

(Factory) Aspects of “Colloids” in Cosmetics

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Tuesday 15 February 2005

Alternatively

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**Micro & Nanotechnological formulation,
performance & production aspects of
dispersed multiphase cosmetic delivery
systems in the larger scale production
environment**

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Introduction – Bob Hefford

- Chemistry degrees at Leeds
- 25 years in the cosmetics industry
- From basic research to manufacturing or
- From “the oral cavity” & “free energy” to “I can’t ****ing pump it!”
- Unilever Research (Isleworth & Port Sunlight)
- Bristol-Myers Squibb, Clairol, P&G
- Consultant & FRSC from 2002
- Visiting Professor at Leeds University Colour Chemistry
- And, of course, Member of the Society of Cosmetic Science

Contents

- Redefine the Talk!
- What are cosmetics all about?
- Look at some dispersion and factory aspects of cosmetics from the product viewpoint
- Shampoo Actives
- Shampoos & Conditioners
- Skin Lotions
- Skin Creams
- Factory Development Rules

A Redefinition

- What is a “colloid”?
- There are people far more qualified than me to tell you
- For this talk I’m redefining “Colloid” as “Dispersion”
- And not worrying too much about 1 micron
- Three aspects to “dispersion”
 - Creation i.e. how to make it
 - Stability i.e. how to keep it in one piece
 - Destabilisation i.e. how to make it work best
- Most real cosmetics are not “classical colloids” at all
- They are usually a “dog’s dinner”, so re-title as

Practical aspects of Dispersion in Cosmetics

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What is the Cosmetics Industry all about?

Selling an advanced Colloidal Personal Care delivery system

Or

Selling a Dream?

We can get a clue from the Advertising

Is Dispersion Important in Cosmetics?

- The simple answer is – Yes
- Getting lots of little bits to stay separated for a “long” period
- The dispersed phase is often the “active”
- The continuous phase is usually the carrier
- The continuous phase is often water
- Water is cheap

Let's look at this from the product end

Shampoo Actives

- Mainly SLES.2EO used in shampoos in the EU
- Use of 70% active
 - As it comes
 - Lower transport cost
 - But harder to handle
 - Self preserving
- Dilution through a cubic phase
- Need for high shear
- Keep it warm

Opacified Conditioning Shampoos

- What's in them?
- Rod micelles
- Glycol Stearate dispersion
- Silicone dispersion
- “Stability” for 36 months
- Delivers conditioning on dilution
- P&G Patent
- Control of particle sizes
- Rate of cooling
- High shear mill then cool rapidly

Shampoos with Cationic Polymers

- First real 2 in 1's used polymers
- Complex coacervation
- Dilute to an insoluble complex
- You cannot beat Jaguar C13S!
- Variable clarity
- How to achieve optimum silicone deposition
- Use as a deposition aid
- Unilever patent
- Silicone emulsions – all sizes & charges available

Conditioners

- How do they work?
- Deposition of hydrophobic layer
- Neutralisation of charge
- Poly Filler effect
- Cationics form the basis
- Added fatty alcohol to give
- Dispersed lamellar?
- Mixing, shearing and cooling rate critical in production
- Often regarded as a art form rather than a science

Skin Care Lotions

- Oil/wax in water system
- Many thickeners
 - Glycol stearate
 - Cetyl alcohol
 - Carbomer
 - Magnesium aluminium silicate
 - TEA/Stearate
- Dissolution of Carbomer
- Powder handling

Heavier Creams

- “Restorative night wear”
- Could be water in oil
- Or more complex
- Could have liposome's or even
- Gel phase!
- Hot fill
- Need for a cooling tunnel
- Cleaning may be difficult

Factory Development Rules

- Try to add polymer powders “slowly”
- Pilot batches will always be scheduled for 3.00am
- Meditation is useful in scale up trials
- Large tanks cool very slowly
- It’s much harder to mix something that is big
- Production engineers hate R&D
- Time is Money
- Polymers are “stringy”
- Silicone is very slippery and difficult to clean
- Formulate with the manufacturing equipment in mind
- Micro-organisms are always with us

Final Remarks

- Dispersion & little bits of stuff are essential to cosmetics
- A factory is bigger than a beaker

Any Questions?