

QUALITY EVALUATION OF WHEAT FLOUR CONSUMED IN RAWALPINDI AND ISLAMABAD

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ABSTRACT : The physicochemical properties and technological value of ration flour consumed in Islamabad and Rawalpindi districts were determined. The ration flour contained 57–62 and 38–43 percent endosperm and bran, respectively. The moisture content was highest (15.9 percent) in the sample collected from Kahuta and lowest value (13.5 percent) was found in flour consumed in Murree. The protein, fat and crude fibre contents range was 11.8–12.6, 1.9–2.2 and 2.3–3.0 percent, respectively. The average ash content of ration flour was 1.7 percent as compared to 0.9 percent for commercial or laboratory milled wheat flour. The farinograph tests revealed that water absorption and dough development time of ration flour ranges 57.5–62.7 percent and 12.0–16.5 min, respectively, as compared to 71.0 percent and 5.0 min for laboratory milled flour. The wet gluten contents of ration, commercial and laboratory milled flour were 16, 21 and 28 percent, respectively. *Chapati* tests indicated the unsatisfactory performance of ration flour in this regard.

Key Words: Wheats; Chemicophysical Properties; Rheological Properties; Quality; Pakistan.

INTRODUCTION

Wheat grain and its products are important components of our daily diet. According to Micronutrient Survey (1978), the average consumption of wheat in Pakistan is 448 g per head per day, constituting 83 percent of the total cereal intake and provides over 50 percent of the total calories and 60 percent of the total protein consumed by the population as a whole. About 90 percent of wheat produced in Pakistan is ground into whole meal flour and consumed in the form of *Chapati* (Chaudry and Muller, 1970). Wheat alone can meet the daily needs of thiamine and niacin and more than half of daily requirements of iron and riboflavin (Khan, 1984). The net dietary protein calories of wheat bread was reported to be 5.9 percent and can meet the protein requirement of adults if consumed in adequate amounts (Khan and Eggum, 1978a).

It is well established that the quality of wheat products depends mainly on the

quality of wheat grain. Stewart (1984) reported that the quality of wheat was affected by variety, environment, fertilizer treatment and postharvest conditions. The nutritional quality and technological value of some Pakistani commercial wheat varieties (Khan and Eggum, 1979a Khan et al. 1987a and 1987b) bread, breakfast cereals, baby foods and diets based on wheat (Khan and Eggum, 1978a, b; Khan, 1981; Khan and Kissana, 1985; Khan and Eggum 1979a) have been evaluated. The quality of wheat flour distributed through a network of ration shops has been reported as poor in a household survey conducted in Rawalpindi (Khan, 1982). Since there was no published work on the quality evaluation of wheat flour available at the ration shops, the present study was initiated to evaluate the physicochemical properties and technological value of ration flour consumed in the districts of Islamabad and Rawalpindi.

MATERIALS AND METHODS

Fifty six samples of wheat flour were collected from ration shops located in different parts of Rawalpindi and Islamabad

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districts during December 1985. Samples from each tehsil of Rawalpindi and from different locations of Islamabad district were blended separately to obtain a representative sample. A popular commercial brand ('Pakeeza') of fine wheat flour purchased from the local market and a wheat blend prepared and milled from local wheat ('Pak-81') in the laboratory were used for comparison. The ratio of white flour and bran content were determined by passing the flour through sifters of the Barabender Quadrumat Senior Mill. The chemical composition of the flour was determined according to standard methods (AOAC, 1970). Standard AACC methods (AACC, 1982) were used for the estimation of gluten and rheological properties of flour. *Chapaties* were made according to the method described by Chaudry and Muller (1970). The samples of *chapaties* were presented to a panel of seven judges for evaluation of quality.

