



Technical Report:

Cold Process Moisture Elements Body Wash

Project:

Body Wash with Floraesters® K-100 Jojoba (**K-100**)

Synopsis:

This study presents results obtained from the optimization of the Cold Process Moisture Elements Body Wash formula. This formula utilizes the moisturization synergy of Floraesters K-100 Jojoba with glycerin. Optimization attributes include several stability parameters, foam volume and duration, and minimization of irritation potential. The methods used to evaluate these attributes were the **Shake Test Foam Retention** (see page 4) and the **Blender Foam Evaluation Test** (see page 6). Additionally, the mildness of the test articles was evaluated using the **Zein Test** (see page 8). The test article Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100 and glycerin) produced foam that was more stable and lasted longer than the test article **without** K-100. In the Blender Foam Evaluation, the overall foam volume reduction of the Cold Process Moisture Elements Body Wash within a 5 minute time-frame was 2.4% compared to the overall foam volume. By contrast, the formula **without** K-100 resulted in a 5.2% reduction in foam. In the mildness test, Zein was used to evaluate the irritation potential of surfactant components. The Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100 and glycerin) denatured an average of 2.1% Zein compared to the formula **without** K-100 which resulted in a 2.9% denaturation.

Description of Product:

- A body wash was created that leverages the moisturization potential of K-100 with glycerin.
- The Cold Process Moisture Elements Body Wash was created to mildly cleanse the skin and provide a rich and creamy lather while you wash. It leaves the skin feeling smooth, soft, and supple.
- K-100 helps keep the skin feeling moisturized and conditioned.

Technical Data

Categories	Cold Process Moisture Elements Body Wash	Body Wash without K-100
Average viscosity	1,200 cps	2,600 cps
Average pH	6.9	6.2
% Solids	47.8%	45.4%
Clarity (UV-VIS spectrophotometer)	99%	99%
Perception (skin feel after wash)	soft, smooth, and clean	tight, dry and de-fatted

Cost: The cost per kilogram of the Cold Process Moisture Elements Body Wash is estimated to be <US\$1.40.



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Cold Process Moisture Elements Body Wash -- Formula # C024

Product(s) highlighted: *Floraesters® K-100 Jojoba, Florasolvs® PEG-16 Macadamia*

Cold Process Moisture Elements Body Wash is built to moisturize and consists of crucial building blocks for healthy and moisturized skin. This Floraesters K-100 Jojoba-containing formula produces a mild wash product with creamy foam. In addition, the combination of Floraesters K-100 Jojoba and glycerin has been shown in studies to improve skin hydration over a 24-hour period when compared to formulas without the combination. The Florasolvs PEG-16 Macadamia helps to leave the skin feeling smooth. This formulation satisfies the senses and it contains quality, skin-compatible ingredients.

Phase	Trade / Common Name	INCI Name	Manufacturer	% wt./wt.
A.	Deionized Water Versene® Na2 Crystals	Water Disodium EDTA	----- The Dow Chemical Co.	q.s. 0.05
B.	Floraesters K-100 Jojoba Florasolvs PEG-16 Macadamia Glycerin, USP Glycerox 767 Fragrance ¹	Hydrolyzed Jojoba Esters (and) Jojoba Esters (and) Water (Aqua) PEG-16 Macadamia Glycerides Glycerin PEG-6 Caprylic/Capric Glycerides Fragrance	Floritech Floritech The Dow Chemical Co. Croda, Inc. -----	1.25 1.25 2.00 4.00 q.s.
C.	Chemccinate® DSLS Mackamide® L-10 Chembetaine® C Plantaren® 2000 N UP	Disodium Laureth Sulfosuccinate Lauramide DEA Cocamidopropyl Betaine Decyl Glucoside	Lubrizon Corporation* Rhodia Novacare Lubrizon Corporation* Cognis Corporation	25.00 10.00 5.00 5.00
D.	Citric Acid, USP (30% solution) Preservative	Citric Acid (and) Water -----	DSM Nutritional Products -----	q.s. q.s.
TOTAL:				100.00

Mixing Procedure:

- Using moderate propeller agitation, add the Versene Na2 Crystals to the deionized water and mix until completely dissolved.
- In a separate container, combine all ingredients of Phase B. Mix Phase B slowly until completely dispersed, then add the mixture to Phase A.
- From Phase C, add each ingredient to Phase AB and continue to mix with moderate propeller agitation until solution becomes clear.
- With continued propeller mixing, add the Citric Acid, USP (30% solution) to achieve pH 6.0–8.0. This will require a 0.8% or slightly more citric acid solution.
- With continued propeller mixing, add the preservative.

