Polyaspartates for the Detergent Market

NanoChem Solutions, Inc. (NCS) manufacturers proprietary polyaspartate formulations for the detergent markets—including hand soaps, laundry detergents, and auto dishwashing tablets. With a number of different molecular weights and options (both liquid and dry), NCS has supplied companies in the detergent market with biodegradable products and technologies for over 15 years.

Product Description

NCS polyaspartates are negatively-charged (anionic), biodegradable amino-acid polymers that are polymerized from L-aspartic acid, a natural amino acid synthesized in plants. The molecular weight of the polymer can vary depending on the specific application. The polymers are small enough to remain highly water soluble, but large enough to act effectively as biodegradable dispersants, anti-encrustation agents, mild chelants, and carbonate- and sulfate-scale inhibitors.

Product Benefits—Laundry

To demonstrate the performance of NCS's polyaspartate products in regard to an increase in detergency and a decrease in encrustation, the following trial with three different fabrics (cotton, cotton/polyester, and polyester) was performed with three (3) different NCS polyaspartate products:

Test Parameters	
Application Rate:	1 g per liter of detergent
Water Hardness:	300 ppm (as $CaCO_3$, Ca:Mg=2:1)
Wash Cycle:	100˚ F wash (10 minutes) and rinse (5 minutes)
Equipment:	6-place Terg-O-Tometer @ 100 revolutions per minute (rpm)

Detergency

Product	Changes In Reflectance (ΔL) Dust–Sebum		
	Cotton	**Cotton/PE**	**PE**
A–2C	8.04	10.38	10.51
A–3C	8.56	10.49	11.91
A–5D	8.48	10.26	10.41
Commercial Product A	8.59	10.68	12.47
Commercial Product B	7.93	8.58	7.69

Encrustation

Product	% $CaCO_2$ on Weight of Fabric		
	Cycle 1	**Cycle 2**	**Cycle 3**
A–2C	0.28	0.35	0.33
A–3C	0.31	0.42	0.42
A–5D	0.31	0.29	0.35
Polyacrylate	0.34	0.32	0.34
Blank	—	—	8.0

Conclusions: Statistically speaking in regard to detergency, NCS A-2C, NCS A-3C, and NCS A-5D performed as well as Commercial Product A with cotton and cotton/polyester blended fabrics. It performed better than Commercial Product B for cotton, cotton/polyester, and polyester fabrics. In regard to encrustation, NCS A-2C, and NCS A-5D performed as well as polyacrylate—a non-biodegradable, bioaccumulating polymer.

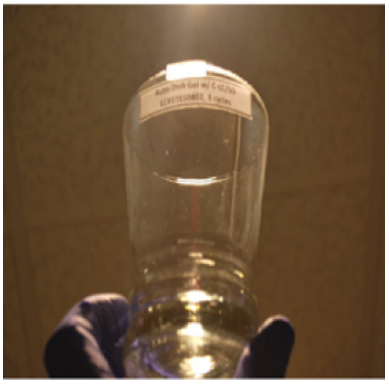
1701 Quincy Ave, Suite 10 Naperville IL 60540 • info@nanochemsolutions.com • www.nanochemsolutions.com • 708.563.9200

Polyaspartates for the Detergent Market

Product Benefits—Auto Dishwashing

To demonstrate the performance of NCS's polyaspartate products in regard to an increase in the performance of film-free, spot-free washing, the following trial was performed with NCS C-LC/SD and a combination of Acusol 445 and 460N:

Test Parameters	
Application Rate:	According to label with industry-standard auto dishwashing gel
Water Hardness:	300 ppm (as $CaCO_3$, Ca:Mg=2:1)
Wash Cycle:	Normal wash cycle with heated dry
Equipment:	Maytag Automatic Dishwasher
Soil Application:	40g soil (32g margarine and 8g milk powder)
Test Method:	ASTM D-3356-850



Auto Dish Gel Containing C–LC/5D		
Cycle:	**Spotting:**	**Filming:**
1	No spot	No visible film
3	No spot	No visible film

Auto Dish Gel Containing Acusol 445 & 460N		
Cycle:	**Spotting:**	**Filming:**
1	Random spots	Moderate film
3	Random spots	Moderate film

Conclusions: When comparing the difference in film between the two pictures, the glass washed with the NCS C-LC/SD additive was free of spots and had no visible film, while the glass washed with the combination of Acusol 445 and 460N additives had random spots and a moderate film. With the performance and biodegradability of NCS C-LC/SD, it should be considered a highly viable option as an additive in auto dishwashing tablets.