



# FATS AND PROTEINS RESEARCH FOUNDATION, INC.

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THE DIRECTOR'S DIGEST  
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## COLLAGEN DERIVATIVES AS DETERGENT INGREDIENTS

Preliminary research at the Illinois Institute of Technology Research Institute (IITRI) indicated that certain cross-linked derivatives of collagen showed promise as ingredients for heavy duty "built" detergents to replace carboxymethylcellulose (CMC) and possibly phosphates (Director's Digest No. 76, October, 1970). Recent results on this project are presented below.

1. The collagen derivatives were all superior to CMC as soil dispersants in built detergents as shown by whiteness retention values in repetitive washings with Aquadag (an aqueous colloidal graphite suspension) as the soil source.
2. None of the collagen derivatives tested was as effective as CMC when tested with EMPA cloth (an oily soil) as the soil source.
3. Simple detergent formulations containing 20% LAS and 50% collagen derivatives were inferior to the standard AHAM detergent formulation or Tide (both contain phosphates) regardless of the test cloth used or water hardness (Table 1).
4. Simple detergent formulations containing 10% Tergitol (a nonionic surfactant) and 50% collagen derivatives were more effective soil removal agents than the standard AHAM formulation when U.S. Testing Company test cloth was used. When EMPA test cloth was used the formulations containing the collagen derivatives were not as effective as the standard AHAM formulation (Table 1). In all cases Tide, which probably contains bleach and optical brighteners in addition to phosphates, was superior to AHAM and the formulations containing collagen derivatives.

Although collagen derivatives in the formulations tested are not completely satisfactory as replacements for either CMC or phosphates, the results are quite promising. More complete cross-linking of the soluble collagen and more extensive formulation studies with non-ionic surfactant compounds should lead to the development of very satisfactory detergent formulations in which collagen derivatives replace CMC and phosphates.

Table 1. Percent Soil Removal by Detergent Formulations as Influenced by Concentration, Water Hardness and Test Cloth

Formula	Collagen Derivative	Concn. %	50 ppm		135 ppm		300 ppm	
			Test Cloth:		Test Cloth:		Test Cloth:	
			EMPA	U.S.	EMPA	U.S.	EMPA	U.S.
			Testing	Testing	Testing	Testing	Testing	Testing
TIDE	-	.2	72	31	71	31	68	30
		.3	74	35	72	32	70	32
AHAM	-	.2	62	25	61	24	56	19
		.3	64	29	61	26	58	24
LAS	None	.2	52	24	38	22	33	20
		.3	52	25	48	25	43	27
LAS	1E	.2	48	16	36	20	32	19
		.3	54	16	45	19	32	20
LAS	3B	.2	51	17	41	19	37	18
		.3	54	17	48	18	33	18
LAS	SP-100	.2	49	18	31	21	26	21
		.3	52	17	46	20	27	21
Tergitol	None	.2	43	25	43	25	45	29
		.3	47	28	48	28	48	30
Tergitol	1E	.2	51	27	37	26	30	27
		.3	52	32	50	30	46	29
Tergitol	3B	.2	56	30	54	29	49	29
		.3	54	30	53	30	51	31