¹ Fragrance Green Clover and Aloe HS supplied by Symrise

* Supplied by Essential Ingredients



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COLD PROCESS MOISTURE ELEMENTS BODY WASH STABILITY EVALUATION

TEST	LIMITS	STABILITY TEMP.	WEEK 0	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 8	WEEK 12
Viscosity (cps) Range: 700 – 1,700 cps	Ambient	4°C		pass	pass	pass	pass	pass	pass
		25°C	pass	pass	pass	pass	pass	pass	pass
		40°C		pass	pass	pass	pass	pass	pass
		60°C		pass					
pH Range: 6.0 – 8.0		4°C		pass	pass	pass	pass	pass	pass
		25°C	pass	pass	pass	pass	pass	pass	pass
		40°C		pass	pass	pass	pass	pass	pass
		60°C		pass					
Color-Visual clear slightly yellow		4°C		pass	pass	pass	pass	pass	pass
		25°C	pass	pass	pass	pass	pass	pass	pass
		40°C		pass	pass	pass	pass	pass	pass
		60°C		pass					
Appearance Transparent, one-phase		4°C		pass	pass	pass	pass	pass	pass
		25°C	pass	pass	pass	pass	pass	pass	pass
		40°C		pass	pass	pass	pass	pass	pass
		60°C		pass					
Odor No off-odor		4°C		pass	pass	pass	pass	pass	pass
		25°C	pass	pass	pass	pass	pass	pass	pass
		40°C		pass	pass	pass	pass	pass	pass
		60°C		pass					
No Light at Room Temperature					pass				
Ultraviolet Light at Room Temperature					pass				

Freeze/Thaw Cycles	Cycle I	Cycle II	Cycle III
Viscosity (cps)	pass	pass	pass
pH Reading	pass	pass	pass

Stability: Stability Evaluation was conducted under the following conditions:

- 4°C, 25°C (room temperature), 40°C with ambient humidity for 12 weeks
- 60°C with ambient humidity for 7 days
- Freeze/Thaw: Freezer at 18°C; product was frozen/thawed once per day for 3 consecutive days
- Ultraviolet Light: Room Temperature for 2 weeks
- No Light: Room Temperature for 2 weeks

Method: Samples were evaluated at room temperature for viscosity, pH, color (visual), appearance and odor right after production (week 0). Samples were removed from the stability chamber and brought to room temperature before each evaluation. Evaluations were conducted on the 1st, 2nd, 3rd, 4th, 8th, and 12th week of stability. Samples meeting the criteria were noted as “pass.” Passing indicates the product is stable and maintains acceptable viscosity, pH, color, appearance and odor.

Summary: Cold Process Moisture Elements Body Wash was stable in various temperatures for 12 weeks, stable in no light and UV conditions for 2 weeks, and freeze/thaw results showed no change in viscosity and pH.



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Methods and Materials:

Cold Process Moisture Elements Body Wash was tested using three methods – Foam Retention, Foam Evaluation and Zein Test. There were a total of three (3) test articles represented. All tests were run in triplicate.

