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## Studies of physico-chemical characteristics of some aromatic Short grain and Medium slender rice genotypes

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**Abstract**

The laboratory experiments were conducted in university lab entitled “Studies of Physico-chemical characteristics of some aromatic Short grain and Medium slender rice genotypes” on the basis of the results obtained from the present study under the investigation of hulling per cent, milling per cent, water uptake value, protein content and stickiness are concluded as The hulling per cent varied from 65.92-78.79 per cent. The maximum hulling per cent found 78.79 per cent in R-2806, followed by R-2809 that was 78.78 per cent. While minimum was found 65.92 per cent in R-3734, followed by R-3717 which was 67.00 per cent, the milling was found between 59.06-71.71 per cent. The Maximum milling per cent was found 71.71 per cent in R-3719, followed by Kala Namak i.e., 68.37 per cent. and minimum for R-3724., 59.06 per cent followed by R-3717 i.e., 59.14 per cent. The moisture content varied from 7.60-12.20 %. The variety R-3745, showed maximum moisture per cent i.e., 12.20 per cent followed by R-3730 i.e., 12.19 per cent the minimum moisture per cent are found in R-3704 i.e., 7.60 per cent followed by R-3738 i.e., 7.96 per cent. The protein content was ranged from 5.58-8.33 per cent, respectively. The maximum protein content were obtained in Kalmunhi (8.33 per cent, respectively), followed by R-3730 i.e., 8.31 per cent, respectively while minimum protein content, were recorded in R-3722 that was 5.58 per cent, followed by R-3717 that was 7.17 per cent respectively and the stickiness appear significantly in the experiments in all the rice genotypes.

**Keywords:** aromatic rice, short & medium slender, genotypes, hulling & milling per cent, water uptake

**Introduction**

Rice (*Oryza sativa* L.) is one of the most important staple food in the world. About 90% of all rice grown in the world is produced and consumed in the Asian region where more than two billion people are getting 60-70% of their energy from rice. (Annual Report, UPCAR, 2017-18) [2] In terms of area and production, it is second to wheat among the rice growing countries. It occupies an area of about 157.62 million hectare at global level with 491 million tonnes production and 493 million tonnes consumption of rice. (International Grains Council, 2017-18) [10]. The slogan ‘Rice is life’ is most appropriate for India as this crop plays a vital role in our national food security and is a means of livelihood for millions of rural households. India has the largest area under rice, i.e. 46.20 million hectare. India ranks first in area, second in production with 31 per cent of calories to Indian diet supplied by rice. India ranked first in area (46.20 million hectare) and second in production (109.69 million tonnes) of rice. (Grain and Feed Annual Report- 2016-17) [8]. Scented rice has a special place in world rice market as it is highly priced, among scented rices, short grain and medium slender aromatic rice have highly demandable in market at present time which have proximate physico-chemical characteristics. Rice grain quality is determined by its physical and chemical properties as hulling and milling characters, water uptake value, protein contents and stickiness.

**Materials and Methods**

The Laboratory experiment were conducted during 2015 and 2017, in Completely Randomized Design with three replications on some aromatic short grain and medium slender rice genotypes at laboratory of department of Agricultural Biochemistry, department of Agronomy and Bio control lab of C.S. Azad University of Agriculture and Technology Kanpur, The experiment was conducted under hulling per cent, milling per cent, the Water

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uptake capacity was determined by Hogan and Plank (1958) [9] method. 100 g rice was taken and added 10 ml of water at 77°C, Moisture content is measured using oven method. The oven is set up at 70° C then the 40 varieties of paddy is weighed and placed inside the oven. Then the final weight of the sample is measured after 24 hours. Nitrogen content in rice was estimated by using instrument, semi- auto nitrogen analyzer of model KEL PLUSH. This instrument work on the principal of kjeldahl's method of nitrogen analysis and protein content was evaluated by multiplying the nitrogen per cent by the coefficient 5.95. Observations on some growth and yield characters also recorded. The stickiness was observed by the panel of students and teachers. All the experimental works were conducted for the followings genotypes of aromatic short grain and medium slender rice.

