

QUALITY CHARACTERISTICS OF SOFT WHEATS AND THEIR UTILIZATION IN JAPAN. II. EVALUATION OF WHEATS FROM THE UNITED STATES, AUSTRALIA, FRANCE, AND JAPAN

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ABSTRACT

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Soft wheats, such as soft white, white club, and soft red winter wheats from the U.S., Victoria soft, Victoria F.A.Q., Western Australia F.A.Q., French, and domestic Japanese wheats were compared with respect to their utility for Japanese products. White club, soft white, and soft red winter wheats were all found to be superior to others in their suitability for making confectionery products, although white club was considered better than soft white. Small quantities of Victoria soft and some types of French and Japanese wheats can be blended with soft wheats from

the U.S. in the production of confectionery flour. In spite of the low protein content, the kernel characteristics of both Australian F.A.Q. wheats were rather hard, and they were least preferable in terms of their sponge-cake baking qualities. As the material for Japanese-type noodle flour, wheats similar to Japanese wheat were considered most desirable. Although Australia F.A.Q., soft white, and white club wheats were different from Japanese wheat, they possessed favorable characteristics for noodle flour.

As described in the previous paper (1), the uses of soft wheats in Japan are twofold: for the production of low protein flours for confectioneries, and for the production of Japanese-type noodle flour and/or all-purpose flour. Western white wheat from the U.S. Pacific Northwest area (soft white and white club) is the most important and indispensable wheat for cakes, biscuits, cookies, crackers, Japanese buns, etc. One or more of western white, Australian standard white from Western Australia and Victoria (formerly classified as Western

TABLE I
Average Quality Data of Soft Wheat Samples from Different Parts of the World

Test	U.S. Wheat			Australian Wheat			French	Japanese
	Soft white	White club	Soft red winter	Victoria soft	Victoria F.A.Q.	W. Aust. F.A.Q.		
Wheat								
Test wt (kg/hl)	80.0	78.5	77.5	80.5	79.0	80.0	77.0	78.5
Moisture (%)	9.5	10.4	11.7	11.4	10.1	9.4	11.5	12.4
Ash (%) ^a	1.28	1.36	1.64	1.26	1.35	1.34	1.53	1.64
Protein (%) ^a	10.8	10.0	10.7	9.0	10.4	10.0	10.0	10.5
Vitreous kernels (%)	40	32	22	46	48	56	27	10
Flour extraction (%)	72.5	73.9	74.6	71.3	71.8	71.9	74.5	69.2
Flour								
Ash (%) ^a	0.36	0.38	0.40	0.37	0.41	0.41	0.38	0.37
Color	0.9	0.1	1.3	0.6	1.0	0.9	2.1	2.3
Protein (%) ^a	8.6	8.0	8.6	7.5	8.8	8.6	8.2	8.8
Maltose value (mg/10 g)	155	115	105	130	190	230	130	85
Specific surface (cm ² /g)	2620	2680	3510	3070	2370	2340	2590	3590
MacMichael viscosity	87	32	55	39	64	81	61	82
Sponge-cake quality ^b	5	7	7	3	2	1	4	4
Cookie quality ^b	5	6	7	3	2	1	4	4
Noodle quality ^b	4	4	3	3	4	5	4	5

^aAs-is moisture basis.

^bScores are assigned over a 9-point range; 1 = much less preferable than a standard; 5 = standard (equal to a control); and 9 = much better than the standard.

Australia F.A.Q. (fair to average quality) and Victoria F.A.Q.), and domestic Japanese wheats are used for Japanese-type noodle flour. In the past, U.S. soft red winter, Australian soft from Victoria (formerly called Victoria soft) and French wheat were used in the making of soft wheat flours.

Since many kinds of soft wheat flours are produced for a variety of products, a description of the quality characteristics required in soft wheat is complex. This report comprises a survey of soft wheat samples received from different parts of the world, an analysis of their utility for Japanese products, and a discussion of the kinds of wheat which are desirable as raw material for soft wheat flours in the Japanese market.