Test Articles:

- A. Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100, and with glycerin)

Focus Ingredients: Disodium Laureth Sulfosuccinate, Lauramide DEA, Cocamidopropyl Betaine, Decyl Glucoside, Glycerin, Hydrolyzed Jojoba Esters (and) Jojoba Esters (and) Water (Aqua) (**Floraesters K-100 Jojoba**), PEG-16 Macadamia Glycerides (**Florasolvs PEG-16 Macadamia**)

- B. Sulfate-free body wash with K-100, and without glycerin

Focus Ingredients: Disodium Laureth Sulfosuccinate, Lauramide DEA, Cocamidopropyl Betaine, Decyl Glucoside, Hydrolyzed Jojoba Esters (and) Jojoba Esters (and) Water (Aqua) (**Floraesters K-100 Jojoba**), PEG-16 Macadamia Glycerides (**Florasolvs PEG-16 Macadamia**)

- C. Sulfate-free body wash **without** K-100, and with glycerin

Focus Ingredients: Disodium Laureth Sulfosuccinate, Lauramide DEA, Cocamidopropyl Betaine, Decyl Glucoside, Glycerin, PEG-16 Macadamia Glycerides (**Florasolvs PEG-16 Macadamia**)

Shake Test - Foam Retention (Floritech Application Document APP 11)

A shake test was performed to determine foam formation and retention. A concentration of 1.0% test article and 99.0% deionized water was used to create the body wash solution. For this test, 50ml of body wash solution was poured into a 250ml graduated cylinder. The cylinder was covered and inverted 10 times. The test produced foam volume of approximately 190ml.

A good body wash/shampoo should have a foam volume of 100ml or more in the shake test. Bubbles should be small. Generally, the smaller the bubbles, the longer the foam will persist. Foam retention should remain stable for at least 5 minutes.

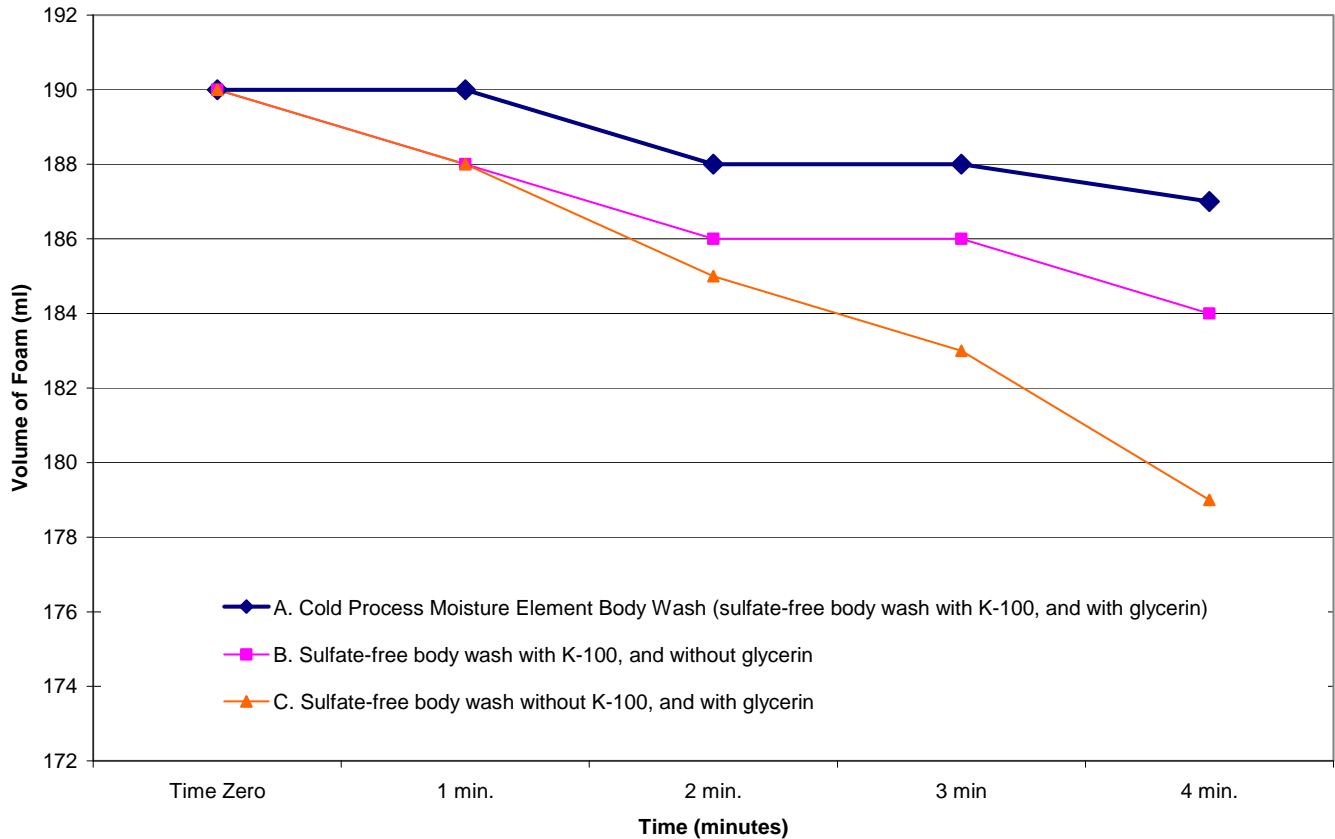
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Foam Volumes of Formula at Multiple Time Points (ml)