#### Treatment varieties: 40

S.N.	Treatments	Varieties
1	V1	R-3704
2	V2	R-3715
3	V3	R-3717
4	V4	R-3719
5	V5	R-3720
6	V6	R-3721
7	V7	R-3722
8	V8	R-3724
9	V9	R-3726
10	V10	R-3728
11	V11	R-3729
12	V12	R-3730
13	V13	R-3732
14	V14	R-3734
15	V15	R-3736
16	V16	R-3737
17	V17	R-3738
18	V18	R-3743
19	V19	R-3745
20	V20	R-3746
21	V21	R-3747
22	V22	R-3748
23	V23	R-2801
24	V24	R-2802
25	V25	R-2803
26	V26	R-2804
27	V27	R-2805
28	V28	R-2806
29	V29	R-2808
30	V30	R-2809
31	V31	R-2812
32	V32	R-2816
33	V33	R-2818
34	V34	R-2819
35	V35	R-2821
36	V36	R-2824
37	V37	P-1509
38	V38	Pa-1121
39	V39	Kalmunhin
40	V40	Kala Namak

#### Results and Discussion

Table 1 presented in the preceding experiments showed milling characters as well as hulling per cent, milling per cent and water uptake value of all the varieties of aromatic short grain and medium slender rice genotypes. The milling parameters in the present investigation are discussed below under following headings. The hulling per cent ranged from 65.92-78.79 per cent. Hulling per cent is governed by the genetic potential. Hence, all the varieties of aromatic short

grain and medium slender rice genotypes were differed significantly. Similar findings have been also reported by Panwar *et al.* (1991) [14], Verma and Srivastava (1993) [25], Sarkar *et al.* (1994) [19], Pandey *et al.* (2002) [13], Singh *et al.* (2000) [23], Patindol and Wang (2002) [15] and Sharma *et al.* (2005) [20]. The Data on milling per cent ranged from 59.06-71.71 per cent which is closely coherence with the inference of Sarkar *et al.* (1994) [19], 48.5-66.6 per cent in different all the varieties of aromatic short grain and medium slender rice genotypes. Chalkiness of rice affects milling per cent because chalky areas are not as heard as translucent areas. Therefore, chalky rice breaks more during milling (Rani, 2006 and Khan *et al.*, 2000) [16, 11]. Hence, the varieties of aromatic short grain and medium slender rice genotypes were differed significantly. Water uptake was observed maximum in Kalmunhi They are governed by genetic potential and presence of amylose content. Hence, all the varieties of aromatic short grain and medium slender rice genotypes were differed significantly. Similar results were reported by, Panwar *et al.* (1991) [14], Chaubey *et al.* (1998), Rao *et al.* (1993) [17], Singh and Srivastava (1997) [21], Khan *et al.* (2000) [11], Sharma *et al.* (2005) [20], Singh *et al.* (2005) [24], Chandi and Sogi (2008) and Husaini *et al.* (2009) [5].

Table 1: Physical Characteristics

S.N.	Varieties	Hulling	Milling	Water uptake Value
1	R-3704	72.90	63.49	354
2	R-3715	71.07	60.48	385
3	R-3717	67.00	59.14	399
4	R-3719	75.32	71.71	391
5	R-3720	77.44	68.35	373
6	R-3721	75.35	65.62	365
7	R-3722	77.61	63.74	393
8	R-3724	65.92	59.06	397
9	R-3726	73.12	63.95	395
10	R-3728	75.60	64.81	369
11	R-3729	73.10	62.15	384
12	R-3730	76.00	62.93	393
13	R-3732	73.52	62.63	398
14	R-3734	78.01	65.66	391
15	R-3736	73.98	59.34	399
16	R-3737	71.59	62.10	399
17	R-3738	75.96	67.01	364
18	R-3743	76.81	64.12	366
19	R-3745	70.15	64.82	386
20	R-3746	72.25	64.29	323
21	R-3747	73.03	62.54	393
22	R-3748	70.14	62.68	399
23	R-2801	74.16	68.36	396
24	R-2802	76.64	66.58	359
25	R-2803	76.80	62.83	377
26	R-2804	73.81	65.13	387
27	R-2805	74.09	65.30	395
28	R-2806	78.79	65.44	403
29	R-2808	71.53	62.98	400
30	R-2809	78.78	62.71	389
31	R-2812	77.45	60.17	399
32	R-2816	74.73	66.73	350
33	R-2818	77.12	68.14	327
34	R-2819	75.54	62.26	364
35	R-2821	75.72	62.89	362
36	R-2824	78.52	65.62	386
37	P-1509	74.52	65.83	316
38	Pa-1121	77.63	64.55	361
39	Kalmunhi	78.50	64.88	404
40	Kala Namak	75.58	68.37	403
41	CD at 5%	1.47	5.15	28.57