MATERIALS AND METHODS

The following numbers of samples were selected from the sample storage of Nisshin Flour Milling Co., Ltd. for this test:

<i>Origin and Wheat Type</i>	<i>Sample Number from Each Crop Year</i>						
	1967	1968	1969	1970	1971	1972	1973
U.S.							
Soft white				2	3	3	3
White club				2	3	3	3
Soft red winter				1	1	1	
Australia							
Victoria soft			1		1	2	
Victoria F.A.Q.				1	2	2	
Western Australia F.A.Q.				2	2	2	
France		1	2				
Japan					3	3	3

Methods used were those described in the preceding paper (1).

RESULTS AND DISCUSSION

The average quality data of wheat samples tested are given in Table I. Figures 1 and 2 show the sponge-cakes and cookies made from composite samples of each class. From the standpoint of usage in Japan, we conclude as follows.

For confectionery flours:

1. White club, soft white, and soft red winter wheats from the U.S. were predominantly superior to others.

2. The sponge-cake and cookie-baking qualities of white club wheat were superior to those of soft white wheat. The Official Grain Standards of the United States (2) defines: the subclass western white wheat shall be white wheat containing more than 10.0% of white club varieties and more than 10.0% of other white wheat. Therefore, the greater the proportion of white club wheat blended with western white wheat, the more favorable it is for use in confectionery products in Japan.

3. Quality variations of soft red winter wheat were large, with the better samples appearing to be superior to white club wheat.

4. Quality variations of French wheat were also large. Some samples with normal amylograph viscosity showed favorable characteristics for confectionery products, which permits these to be used for blending purposes.

5. Victoria soft wheat was more soft than other Australian wheats, but was inferior to western white wheat in suitability for making confectionery products. Small quantities may be blended with western white in the production of confectionery flour.

6. The quality range of domestic Japanese wheat was also large. Some of the samples grown in southern Japan showed suitable quality for sponge-cake and cookie-baking.

7. Australian F.A.Q. wheats were not suitable for production of confectionery flours. In spite of the low protein content, the kernel characteristics of Australia F.A.Q. were rather hard, as indicated by high maltose values and coarse particle size (low specific surface).

For Japanese-type noodle flours:

1. Soft red winter wheat was not desirable because of excessive softness.
2. Victoria soft wheat was weak in terms of palatability because of its low protein content.

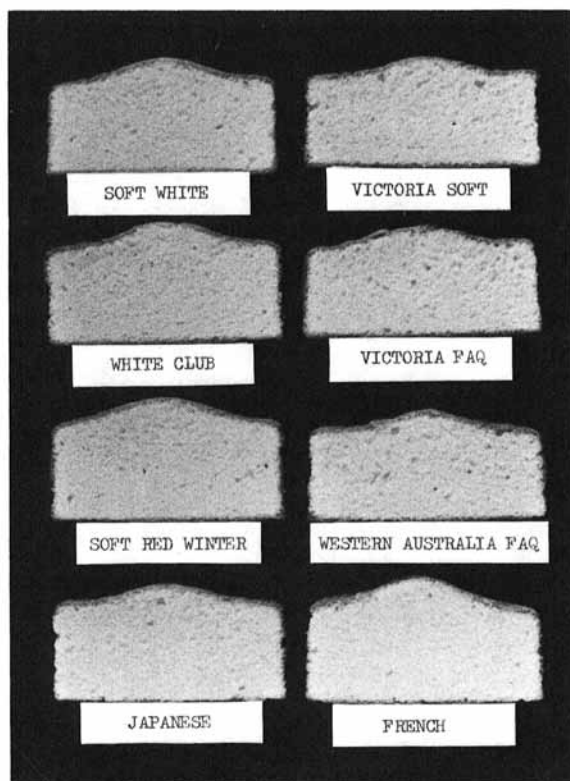


Fig. 1. Sponge-cakes made from 60% extraction flours of composite samples of soft wheats from different parts of the world.

