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QUALITY EVALUATION OF YOGURT PRODUCED COMMERCIALY IN ONTARIO

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ABSTRACT

Analyses for fat, total solids, solids-not-fat (SNF), pH, and net weight were conducted on 152 yogurts of which 15 were unflavored. These yogurts were produced by 13 different manufacturers and sold in Ontario. The fat content of all samples varied from 0.9 to 3.6% with a mean of 1.98%. For the plain yogurt, the mean fat percentage was 2.46%. The SNF content of all samples ranged from 10.0 to 28.9% with a mean of 18.96%. For the plain yogurt, the mean SNF percentage was 13.40. The pH values for all samples varied from 3.27 to 4.53. The mean overweight for all samples was 7.2% with as much as 15% for one manufacturer.

The success of yogurt as a dairy product on the Canadian market has resulted in the introduction of many new brand names. Most dairies producing these brands have had little or no previous experience in yogurt manufacture. Lack of regulatory standards of composition has allowed the dairies to experiment with fat and solids-not-fat (SNF) content of yogurt. This has resulted in general confusion as to the composition of yogurts available to the consumer in Canada. We have undertaken the study reported here to make available to the dairy industry and the regulatory agencies information regarding the composition of yogurt marketed in Ontario.

MATERIALS AND METHODS

Products

One hundred and fifty-two commercially produced yogurts were obtained from grocery stores in Ontario during June, July, and August of 1971. The samples which represented 13 different manufacturers included 15 plain and 137 fruit or fruit-flavored yogurts (Swiss style). All products were trans-

ported to the laboratory within 2 hr of purchase and kept refrigerated until analyzed.

Analyses

Before removing portions of the sample for analysis, the whole content of the container was transferred quantitatively into a Waring blender and thoroughly mixed for 3 min at high speed. Analyses for fat and total solids were done in duplicate.

Fat, total solids, solids-not-fat

Percent fat and total solids were determined by the Mojonnier method (1). Solids-not-fat was considered to be the arithmetic difference.

Weight of product

The outside of each container of yogurt was wiped dry and the container and contents weighed. After removal of the product, each container was washed, dried, and reweighed. The difference in weight represented the net weight of product and was reported with the weight specified on the package.

pH

A Radiometer 26 pH meter with a combination electrode was used to determine the pH of each sample.

RESULTS

Samples were analysed and grouped according to brand. Each of the groups A to H inclusive, represented one brand and contained 15 to 17 samples. Group I represented five different brands of yogurt and contained 20 samples. Results are summarized in Table 1.

Fat

The fat content ranged from 0.9 to 3.6%. With-

TABLE 1. ANALYSES OF COMMERCIAL SAMPLES OF YOGURT

Group	A	B	C	D	E	F	G	H	I	Total
Samples tested	15	16	16	17	17	17	17	17	20	152
Plain samples	0	0	0	2	1	0	3	2	7	15
Fat %										
Mean	2.90	1.04	1.10	2.04	3.09	1.63	2.07	1.63	2.27	1.98
Range ¹	2.5-3.2	0.9-1.2	0.9-1.5	1.3-3.0	2.5-3.6	1.2-2.1	1.5-2.7	1.1-3.4	1.4-3.2	0.9-3.6
Range ²	2.5-3.2	0.9-1.2	0.9-1.5	1.3-3.0	2.5-3.6	1.2-2.1	1.5-2.5	1.1-2.8	1.4-2.9	0.9-3.6
SNF %										
Mean	21.98	23.43	23.33	21.28	24.47	21.87	20.87	23.41	17.40	21.79
Range ¹	19.8-24.4	18.7-28.5	21.2-25.7	12.6-25.0	18.9-26.6	21.1-22.6	17.1-24.4	13.4-28.9	10.0-24.3	10.0-28.9
Range ²	19.8-24.4	18.7-28.5	21.2-25.7	18.9-25.0	19.2-26.6	21.1-22.6	19.8-24.4	21.8-28.9	17.6-24.3	17.6-28.9
pH										
Mean	3.66	3.92	3.89	4.09	3.87	4.01	3.93	3.82	3.97	3.91
Range ¹	3.27-3.97	3.77-4.06	3.77-4.08	3.85-4.25	3.71-4.15	3.78-4.28	3.60-4.40	3.68-3.95	3.53-4.53	3.27-4.53
Range ²	3.27-3.97	3.77-4.06	3.77-4.08	3.85-4.25	3.71-4.15	3.78-4.28	3.60-4.40	3.68-3.95	3.53-4.53	3.27-4.53
Weight										
Mean % over or under fill	+10	+3	+11	+7	+11	+11	+15	-1	+4	+7.2