Table 2 presented in the preceding experiments showed the chemical composition of some important nutritional compound like moisture per cent, protein contents, and stickiness of all the varieties of aromatic short grain and medium slender rice genotypes. The chemical parameters in the present investigation are discussed below under following underlines resulted as Data on moisture per cent have been presented in Table 2. It ranged from 7.60-12.20 per cent which is closely coherence with the inference of Husaini *et al.* (2009) [5] Hence, the varieties of aromatic short grain and medium slender rice genotypes were differed significantly. Data presented in Table 2 in respect of protein content in rice flour indicated that protein content in different varieties of aromatic short grain and medium slender rice genotypes ranged from 5.58-8.33 per cent respectively. Highest protein content was recorded in Kalmunhi in instant milled various varieties of aromatic short grain and medium slender rice genotypes. Protein content may be affected due to application of higher doses of fertilizer also. It is governed by genetic potential. These results are in close with by Reddy *et al.* (1986) [18], Singh (1993), Ahmed *et al.* (1998) [1], Deka and Sood (2001) [7], Patindol and Wang (2002) [15], Zhou *et al.* (2002) [26], Borua *et al.* (2003) [3] and Nayak *et al.* (2003) [12] and Reddy and Pushpamma (1986) [18]. The stickiness of cooked rice varied due to higher amylose and lower protein content. Medium slender type had poorest eating quality. This report has been supported by Intermediate amylose content in rice is mostly preferred for eating. The results are supported by Sharma (2005) [20].

**Table 2:** Chemical Parameters

S.N.	Varieties	Moisture %	Protein Content	Stickiness
1	R-3704	7.60	7.51	Less
2	R-3715	11.78	7.17	Medium
3	R-3717	9.43	7.26	Less
4	R-3719	11.73	7.35	More
5	R-3720	8.46	7.59	Less
6	R-3721	9.47	7.74	Medium
7	R-3722	10.40	5.58	Less
8	R-3724	9.96	8.20	More
9	R-3726	11.33	7.72	Less
10	R-3728	12.06	8.11	More
11	R-3729	8.57	7.67	Less
12	R-3730	12.19	8.31	More
13	R-3732	10.44	7.53	Less
14	R-3734	11.97	8.01	Medium
15	R-3736	11.04	7.30	Less
16	R-3737	9.58	7.54	Less
17	R-3738	7.96	8.01	Less
18	R-3743	9.60	7.64	More
19	R-3745	12.20	7.87	Less
20	R-3746	11.34	7.67	Medium
21	R-3747	9.85	7.81	More
22	R-3748	11.73	7.42	Medium
23	R-2801	12.16	7.58	Less
24	R-2802	12.10	7.44	More
25	R-2803	8.73	8.10	Medium
26	R-2804	9.57	7.73	More
27	R-2805	9.27	8.08	Less
28	R-2806	11.09	8.23	Medium
29	R-2808	11.06	7.71	Less
30	R-2809	8.23	7.36	More
31	R-2812	11.69	8.15	Less
32	R-2816	11.62	8.00	More
33	R-2818	9.31	8.17	Less
34	R-2819	10.70	7.93	Medium
35	R-2821	9.27	7.60	Less

36	R-2824	9.56	8.14	Less
37	P-1509	8.58	8.04	Less
38	Pa-1121	10.90	7.94	More
39	Kalmunhi	11.42	8.33	Less
40	Kala Namak	11.13	8.11	Medium
41	CD at 5%	1.53	0.54	N/A

## Conclusion

The present experiments concluded that the “Studies of Physico-chemical characteristics of some aromatic Short grain and Medium slender rice genotypes” explained as the hulling per cent ranged from 65.92-78.79 per cent The Data on milling per cent ranged from 59.06-71.71 per cent. Water uptake was observed maximum in Kalmunhi They are governed by genetic potential and presence of amylose content. The moisture per cent ranged from 7.60-12.20 per cent. The variety R-3745, showed maximum moisture per cent i.e., 12.20 followed by R-3730 i.e., 12.19. The minimum moisture per cent are found in R-3704 i.e., 7.60 followed by R-3738 i.e., 7.96 per cent. The protein content was ranged from 5.58-8.33 per cent, respectively. The maximum protein content were obtained in Kalmunhi (8.33 per cent, respectively), followed by R-3730 (8.31 per cent, respectively) while minimum protein content, were recorded in R-3722 that was 5.58 per cent, followed by R-3717 that was 7.17 per cent respectively. The stickiness of cooked rice varied due to higher amylose and lower protein content. Medium slender type had poorest eating quality. Intermediate amylose content in rice is mostly preferred for eating.

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