Test Articles	Time Zero	1 min.	2 min.	3 min.	4 min.
A. Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100, and with glycerin)	190	190	188	188	187
B. Sulfate-free body wash with K-100, and without glycerin	190	188	186	186	184
C. Sulfate-free body wash <u>without</u> K-100, and with glycerin	190	188	185	183	179

Shake Test - Foam Retention





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Summary of Results

- A. **Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100, and with glycerin)** produced foam volume of approximately 190ml. The foam primarily consisted of medium to small bubbles. The bubbles dissipated at a slower rate than those in test article C over a 4-minute observation time.
- B. **Sulfate-free body wash with K-100, and without glycerin**, produced foam volume of approximately 190ml. The foam volume decreased over a 4-minute observation time.
- C. **Sulfate-free body wash without K-100, and with glycerin**, produced foam volume of approximately 190ml. The foam volume decreased rapidly over a 4-minute observation time.

Test article B provided longer-lasting foam than test article C. Cold Process Moisture Elements Body Wash (A) provided longer-lasting foam than test articles B and C.

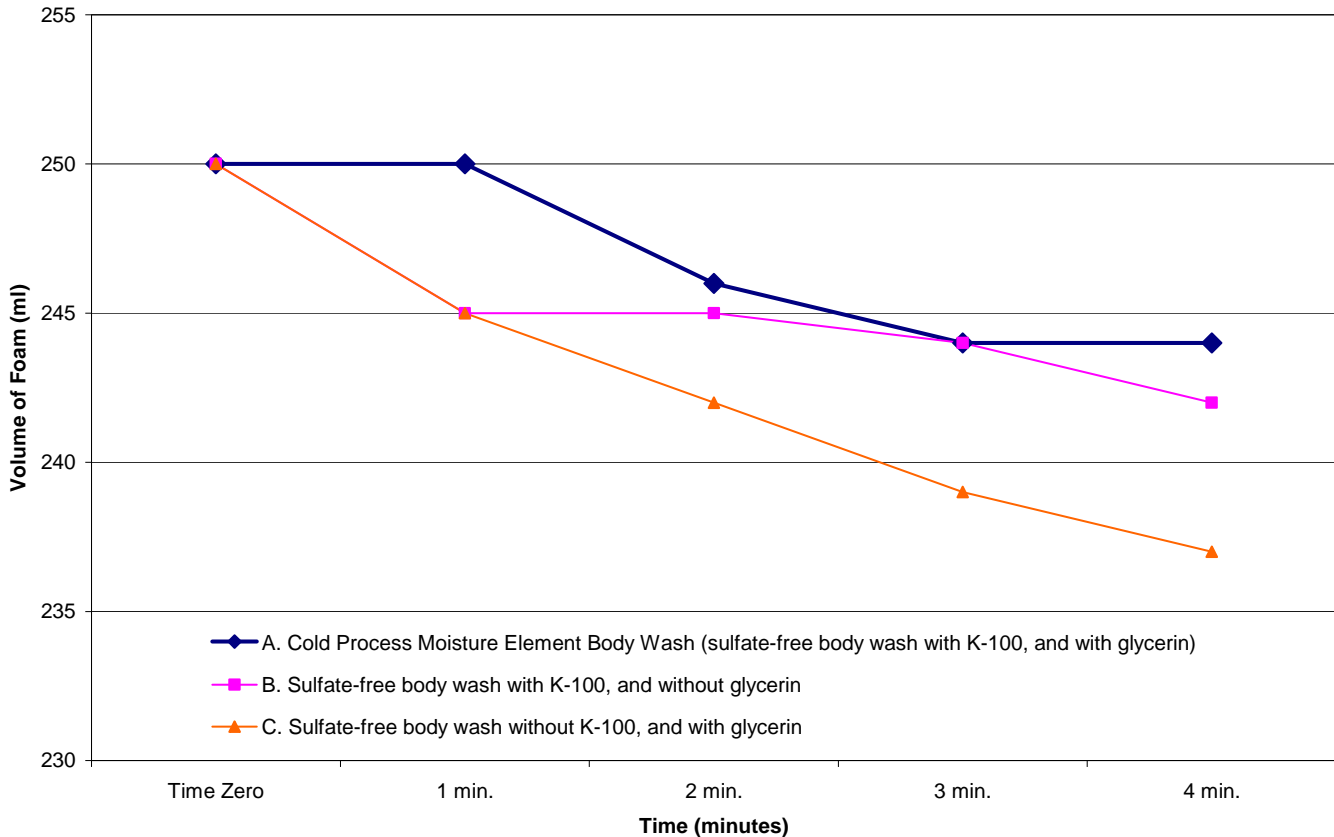
Blender - Foam Evaluation Test (Floritech Application Document APP 11)