¹Range for all samples²Range for all but plain samples

in groups the range interval was narrower but was still greater than 1% for 5 of the 9 groups. The mean of all samples was 1.98% fat and for the plain yogurt, 2.46%. When the latter was excluded from the groups, some of the ranges were narrowed. The means of the groups varied from 1.04 to 3.09%. Only three of the manufacturers, groups B, C, and F, had the fat content (1%) advertised on the packages. In these instances the actual percent fat ranged from 0.9 to 1.2, 0.9 to 1.5, and 1.2 to 2.1 with means of 1.04, 1.10, and 1.63, respectively.

SNF

The SNF content of all samples ranged from 10.0 to 28.9%. When the plain yogurt was excluded, the range was narrowed to 17.6 to 28.9%. The range interval within groups was as narrow as 1.5% for group F and as large as 15.5% for group H. The range interval became less than 10% for each group when plain samples were omitted. The mean of all samples was 21.79% and for plain yogurt, 13.04%.

pH

The pH values of all samples varied from 3.27 to 4.53 with a mean value of 3.91. The smallest range was 0.27 for group H and the largest was 1.0 for group I. There did not appear to be any correlation between pH and the type of fruit added to yogurt.

Weight

The packages contained a mean overweight of 7.2%. The group means varied from plus 15% in G to minus 1% in H.

DISCUSSION

The results clearly show that yogurt sold on the Ontario market varies considerably in fat and SNF content. Differences between manufacturers could be expected but the wide variations in composition within yogurts of a single manufacturer were surprising. Plain yogurt was generally higher in fat, probably because it was not being diluted by the addition of fruit or flavorings. It is also obvious that addition of high-solids fruit preparations will raise the SNF content above that of plain yogurt. Depending upon the type of fruit, more or less of it must be added to yogurt to give it the desired flavor. This will result in varying dilution effects with respect to fat content. This explains, in part, the variations in fat content between flavors. However, it does not explain wide variations within a flavor of a single manufacturer such as 1.2 to 2.8% fat in strawberry of group H, or 1.2 to 2.1% fat in orange of group F, or 1.8 to 3.0% fat in banana of group D. That fat content can be controlled more closely was demonstrated by the results for group B in which the fat range interval for 16 samples of 7 different flavors was only 0.3%.

The same remarks are generally true for the SNF content. Even when plain yogurt samples were omitted, SNF range intervals were as great as 9.7 for group B. However, group F with seven flavors represented in 17 samples had a range interval of only 1.5%.

It is difficult to draw any conclusions from the

data on pH with regard to adequate pH control by the manufacturer. Since the samples were collected from retail outlets, and since yogurt is a biologically active product and therefore has to be kept at about 5 C, it is likely that inadequate storage conditions and age of sample influenced the pH readings obtained. In this respect, the main factor may be the type of bacterium which predominates in the product. An excess of *Lactobacillus bulgaricus* would cause a lower pH than would an excess of *Streptococcus thermophilus*.

Generally the customer received good measure for his money. On the average, the weights were in excess by 7.2%. Samples in groups I and B were well controlled with excess mean weights of only 4 and 3%, respectively. Group B was exceptionally well controlled with only 1 sample of 16 being un-

derweight and that by less than 1 g.

Based on the results of this study, yogurt of uniform composition is generally not available to the consumer. This was evident not only between brands but within most brands. This lack of consistency in product composition may also be responsible for variations in viscosity of the product and thus influence public acceptance.

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