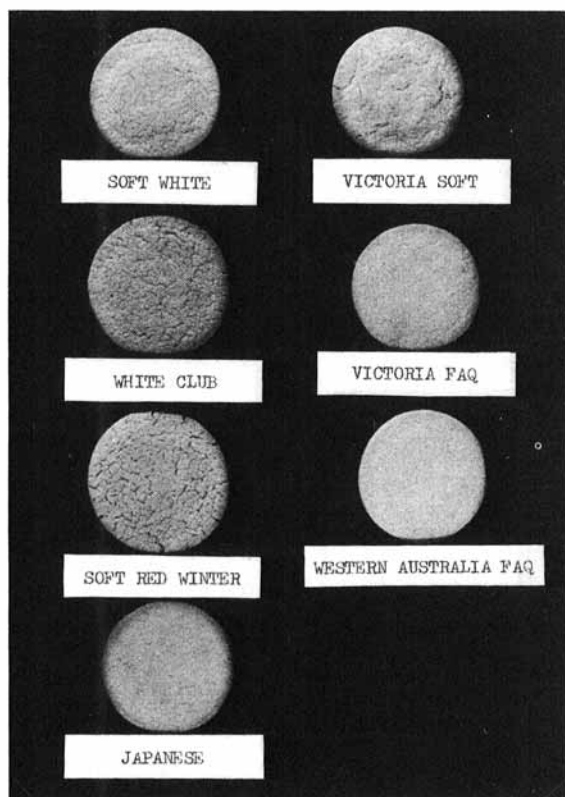


Fig. 2. Cookies made from 60% extraction flours of composite samples of soft wheats from different parts of the world.

3. The Japanese people's taste preference for noodle quality originates from use of domestic Japanese wheat. Therefore, those wheats similar to Japanese grain would be most desirable. Australian F.A.Q., soft white, and white club, although different in some respects from Japanese wheat, possessed unique characteristics which were favorable for making noodle flour. We presume that the rather comparable noodle-processing characteristics of Western Australia F.A.Q. to Japanese wheat come from its gluten and starch-gelatinization characteristics. Gelatinization at the relatively low temperature shown in Fig. 3 may be one of the factors which contribute to softness and elasticity of the product.

4. French wheat may be blended with Australian F.A.Q., soft white, or white club for the production of Japanese-type noodle flour.

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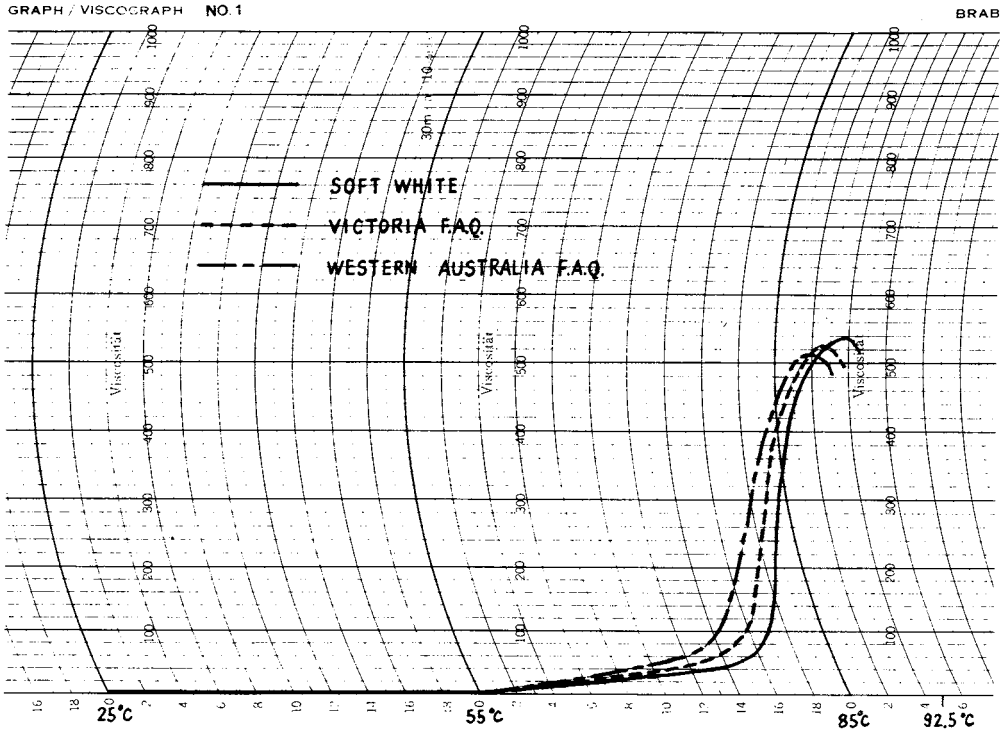


Fig. 3. Comparison of amylogram between Australia F.A.Q. and soft white. Tests were done on 60% extraction flours of each wheat sample.

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