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TECHNICAL REPORT -Coacervate Technology

Silplex J-2S has been found to be an effective agent for the formation of coacervate shampoos. The use of Silplex J-2S allows one to formulate a shampoo with outstanding foam and conditioning using natural oils and CosmoSurf CE-100, a natural ECOCERT polymer, available from SurfaTech.

Shampoo Formulation			
2 in 1 Shampoo (Coacervate) FH183D			
Part ID	**Description (Supplier)**	**INCI Name**	**weight %**
A			
	D.I. Water	Aqua	22.000
	Carbopol Aqua SF-1 Polymer (1%)	Acrylates copolymer	2.500
	TEA 99%	Triethanolamine	0.200
	Na2EDTA	Disodium EDTA	0.100
	Sodium Laureth Sulfate	Sodium Laureth-2 Sulfate	27.500
	Cocamidopropyl Betaine	Cocamidopropyl Betaine	6.000
B			
	D.I. Water	Aqua	18.000
	Sodium Laureth Sulfate	Sodium Laureth-2 Sulfate	5.500
	Cocamidopropyl Betaine	Cocamidopropyl Betaine	4.000
	Ninol COMF	Cocamide MEA	1.200
	EGDS	Ethylene Glycol Distearate	3.000
C			
	Silplex J2-S (Siltech LLC)	Silicone Quaternium-20	1.000
	Cosmosurf® CE-100 (SurfaTech)	Octyldodecyl citrate crosspolymer	1.000
	Wheat Protein	Wheat Protein	0.500
	Hemp Seed Oil	Cannabis Sativa (Hemp) Seed Oil	1.000
	Nipaguard DMDMH	DMDM Hydantoin	0.500
D			
	Decyl Glucoside	Decyl Glucoside	3.000
	Amphosol 2C	Disodium Cocoamphodiacetate	3.000
	Citric Acid (40% aq)	Citric Acid	q.s.
	Sodium Chloride (if needed)	Sodium Chloride	q.s.
	Crothix (Croda) (if needed)	PEG-150 Pentaerythrityl Tetrastearate	q.s.
	Fruity Herbal	Fragrance	q.s.
		Total	100.000

Procedure:

1. Into a clean and sanitized stainless steel container equipped with propeller mixer, add water in Phase B
2. Add SLES-2 and Betaine, heat up to 70 to 75 C, slowly add Cocamide MEA and EGDS, mix slowly while minimizing air incorporation. Mix until uniform, then cool down to room temperature.
3. In another clean and sanitized stainless steel tank equipped with propeller mixer, add water and the rest of ingredients of phase A one by one while minimizing air incorporation. Mix until uniform.

4. Add phase B slowly into Phase A. Mix until uniform
5. Premix Silplex J2-S and Cosmosurf CE-100 until uniform, then add into Phase A+B, mix well. Add the rest of ingredients in Phase C one by one into Phase A+B until homogeneous while minimizing air incorporation.
6. Add ingredients in Phase D one by one. Adjust pH by using citric acid to pH = 5.5 ~ 6.5, and adjust viscosity to 6,000 cps ~ 12, 000 cps by adding q.s. NaCl and Crothix. Add fragrance if necessary.

Properties

Viscosity (cps)	12,000
pH	5.70
Appearance	Opaque white cream

FOAM

Method: All products were evaluated with the same procedure. A 1000 mL cylinder with 10 mL increments was used. All samples and distilled water was prepared at 25 °C. 1.00 gram of test material was used and 100 mL distill water was added to dissolve the test material in a 250 mL beaker. After the test material was totally dissolved, the solution was transferred into the cylinder. An outlet of air pump was sited on the bottom of the cylinder to generate the bubbles. Record the foam height within 20 seconds for each test materials, each material was evaluated 3 times and their averages were documented.
The scale for Foam Height is 1000 mL is outstanding and 100 mL is very poor. The type of foam was also noted whether it is tight or loose. Bubbles were generated by electronic air pump.

Sample (Bubble for 20 sec)	**Initial Reading** (Average, mL)	**Two Minute Reading** (average, mL)	**Five Minute Reading** (average, mL)
FH183D	700	690	670

Foam was tight and uniform.

Wet Comb

All products were evaluated on 10-inch Virgin Brown Hair. Two x 2-gram swatches were used for each material tested, all from the same lot. All swatches were wet with 25 °C water and one gram of test material was used for each swatch. Swatches were washed and then rinsed for at least one minute per swatch. Wet Comb Evaluation was then performed. No blow-drying of hair was done. All swatches air-dried then the Dry Comb Evaluation was performed once hair was completely dry.
Scale used is 1 to 5, 5 being the best. Used for wet and dry combing.

Evaluation / Sample	Wet Comb	Rinse off	Clean Feel (Scroop)	Shine	Residual Feel	Average
Control Water only	1.0	3.0	2.0	2.0	2.0	2.0
FH183D	4.5	4.5	4.5	3.0	3.0	3.9

Dry Comb

Evaluation / Sample	Dry Comb	Dry Feel	Clean Feel /Look	Shine	Fullness /Manageable	Fly-away	Residual Feel	Static	Aver-age
Control Water only	3.0	3.0	2.0	1.0	1.0	1.0	1.0	2.0	**1.750**
FH183D	4.4	4.5	4.0	4.0	4.4	4.2	3.5	4.0	**4.125**

Salt Tolerance, pH, Viscosity, Ease of Formulation, Effect on Formulation Stability:

Scale used is 1 to 5, 5 being the best, only for salt tolerance, Ease of formulation, effect on formulation stability. Viscosity was tested by using Brookfiled, LVT, #4 spindle, 12 rpm.

Evaluation / Formula	Salt Tolerance	pH	Viscosity, cps	Ease of Formulation	Effect on formulation Stability	Average
FH183D	2.5	5.70	12,000	4.0	4.5	3.67

End Report