A blender test was conducted for foam evaluation. A concentration of 1.0% test article and 99.0% deionized water was used to create the body wash solution. Approximately 40ml of body wash solution was weighed in a 250ml graduated cylinder, being careful not to create bubbles during pouring and weighing. The solution was then carefully poured into a blender and blended for 1 minute. The change in volume was recorded at 1, 2, 3 and 4 minutes. A foam volume of approximately 250ml was produced after 1 minute of blend time for all samples.

Foam Volumes of Formula at Multiple Time Points (ml)

Test Articles	Time Zero	1 min.	2 min.	3 min.	4 min.
A. Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100, and with glycerin)	250	250	246	244	244
B. Sulfate-free body wash with K-100, and without glycerin	250	245	245	244	242
C. Sulfate-free body wash <u>without</u> K-100, and with glycerin	250	245	242	239	237

Blender - Foam Evaluation Test



Summary of Results

- Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100, and with glycerin)** produced a foam that was creamy and consisted of mostly smaller bubbles. The foam for this sample stayed intact longer and slowly dissipated.
- Sulfate-free body wash with K-100, and without glycerin**, produced foam that appeared stable for the first 2 minutes and then slowly dissipated.
- Sulfate-free body wash without K-100, and with glycerin**, produced a foam that was creamy and consisted of mostly smaller bubbles. The foam dissipated more quickly than the foam in test article A and B.

Test article B provided longer-lasting foam than test article C. Cold Process Moisture Elements Body Wash (A) provided longer-lasting foam than test articles B and C.



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Mildness Evaluation - Zein Test (Floritech Application Document APP 21)

