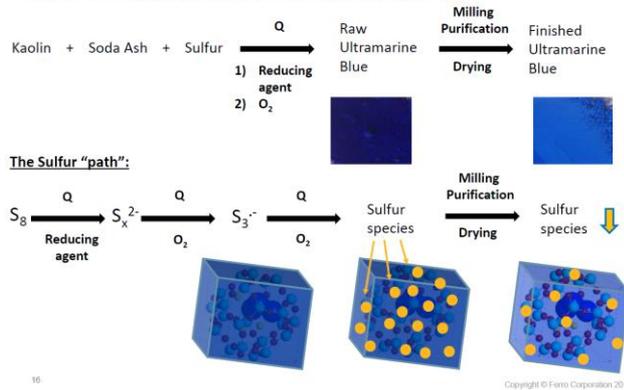


Color solutions for plastics in contact with food

Dani Lladó, Technical Marketing Manager Plastics
SPE Additives and Colors, 28-29th March 2019

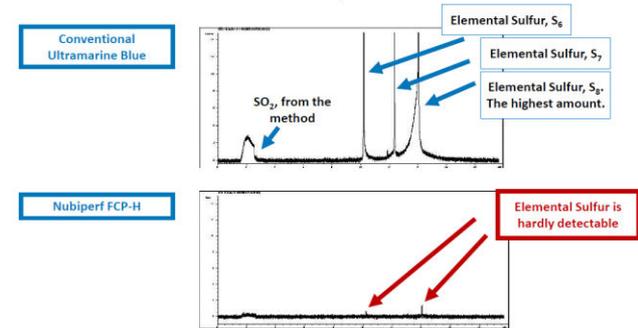
Ultramarine Blue Nubiperf FCP

1st challenge: which Sulfur species are behind any potential Sulfurous odor/taste?



2nd challenge: how can we dramatically reduce the amount of residual, attached elemental Sulfur?

- Tests carried out at RIC Institut (Belgium)
- 1 g pigment – 70°C, 30 min – SPME of volatiles
- Detection of Sulfur derivatives in volatiles by GC-AED

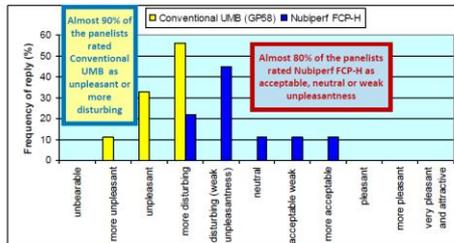


3rd challenge: how can we demonstrate the organoleptic improvement of Nubiperf FCP tech?

- Organoleptic test (Hedonistic tone assessment) in powder Ultramarine Blues**, carried out at Certech (Belgium): Nubiperf FCP-H vs Conventional Ultramarine Blue (GP-58)
- Pigment heated at 100°C, 2h - direct assessment of gas odor by panelists
- Rating: +5 (very pleasant and attractive) to -5 (unbearable scale)



R&D



Technical Data Sheet

Nubiperf FCP-H
C.I. Pigment Blue 29
CAS# 57455-37-5

Ultramarine Blue
EINECS # 309-928-3
C.I. # 77007

Product Description
Nubiperf FCP-H is an organoleptic, strong, medium shade Ultramarine Blue. Pigment with excellent outdoor durability, light and heat fastness. Non bleeding, non migratory. Nubiperf FCP (Food and Cosmetic Packaging) series is the very low Sulfur / high dispersibility / low moisture content / narrow colorimetric tolerances / no oversized particles series for Plastics (including Engineering polymers) applications which are sensitive to color and taste.

Physical & Chemical Properties	Typical Value	Analysis Method
Specific Gravity (g/cm ³)	2-35	ASTM D-153
Oil Absorption (g/100 g)	40	ASTM D-281
Absolute T-Strength	310	NCF-33
Heat Fastness	350°C 5min	NCF-33
Acid Fastness	1	NCF-35
Alkali Fastness	5	NCF-35
Light Fastness	8	NCF-32
Soluble Heavy Metals	< 20 ppm	NCF-43 (ar, ba, ni, ni+co, v, vi)
Total Heavy Metals	< 100 ppm	NCF-43 (ar, ba, ni, ni+co, v, vi)

Certified Characteristics	Lot tolerance	Analysis Method
dL in reduced shade	-0.40/+0.40	NCF-01
dB in reduced shade	-0.50/+0.50	NCF-01
dC in reduced shade	-0.50/+0.50	NCF-01
dH in reduced shade	-0.50/+0.50	NCF-01
dI in reduced shade	-0.50/+0.50	NCF-01
dJ in reduced shade	-0.50/+0.50	NCF-01
Tinting Strength	100 +/- 5%	NCF-01
Moisture (when packaged)	< 0.05%	ASTM D-260
Sieve Residue (125 mesh / 45µm)	< 0.03%	ASTM D-285
Free Sulphur	< 1 ppm	NCF-38
Sulfide Salts	< 0.70%	ASTM D-260
Dispersibility Index (FDV-114)	< 5.00 ml/g	ASTM D-260
Organoleptic factor	5	

(5 = Excellent; 1 = Poor)

**Less than 1ppm
free Sulfur
Guaranteed**

Ultramarine Blue Nubiperf FCP



Organoleptic test of water in contact with plastic caps

Test done at Certech (BE)

Caps made by INEOS (HDPE organoleptic grade)

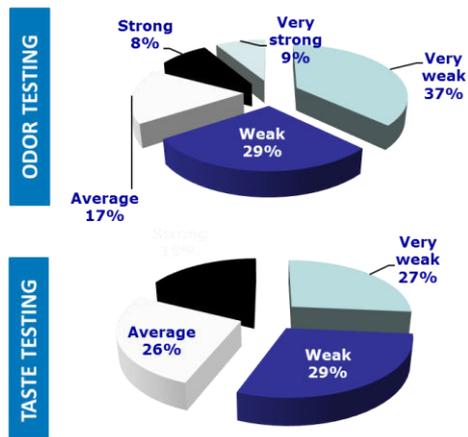
4 different caps tested

- S1** 100% HDPE, Blank
- S2** Pigment Blue 28 (Food grade at 1.12%)
- S3** Nubiperf FCP-R (at 0.75%)
- S4** Pigment Blue 15:3 (food grade at 0.15%)

Methodology:

- 4 caps per liter of water totally immersed for 10 days at 40 °C (XP ENV 13130-1:1999)
- Used water Chaudfontaine
- 35 panelists (taste and odor analysis of blind samples)

Differences between the least and the most intense sample



Odor rate (*)

Sample	Average 35 panellists
S1 (Blank)	2.58
S2 (PB28)	6.63
S3 (FCP-R)	3.87
S4 (PB15:3)	4.51

(*) The higher the rate, the more intense the odor/taste

Taste rate (*)

Sample	Average 35 panellists
S1 (Blank)	3.37
S2 (PB28)	6.62
S3 (FCP-R)	5.46
S4 (PB15:3)	5.06



R&D

Conclusion: there are no significant differences among tested caps (including the blank)