RESULTS AND DISCUSSION

The physicochemical composition of ration, commercial and laboratory flour revealed that all samples of ration flour contained 57 to 62 percent endosperm as compared to over 80 percent found in commercial and laboratory flour (Table 1). The bran content in ration flour ranged from 38 to 43 percent. The colour of the ration flour appeared as greyish red. This may be due to the presence of bran, extraneous dirt or damaged wheat. The sieving index for wheat flour has been controlled by the cohesiveness of the flour system which in turn depends on moisture content, presence or absence of fat or particle size distribution and particle surface roughness (Neel and Hosney, 1984).

The moisture content of flour is one of the characteristics, particularly in relation to safe storage. The ration flour collected from

Table 1. Physicochemical composition of ration and commercial wheat flour

Source/ Location	Physical composition (%)			Chemical composition (%)			
	White flour	Bran	Moisture	Protein	Fat	Crude fibre	Ash
Dry basis							
Ration shop							
Islamabad	61	39	15.5	12.1	2.0	2.3	1.7
Murree	58	42	13.5	12.6	2.2	2.9	1.7
Rawalpindi	60	40	14.5	12.5	1.9	2.9	1.7
Kahuta	62	38	15.9	12.2	1.9	3.0	1.7
Gujar Khan	57	43	15.5	11.8	2.0	2.9	1.8
Commercial							
'Pakeeza'	81	19	14.1	12.2	1.6	1.5	0.9
NARC Lab.							
'Pak-81'	88	12	12.1	15.2	1.9	2.5	0.9

Islamabad, Kahuta and Gujar Khan exhibited a higher moisture content (Table 1). Moisture content higher than 13 percent may result in deterioration of flour quality during storage in bags due to mould growth (Kent, 1984). The laboratory milled flour had the highest protein content (15.2 percent) as compared to ration flour, showing 11.8–12.6 percent protein. From the nutritional stand point, it is important that cereals in general and wheat in particular should have high protein content because these from the bulk of the ordinary Pakistani diet and provide 65 percent of the daily protein requirement of an individual (Khan and Ullah, 1984). However, regarding the suitability of wheat flour for making *chapati*, the protein content from 10 to 13 percent of the right quality is required (Austin and

Ram, 1971). The ash values were higher in ration flour samples due to higher content of bran.

The rheological and baking characteristics of ration, commercial and laboratory flour samples and their farinograph curves indicated dough development time and dough stability (Table 2, Figure 1). Flour absorption is an important factor in the production of all types of baked products. In the present study water absorption (71.0 percent) of laboratory flour was significantly higher than the water absorption of ration flour samples (57.5 – 62.7 percent). High absorption values are desirable, since they tend to increase unit yields (Pratt, 1971) and improve the keeping quality of the product (Austin and Ram, 1971).

Table 2. Technological value of ration and commercial wheat flour

Source/ Location	Farinograph			Gluten		Chapati quality		
	Water absorption (%)	Dough development (min)	Stability (min)	Wet gluten (%)	Quality	Colour	Texture	Overall acceptability
Ration Shop								
Islamabad	59.8	16.5	5.0	17	Low	Brown	Coarse but pliable	U
Murree	62.7	12.0	7.5	19	Low	Brown	Tough	U
Rawalpindi	61.6	14.5	4.5	17	Low	Brown	Tough	U
Kahuta	57.5	15.5	2.0	13	Low	Brown	Tough	U
Gujar Khan	57.5	15.5	2.5	15	Low	Brown	Tough	U
Commercial								
'Pakeeza'	57.0	9.0	12.0	21	Moderate	Creamy White	Soft pliable	S
NARC Lab.								
'Pak-81'	71.0	5.0	2.7	28	Moderate	Creamy	Slightly tough but pliable	S