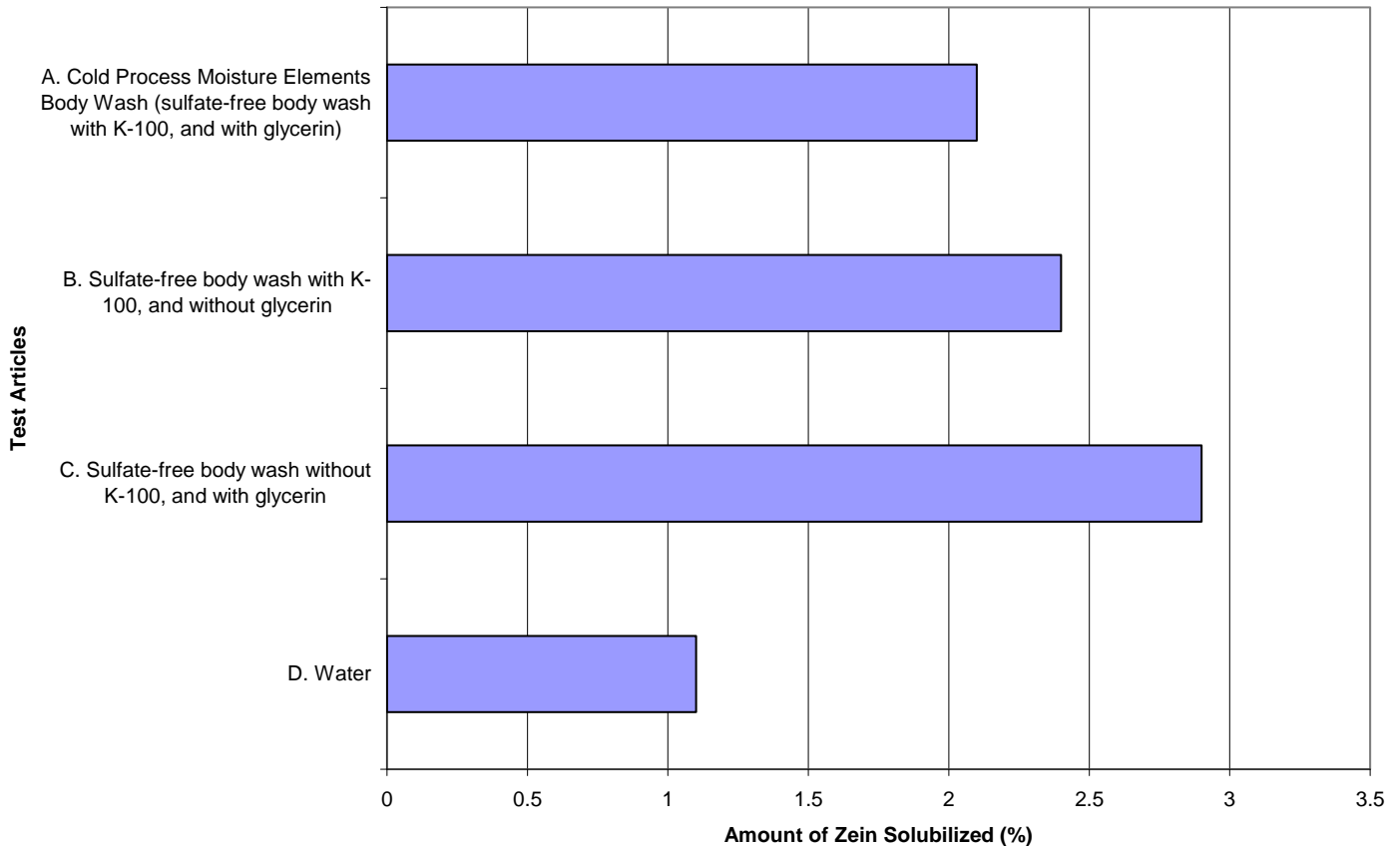
The purpose of the Zein Test is to investigate the irritation potential (harshness) of a surfactant (body wash, liquid hand soap, shampoo, etc.). Zein is a yellow corn protein that is similar to keratin present in the skin and hair. Zein is denatured (solubilized) by irritant products (e.g., the surfactant product diluted in a specific amount of water). The more Zein dissolved by the body wash solution, the higher the predicted irritation potential. For this test, the body wash concentration consists of 10% test article and 90% deionized water.

The Zein Test provides a rapid and convenient screen for irritation potential, especially for compositions that contain surface active agents.

Evaluation of Zein Test

Test Articles	Average Zein Solubilized (%)
A. Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100, and with glycerin)	2.1
B. Sulfate-free body wash with K-100, and without glycerin	2.4
C. Sulfate-free body wash <u>without</u> K-100, and with glycerin	2.9
D. Water	1.1

Zein Test - Solubility



Summary of Results

Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100, and with glycerin), test article A, solubilized less Zein than all other test articles.

Cold Process Moisture Elements Body Wash proved to be the mildest of all the test articles.

Conclusion

In conclusion, Cold Process Moisture Elements Body Wash (sulfate-free body wash with K-100, and with glycerin) performed better than the other test articles in all categories.