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Short Note

Influence of moisture content and storage period on physical parameters of paddy grains

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A developing country like India which is eager to attain a sustained progress in economic growth, has to give top priority to agriculture and thus in order to achieve substantial and sustained progress in agriculture, it is equally essential that food grains are to be stored in the scientific manner. Paddy grains are normally harvested at high moisture content and if stored as such for longer period can cause "crop loss". These losses escalate non-essential overhead costs, reduce market supply, affect the family food cost and impose serious national problems. Moreover, reduction in losses due to high moisture content not only increases the farmer share of profit but also decreases the price paid by the actual consumer. Thus, the present investigation was undertaken to study the relationship between moisture content and storage period to physical characters of paddy grains.

The paddy grains of genotype "RP-2421" were procured from the Rice Research Station, Malan of the CSK HPKV, Palampur. After receiving the paddy grains were cleaned manually to get rid of the dust and other foreign material. The adjustment of the moisture levels at 8, 13 and 18 per cent was done and then were packed in metal bins in triplicate for a period of 180 days. Properly packed and labeled storage containers were stored at ambient temperature (27±5°C and 70-75% RH) in the laboratory and were analyzed for their physical parameters like weight loss, density and per cent damage (Bhattacharya *et al.*, 1972) after desired intervals. The milling and marketable qualities of a paddy depend upon both the size and shape of the grain. The data on physical parameters of paddy are shown in Table 1. The husk colour was yellow and the grain colour of "RP2421" was white. The kernel weight is an important factor which affects the total yield. The average kernel weight of paddy was 24.82g per 1000 kernels.

The results are in general agreement with those of Sajkia and Bains (1990), who reported the

Table 1. Physical characteristics of paddy

Parameters	Value
Category	*indica*
Husk colour	yellow
1000 kernel weight (g)	24.82
Kernel length (mm)	8.45
Kernel breadth (mm)	2.34
L/B ratio	3.61
Density (g/ml)	1.30

1000 kernel weight of paddy ranging from 14.57-28.30g. The paddy kernel length and width was 8.45 and 2.34mm, respectively. Bhattacharya *et al* (1972) reported the length of paddy ranging from 6.14 to 10.84mm. The length/breadth ratio of the paddy genotype was 3.61. Sajkia and Bains (1990) have reported the L/B ratio of paddy varieties ranging from3.24 to 3.80. Density gives the idea as to how closely the atoms of a substance are packed. The average density of the grains was 1.30g/ml and compare very well with those of Sajkia and Bains (1990).

Percentage reduction in weight was recorded for different storage intervals. The results pertaining to this aspect are presented in Table 2. The moisture levels had significant effect in relation to weight. The highest weight loss was observed in grains stored at 18 per cent moisture level (0.61%) and minimum was observed in grains stored at 8 per cent moisture (0.27%) after 30 days. The increase in weight loss per cent was observed after 60, 90,120 and 150 days of storage and the moisture levels had significant effect with respect to weight loss per cent at all storage intervals. After 180 days of storage the weight loss per cent was also significant at all moisture levels and was observed to be maximum at 18 per cent moisture level (1.47%). Highest insect infestation resulted in more damage to the grains stored at 18 per cent moisture level. Pushpamma and Reddy (1979) also reported that the weight loss increased correspondingly with the length of storage.

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Table 2 . Effect of different moisture levels and storage periods on physical parameters of paddy grains

Storage period (days)	Weight loss (%)				Density (g/ml)				Per cent Damage (%)			
	Moisture level				Moisture level				Moisture level			
	8%	13%	18%	CD (P=0.05)	8%	13%	18%	CD (P=0.05)	8%	13%	18%	CD (P=0.05)
0	0.27	0.36	0.61	0.027	1.30	1.28	1.25	0.020	1.75	2.03	2.36	0.038
30	0.47	0.72	0.82	0.025	1.26	1.24	1.21	0.026	2.27	2.50	3.02	0.037
60	0.67	0.91	1.08	0.025	1.22	1.18	1.15	0.024	2.52	2.96	3.25	0.038
90	0.93	1.15	1.26	0.023	1.19	1.09	1.09	0.023	2.94	3.14	3.79	0.034
120	1.01	1.27	1.39	0.025	1.11	1.02	0.92	0.023	3.22	3.65	4.18	0.042
180	1.13	1.36	1.47	0.024	1.08	0.91	0.87	0.024	3.89	4.37	4.86	0.042

The initial value of density at 8, 13 and 18 per cent moisture levels was 1.33, 1.30 and 1.27 per cent, respectively. With the increase in the storage period, density decreased gradually. After 30 days of storage period, density observed was significant at all moisture levels and highest density was found in 8 per cent moisture level stored grains. Similarly the density decreased at all the storage intervals. Decrease in density was due to the reason that insects consumed the endosperm and germ portion of grains leaving behind the husk intact. Modgil and Mehta (1994) and Samuels (1997) also reported decrease in density in stored grains.

As it is clear from the data (Table 2) that with increase in storage period, per cent damage increased in paddy stored in metal bins. After 30 days of storage significant differences were observed in moisture levels with respect to per cent damage. Minimum damage was found in grains stored at 8 per cent moisture and this result was found to be similar up to 180 days of storage. Pushpamma and Reddy (1979) also reported that the extent of kernel damage increased with moisture content of grains. Khara (1972) reported that per cent damage in paddy was 0.13 to 5.12 per cent. Thus the grains stored at 8 per cent moisture level in metal bins proved to be effective in reducing damage percentage and weight loss percentage upto 180 days of storage.

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