

Research Paper :

Quality evaluation of bread wheat germplasms

SANDHYA YADAV, ANITA SATI AND S.S. YADAV

Accepted : July, 2009

See end of the article for authors' affiliations

Correspondence to:

SANDHYA YADAV
Department of Home
Science, H.N.B. Garhwal
University, Srinagar,
GARHWAL,
(UTTARAKHAND)
INDIA

ABSTRACT

An experiment was laid out at C.S.A. University of Agriculture and Technology, Kanpur during 1994-96 to evaluate wheat varieties/ strains/ lines for their suitability of bread making quality and other quality characters viz., grain characteristics, flour characters, dough characteristics, Chapati quality etc. Experimentation material included six strains of bread wheat (*Triticum aestivum* L.) i.e. K-8965, K-9222, K-8027, (undertaken as check), K-9329, K-9323 and K-9443. It was revealed out from the study that K-8027 (check) and K-9443 appeared to be best for eleven characters namely; grain hardness, phenol colour reaction, protein content, wet gluten, dry gluten, sedimentation value, pelshenke value, water absorption, dough colour and appearance, dough handling property and suitability for Chapatti quality .

Key words : Bread wheat, *Triticum astivum*, Quality evaluation

Wheat is an important cereal crop of world. Average productivity and production of wheat in Uttar Pradesh is 25.02 Q/ha and 215.14 Lakh M tones, respectively from an area of 90.00 Lakh ha (Anonymus, 2008) which showed tremendous potentiality for improving yield of the crop. The production and productivity of wheat in different parts of the country. *Aestivum* wheat is the most important cultivated species of the genus *Triticum* (a hexaploid wheat) which is generally considered as main crop among all species in our country.

METHODOLOGY

The present experiment was conducted at Department of Home Science and Department of Biochemistry, C.S. Azad University of Agriculture and Technology, Kanpur. The experimental material included six cultivars of *Triticum aestivum* viz., K-8965, K-8027, K-9222, K-9329, K-9323 and K-9443 with K-8027 as check variety. Genetically pure seeds of these germplasms were procured from Economic Botany and Rabi Cereal section of C.S. Azad University of Agricultural and Technology, Kanpur.

The observations were recorded for various grain characteristics viz., test weight (1000 grain weight), grain hardness and phenol colour (Abrol *et al.*, 1971), flour characteristics viz; protein content (Williams, 1961), gluten content (Kaldy *et al.*, 1993), sedimentation value (Pinckney *et al.*, 1957), pelshenke value (Ammowath and Mabelsal993) and ash content (AOAC, 1970), Dough/alveographic characteristics (Austin and Ram, 1971) viz., water absorption, colour (dull whitish, whitish, creamish,

yellowish, light reddish and reddish) and appearance of dough (homogenous, heterogenous) and dough handling properties (sticky, slight sticky, non sticky) and Chapati characteristics viz., puffing (full puffed, almost full puffed, partial puffed slight puffed), colour (creamish and attractive, whitish, dull reddish and non attractive), aroma (pleasing, good mild blend, non pleasing), appearance (good, medium, fair, rough), texture (very soft and pliable, soft and pliable, medium soft, leathery), texture after keeping 4 hrs (medium soft to soft) and taste and palatability (very sweet, sweet, medium sweet, less sweet) test as per standard methods being followed.

FINDINGS AND DISCUSSION

The results obtained on the quality characteristics and nutritional quality parameters of different genotypes of *Triticum aestivum* are presented in Table 1 (grain characteristics and flour characteristics) and Table 2 (dough/aleuronic characteristics and Chapatti characteristics). Characterwise findings of the study are given below.

Grain characteristics:

Values of grain characters viz., test weight, grain hardness and phenol colour- reaction are presented in Table 1. Among six genotypes of *aestivum* wheat, maximum and minimum test weight and grain hardness was observed 43.240g (K-9222) to 29.607 g (K-8027) and 16.000 kg/g (K-8965) to 10.000 kg/g (K-9329), respectively. All genotypes showed significant differences for 1000 seed weight whereas, for grain hardness K-9222

Table 1 : Grain and flour characteristics of different genotypes of *T. aestivum*

Genotype	Grain characteristics				Flour characteristics				
	Test weight (g)	Grain hardness (kg/g)	Phenol colour	Protein content (%)	Glutin content (%)		Sedimentation value (ml)	Pelshenke value (mts)	Ash content
					Dry	Wet			
K-8965	32.173	16.000	++	12.563	30.00	12.29	37.40	75.33	1.533
K-9222	43.240	13.333	+	12.113	28.54	11.38	19.73	735.33	1.433
K-8027	29.607	15.000	+	13.580	36.93	15.35	34.52	153.00	1.600
K-9329	38.333	10.000	+++	8.340	30.58	12.39	33.30	242.33	1.300
K-9323	33.863	12.667	++	9.633	26.28	11.77	24.58	149.70	1.500
K-9443	41.473	13.000	++	11.413	32.02	13.41	30.60	207.70	1.617
S.E. _±	0.408	0.667	-	0.161	0.150	0.340	0.146	1.197	0.073
C.D. (P=0.05)	0.827	1.353	-	0.327	0.300	0.690	0.296	2.428	0.148

+, ++ Suitable for Chapatti making +++, +++++: Not suitable for Chapatti making

(13.333 kg/g) and K- 9443 (13.000kg/g) achieved non-significant values. Krishna and Ahmad (1992) observed significant variability in *aestivum* wheat for test weight and grain hardness. However, with regard to phenol colour reaction, out of six, all were found suitable for Chapatti making except K-9329 which was found unsuitable for Chapatti making. K-9222 and K-8027 were observed as most suitable genotypes for Chapatti making. Carrillo (1983) studied the grain hardness of different strains of *Aestivum* wheat and proposed the same findings.

