of cooked rice. While, higher grain amylose content is associated with lower grain protein content (Prakash *et al.*, 2002). Whereas, Yamashita and Fujimoto (1974) stated that amylose content showed no relationship with protein content. Grain size and shape are closely related to head rice yield (Jennings *et al.*, 1979; Ferdous *et al.*, 2004). The head rice recovery had significant negative correlation with kernel length, length breadth ratio, cooked kernel length and elongation ratio. Kernel length had significant positive correlation with length breadth ratio and cooked kernel length. Length breadth ratio had similar association with cooked kernel length. The volume expansion ratio had negative association with cooked kernel elongation ratio (Nayak *et al.*, 2003). Therefore, the present study was aimed to observed the Inter-relationship among quality characters in aromatic rice.

### Materials and Methods

Three aromatic rice varieties were grown in Hajee Mohammad Danesh Science and Technology University farm, Dinajpur, Bangladesh during July to December of 2005. After drying, required of grain samples of appropriate sizes from each plot were taken and analyzed for physicochemical properties. Grain physicochemical

parameters were measured at Grain Quality and Nutrition Division laboratory, Bangladesh Rice Research Institute, Gazipur. Milled rice outturn was determined by dehulling 200g rough rice in a Satake Rice Mill, followed by 75 second polishing in Satake Grain Testing Mill TM-05. Head rice outturn was determined by separating broken from milled rice by hand. Milled rice outturn and head rice outturn were expressed as percentage of rough and milled rice respectively. Grain length and breadth were measured by digital slide calipers. Protein content was calculated from nitrogen and it was determined by the micro Kjeldahl method (Juliano *et al.*, 1968; AOAC, 1970). Volume of cooked and milled rice was measured by water displacement.

### Results and Discussion

**Inter-relationship among quality characters in aromatic rice:** The coefficient of correlation among different quality characters from the experiment are presented in Table 1. Milling outturn ( $r = -0.684$ ), head rice outturn ( $r = -0.822$ ), grain elongation ratio ( $r = -0.740$ ), protein content ( $r = -0.705$ ) were negatively but volume expansion ratio ( $r = 0.986$ ) was showed significant positive correlation with amylose. Similar finding also reported by Prakash (2000) for volume expansion ration and protein content. Nayak *et al.* (2003) also reported similar observation for volume expansion ratio. The head rice outturn had significant negative correlation with grain length ( $r = -0.862$ ), length: breadth ratio ( $r = -0.692$ ), volume expansion ( $r = -0.717$ ), cooking time ( $r = -0.943$ ) and amylose content ( $r = -0.822$ ) but positive relation with protein content ( $r = 0.983$ ) and grain elongation ratio ( $r = 0.991$ ). Nayak *et al.* (2003) got similar results for kernel length and length: breadth ratio. Grain elongation ratio showed significant positive correlation with protein content ( $r = 0.999$ ) but negatively related with grain length. This result corroborated with the findings of Nayak *et al.* (2003). From the regression studies, it was clear that volume expansion and grain elongation ratio showed significant association with amylose content. The quality

parameters grain length, length: breadth ratio and cooking time showed insignificant in multiple regressions coefficient with amylose.

**Table 1.** Correlation matrix (Pearson Correlation) among the quality characters based on dependent character amylose content

Character	Milling outturn	Head rice outturn	Grain length	Length Breadth ratio	Grain elongation ratio	Volume expansion ratio	Protein	Cooking time	Amylose
Milling outturn		0.978**	-0.949**	-0.828**	0.997**	-0.555	1.000**	-0.992**	-0.684*
Head rice outturn			-0.862**	-0.692*	0.991**	-0.717**	0.983**	-0.943**	-0.822**
Grain length				0.962**	-0.921**	0.266	-0.940**	0.982**	0.420
Length Breadth ratio					-0.780*	-0.007	-0.811**	0.892**	0.157
Grain elongation ratio						-0.620	0.999**	-0.979**	-0.740*
Volume expansion ratio							-0.579	0.445	0.986*
Protein								-0.988**	-0.705*
Cooking time									0.586

\*\* Correlation is significant at the 0.01 level (2-tailed),\* Correlation is significant at the 0.05 level (2-tailed)

**Acknowledgement:** The authors wish to thank scientists of Grain Quality and Nutrition Division, Bangladesh Rice Research Institute (BRRI) for technical assistance throughout the study period.

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