A Note on Ethoxylated Sorbitol Esters as Bread Conditioner/Softeners

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Considerable recent interest has developed over ethoxylated glycerol and sorbitan esters as dough conditioner/softeners. We have screened several ethoxylated sorbitol esters, finding some to be quite effective in this application.

MATERIALS AND METHODS

Standard white bread sponge-dough formulation and procedure were used. Doughs were proofed to template height. All bakings were replicated at least

TABLE I. BAKING DATA

Material[1]	Level (Flour Basis) %	Loaf Volume cc.	Average Softness Index
Blank control	...	2,554	1.00
A	0.2	2,607	0.89
	0.25	2,639	0.93
	0.4	2,722	0.81
	0.6	2,754	0.74
	0.8	2,779	0.70
B	0.3	2,508	0.95
	0.6	2,542	0.93
C	0.3	2,495	0.92
	0.6	2,568	0.89
D	0.2	2,719	0.83
	0.25	2,696	0.88
	0.3	2,719	0.77
	0.4	2,734	0.79
	0.6	2,762	0.74
	0.8	2,764	0.77
E	0.25	2,714	0.93
F	0.25	2,773	0.84
G	0.25	2,708	0.90
H	0.25	2,626	0.96

[1]A = Commercial conditioner/softener;
B = polyoxyethylene (30) sorbitol (15% H_2O) septaoleate;
C = polyoxyethylene (20) sorbitol (15% H_2O) hexaoleate;
D = polyoxyethylene (40) sorbitol (15% H_2O) hexalaurate;
E = polyoxyethylene (50) sorbitol (15% H_2O) hexaoleate;
F = polyoxyethylene (30) sorbitol (15% H_2O) pentalaurate;
G = polyoxyethylene (40) sorbitol (15% H_2O) septaoleate;
H = polyoxyethylene (40) sorbitol (15% H_2O) hexaoleate.

twice and averaged; loaf volumes were determined by rapeseed displacement. Crumb firmness data were obtained from 3- and 6-day-old bread compressed with an Instron Universal Tester adapted for this purpose. To determine the relative firmness between batches, an index was computed by dividing the mean compression value for each test batch by a comparable value for a blank control. The lower this index, the softer the crumb. Softness data reported in Table I are mean values of 3- and 6-day test data.

Commercial ethoxylated sorbitol esters were generally used, though some esters were prepared from commercial ethoxylated sorbitol. The sorbitol used for all materials contained 15% water, thereby permitting preparation of septa-esters from the more reactive ethoxylated sorbitol (15% H_2O). A standard commercial conditioner/softener consisting of 60% plastic mono- and diglycerides and 40% polysorbate 60 (polyoxyethylene (20) sorbitan monostearate) was included in each baking for comparison (1). Additives were incorporated at the dough stage.

RESULTS AND DISCUSSION

Table I shows the efficacy of the esters examined. Esters D and F, both laurate-based, were highly functional; esters B and C performed poorly. The remainder were intermediate in effectiveness, indicating that oleate esters require ethoxylation at least in the 40- to 50-mole range.

Our most interesting finding is the exceptional functionality of laurate esters at relatively low use levels (0.2 to 0.3%, flour basis). In this range they are as effective as commercial conditioner/softeners at 0.4%.

Literature Cited

1. LANGHANS, R. K., and THALHEIMER, W. G. Polysorbate 60: Effects in bread. Cereal Chem. 48: 283 (1971).

[Received February 5, 1974. Accepted May 7, 1974]