Flour characteristics:

Data on flour characteristics *i.e.* protein content, gluten content, sedimentation value, pelshenke value and ash content are represented in Table 1. Highest and lowest protein content was observed in K-8027 (13.580%) and K-9329 (8.340%). Comparatively higher values of protein

content was observed in K-8965 (12.563%), K-9222 (12.113%) but all the genotypes produced significant variability for protein content. Webster and Jackson (1993) analysed the strains of *Aestivum* wheat for protein content and reported significant variances among the strains under study. Among six genotypes, the variability for wet and dry gluten content varied from 36.93% (K-8027) to 26.28% (K-9323) and 15.35% (K-8027) to 11.38% (K-9222), respectively. Again all genotypes showed significant variability for gluten content.

With regard to pelshenke value, a great variability among the genotypes was observed from 735.33 mts in K-9222 to 75.33 mts in K-8965. Large number of *Aestivum* wheat were studied for pelshenke value and reported the range of pelshenke value for 75-250 minutes Anonymus (1973-76). For sedimentation value a range of variability was observed just opposite to pelshenke

Table 2 : Dough characteristics and chapati characteristics of different

Genotypes	Dough characteristics				Chapati quality					
	Water absorption	Colour and appearance of dough	Dough handling property	Colour of Chapati	Puffing	Aroma	Texture	Appearance	Taste	Texture after keeping 4 hrs.
K-8965	71.333	W-HO	SS	W	F	G	SoP	GO	VSW	MSO
K-9222	72.333	W-HO	SS	W	F	G	SoP	GO	VSW	SO
K-8027	76.667	W-HO	SS	W	F	PL	VSP	ME	SW	SO
K-9329	72.333	W-HO	S	W	F	G	VSP	ME	SW	SO
K-9323	71.000	W-HO	S	W	F	G	VSP	GO	SW	SO
K-9443	75.333	Y-HE	S	W	F	G	VSP	GO	VSW	SO
S.E. _±	0.841	-	-	-	-	-	-	-	-	-
C.D. (P=0.05)	1.706									

W-HO	Whitish and homogenous	YHE	Yellowish and heterogmous	(S)	Sticky
(SS)	Slightly sticky	W	Whitish	F	Full puffed
PL	Pleasing	G	Good	SoP	Soft and pliable
VSP	Very soft and pliable	Go	Good	Me	Medium
VSW	Very Sweet	SW	Sweet	SO	Soft
MSO	Medium soft				

value *i.e.* from 37.40 ml in K-8965 to 19.73 ml in K-9222. K-8965 was significantly superior over all genotypes for sedimentation value. Regarding ash content, non-significantly superior differences were achieved by K-9443 (1.617), K-8027 (1.600) and K-8965 (1.533). Singh (1987) reported that ash content in wheat varied from 1.2 to 1.89 %. In all, K-8027 was observed as the best genotype with regard to grain and flour characteristics among the genotypes under test.

Dough characteristics:

Out of six genotypes a range of variability of water absorption varied from 76.667% (K-8027) to 71% (K-9323). K-8965 (71.333%), K-9222 (72.333%) and K-9329 (72.333%) gave at par values of water absorption. K-8027 (76.667%) and K-9443 (75.333%) showed significantly higher water absorption values (Table 2). Sharma and Bains (1984) found a significant variation for water absorption among the strains of Indian wheat. All strains/genotypes showed whitish colour of dough with homogeneous appearance. K-9329, K-9323 and K-9443 were found sticky in nature whereas, rest of the genotypes was found slightly sticky for dough handling property. Sekhan *et al.* (1981) described different dough characteristics of a number of *Aestivum* wheat strains and proposed their superiority over durum wheat and *triticale*.

Chapati quality:

Chapati of all six genotypes under test was whitish in colour and full puffed with good and medium appearance whereas texture was very soft and pliable or soft and pliable. With regard to taste of Chapati of all genotypes was sweet except K-8965, K-9222 and K-9443 where the taste was very sweet. Texture of Chapati of all the genotypes were observed soft after keeping 4 hours except in K-8965 where it was medium soft. Singh and Sheoran (1972) studied different aspects of Chapati quality of *Aestivum* wheat and reported more or less similar observations of the present investigation.

Authors' affiliations:

ANITA SATI, Department of Home Science, H.N.B. Garhwal University, Srinagar, GARHWAL (UTTARAKHAND) INDIA

S.S. YADAV, Department of Biochemistry, C.S.A. university of Agriculture and Technology, KANPUR (U.P. INDIA

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