

SOME STUDIES ON PROCESSING LOSSES OF RICE IN THE PUNJAB, PAKISTAN

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Head Rice Yield (HRY) of three modern milling units, three shellers and one huller was assessed and compared with that of laboratory mill to see their milling efficiency. HRY, on an average, was 63.74% and 56.83% in the modern mills and shellers/hullers, respectively, as compared with 71.19 to 70.92% in the lab mill showing a difference of 8.07 and 14.09% respectively.

INTRODUCTION

Rice is an important source of foreign exchange earning of the country. Paddy is processed into polished rice through modern rice mills as well as primitive type of shellers. The modern mills meet only a part of total paddy processing requirements of the province while the remaining paddy is processed in old styled shellers. Taking, on an average, 5% loss of Head Rice Recovery compared with the rice recovery of modern rice mills, the total loss may amount to 20,000 tonnes of rice every year. According to Ali *et al.* (1992) head rice yield in test varieties KS282 and B.385 was, respectively, 59.6 and 57% in modern rubber shellers as compared to 56.2, 54.0% in disk shellers and 51.8 and 49.7% in steel huller. In India Rafey *et al.* (1992) reported that moisture content of 22-25% at harvest gave greater HRY (66.40%) than at moisture content 19-22% (64.94%) or 16-19% (62.79%). Factors determining HRY have also been explored in USA by workers like Siebenmorgen and Sharp (1992) and Siebenmorgen *et al.* (1998).

The present studies were taken up with a view to providing empirical evidence regarding the processing losses of rice in different types of processing units in the Punjab, Pakistan.

MATERIAL AND METHODS

The modern rice mills located at Sheikhpura and Emenabad were selected for taking samples at various processing stages. Besides, three shellers were also selected from the same localities for comparison of

results. A PASSCO huller located at Hafizabad was also included in this study to assess its working efficiency.

The samples of paddy were drawn at the time of intake, before drying, after drying and before milling and were analysed for foreign matter, unfilled, impure and mouldy grains. In all 243 samples were drawn, out of which 190 samples could be milled in the laboratory. The samples drawn at different processing stages were processed in the laboratory mill. The milled samples were analysed in terms of total broken grains, discoloured grain, chalky grains, and Head Rice Yield (HRY).

RESULTS AND DISCUSSION

1. Quality analysis of paddy:

The data regarding the analysis of paddy samples, given in Table 1., indicated that percentage foreign matter, unfilled & immature grains, and mouldy grains ranged from 0.77-1.90, 2.06-3.87 and 2.04-8.86 per cent with an average of 1.30, 3.23 and 6.44 per cent, respectively.

The data showed that percentage of mouldy grains was very high. Consequently, on the basis of these results, the paddy has been placed in grade III of the quality standard.

2. Moisture contents of paddy:

Moisture contents of paddy purchased by the processing units at in-take, on an average, were 18.50% and 17.28% in modern mills and shellers/huller, respectively. The difference might be

Table 1. Quality analysis of paddy (Average of samples) purchased by different rice milling units .

Modern rice mills				Shellers				Overall Average
	Hafiz-abad	Sheikhu-pura	Emen-abad	Pasrur, Hafizabad	Remat, Sheikhpura	Kaleem, Emenabad	PASSCO, Hafizabad	
Foreign Matter (%age)	1.37	0.77	0.94	1.80	1.10	1.22	1.90	1.30
Total unfilled and immature grains (%age)	3.27	3.29	3.41	3.87	2.06	3.30	3.67	3.27
Mouldy grains (%age)	8.86	8.18	7.11	8.00	7.18	2.04	3.75	6.44
Total	13.50	12.24	11.46	13.67	10.34	6.56	9.32	11.01

Table 3: Comparison of modern rice mills and shellers of Punjab with Lab. Milled samples.

Modern rice mills	Average of the three mills		Average of the four shellers		Overall Average of 4 units	
	Modern rice mills	Shellers	Modern rice mills	Shellers	Modern rice mills	Shellers
Modern rice mills	76.72	76.76	76.72	76.76	76.72	76.76
Modern rice mills	76.72	76.76	76.72	76.76	76.72	76.76
Modern rice mills	76.72	76.76	76.72	76.76	76.72	76.76

Table 4: Comparison of modern rice mills and shellers of Punjab with Lab. Milled samples.

Modern rice mills	Average of the three mills		Average of the four shellers		Overall Average of 4 units	
	Modern rice mills	Shellers	Modern rice mills	Shellers	Modern rice mills	Shellers
Modern rice mills	76.72	76.76	76.72	76.76	76.72	76.76
Modern rice mills	76.72	76.76	76.72	76.76	76.72	76.76
Modern rice mills	76.72	76.76	76.72	76.76	76.72	76.76

Table 5: Comparison of modern rice mills and shellers of Punjab with Lab. Milled samples.

Modern rice mills	Average of the three mills		Average of the four shellers		Overall Average of 4 units	
	Modern rice mills	Shellers	Modern rice mills	Shellers	Modern rice mills	Shellers
Modern rice mills	76.72	76.76	76.72	76.76	76.72	76.76
Modern rice mills	76.72	76.76	76.72	76.76	76.72	76.76
Modern rice mills	76.72	76.76	76.72	76.76	76.72	76.76

due to the fact that modern rice mills purchase much higher quantity of paddy than that of the local shellers. The samples taken immediately before milling indicated that the moisture in the paddy due to drying process, on an average, was reduced to 14.46 and 14.21% in case of modern mills and shellers respectively (Table 2).

3. Laboratory milling of paddy:

The samples collected from different milling units were milled in the laboratory and the results are given in Table 3.

4. Comparison of Head Rice Yield from rice milled the modern mills and sheller with that of laboratory milling (of the same stack)

The samples of paddy taken from the modern rice mills and shellers were milled in the laboratory for comparative studies of the efficiency of modern mills and shellers involved in rice milling in the Punjab province. The data is given in Table 3. The Head Rice Yield of three modern rice mills, i.e. Sheikhpura, Hafizabad and Emenabad (Table 4) was 61.93, 67.00 and 62.29 with an average of 63.74%. The samples taken from the aforesaid mills before milling, when milled in the laboratory, on an average, gave Head Rice Yield of 66.15, 75.20 and 67.72% respectively. This showed that there was still a scope for improvement of the milling efficiency of modern mills by 4.22-8.20% through proper management. The efficiency of shellers and huller was comparatively low and it ranged between 49.77 and 63.13 and averaged 57.71. The loss of HRY ranged between 6.27 and 20.06 with an average of 14.09%. The results are in conformity with those of Esmay *et al.* (1979) who reported that Head Rice and broken rice grain recovery

in case of Hullers, Shellers and Modern mills were 46.5-16.9, 55.9-11.6 and 62.0-8% respectively. Ali *et al.* (1992) found that the modern mills produced more head rice (59.6 and 57%), broken rice 12.1 and 13.5% in case of medium grain variety KS-282 and fine grain variety Basmati 385 than the disk sheller and steel huller (56.2, 54.0%) and (51.8, 49.7%) with broken rice 13.8 & 15.0 and 15.8 and 16.6% in the respective varieties. This is really a big loss. There is a great need to save this loss.

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