U = Unsatisfactory — S = Satisfactory

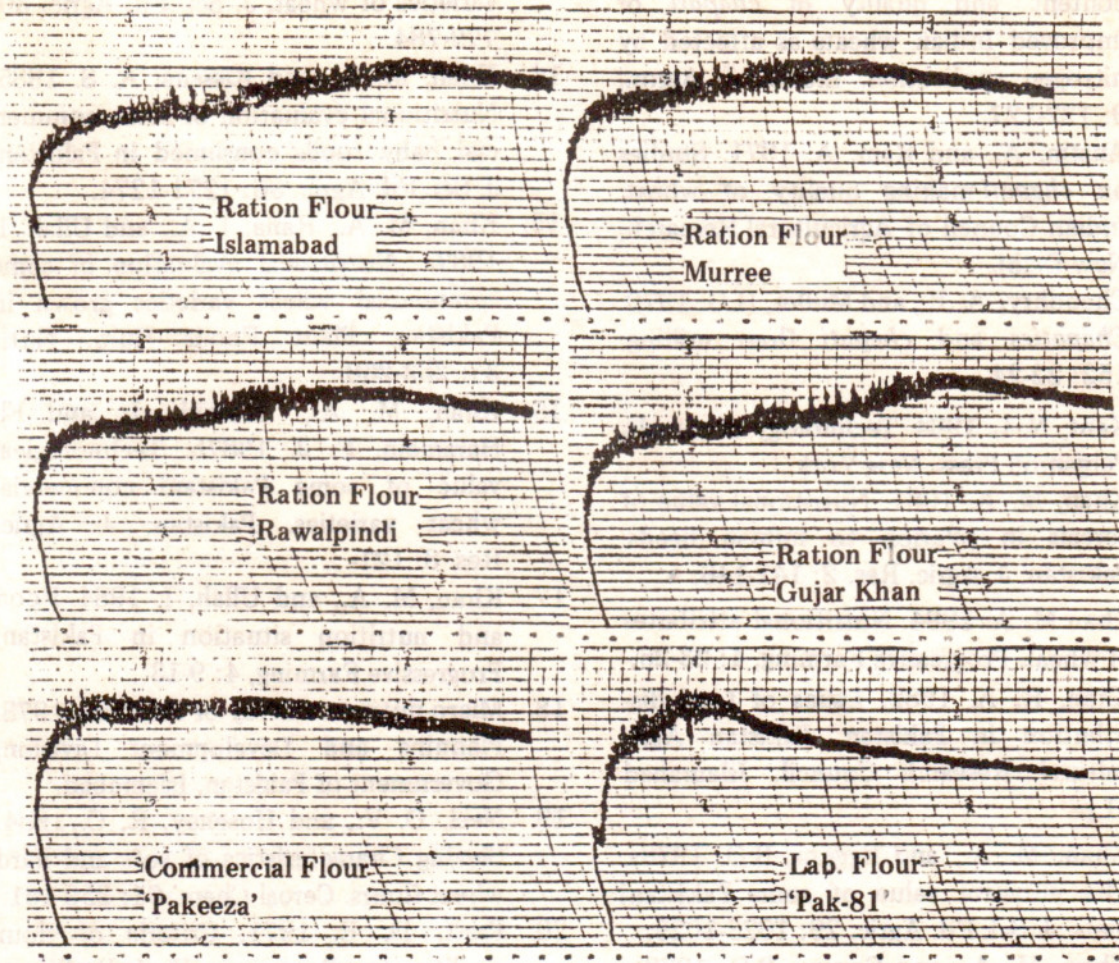


Figure 1. Farinograms of the ration, laboratory and commercial flour

Ration flour took longer time to develop dough and the dough stability was significantly lower than commercial flour. Low stability time of dough prepared from laboratory flour was due to fresh unmatured flour used in the present study. The ration flour samples had lowest wet gluten content, ranging from 13 to 19 percent. Such flour produced a crumbly type *chapati* having poor texture and keeping quality (Austin and Jhamb, 1964). The results of the present study indicated that *chapatis* prepared from ration flour samples produced brown colour product with tough texture and high chewability. The after-taste was slightly bitter due to higher percentage of bran in flour and their quality was unsatisfac-

tory. Commercially and laboratory milled flour produced reasonably good quality *chapatis*. In conclusion, the wheat flour available at the ration shops was poor in quality for the *chapati*-making purpose.

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