

## **Personal Care Feature: Bathroom Products 2003**

**John Woodruff**

**Published in SPC; February 2003**

Following is a brief extract from an amusing tale currently being circulated on the Internet that parodies male and female bathroom habits.

Female:

- Uses face cloth, arm cloth, leg cloth, long luffa, wide luffa, and pumice stone.
- Washes hair once with cucumber and sage shampoo with 43 added vitamins.
- Washes hair again to make sure it's clean.
- Conditions hair with grapefruit and mint conditioner enhanced with natural avocado oil. Left on hair for 15 minutes.
- Washes face with crushed apricot facial scrub for 10 minutes until red.
- Washes entire rest of body with ginger nut and jaffa cake body wash.
- Rinses conditioner off hair.

Male:

- Gets in the shower.
- Washes face.
- Washes armpits.
- Spends majority of time washing privates and surrounding area.
- Shampoos hair.
- Tastes wife's ginger nut and jaffa cake body wash.
- Rinses off and gets out of shower.

Does it sound familiar? Just don't tell marketing about all those new vitamins.

The male in the tale would probably be happy with a combined shower gel and shampoo comprising a basic mixture of an anionic surfactant to give copious foam, an amphoteric to enrich the foam and make the product less harsh and a non-ionic to solubilise perfume oil. The same product would also impart satisfactory bubbles if added to a bath. However his partner expects more than bubbles and a pleasant odour and it is satisfy her enhanced perceptions of what makes a satisfactory personal care product that is the subject of this feature.

A rinse-off personal care product should not only be an effective cleanser, it should offer supplementary benefits. One such benefit may be a claim that the product has anti-bacterial properties. If a benefit is claimed it should be proven and a recent paper published in the Journal of Cosmetic Science [Ref 1] described a method whereby the effectiveness of a cleansing composition containing 1.5% triclocarban was evaluated under simulated conditions considered optimal for bacterial growth and possible infection. A washout period to clear the skin of any antimicrobial agents previously used was followed by a treatment period in which the subjects

## **Personal Care Feature: Bathroom Products 2003**

**John Woodruff**

**Published in SPC; February 2003**

washed one of their forearms with the antibacterial composition and the other forearm with the control composition. Either immediately or 24 hours following the final wash, three test sites on both forearms were inoculated with *S. aureus* and occluded with Hill Top Chambert patches. At intervals of 30 minutes, two hours and five hours, the patches were removed and the number of surviving CFUs at each time period determined.

The method successfully demonstrated that sufficient triclocarban had remained on the skin for 24 hours after the final wash to effectively inhibit the growth of *S. aureus* on the skin for as long as five hours after inoculation. It should be noted that within Europe triclocarban may only be used as a preservative at a maximum level of 0.2% and although it may be used in excess of this provided its primary purpose is not the inhibition of growth of micro-organisms in the product and the purpose for which such excess is present is apparent from the labelling of the product, extra caution is advised when making a safety assessment of such products.

A consumers initial decision to purchase a personal cleansing product is heavily determined by advertising and product claims but the decision to buy a second time will be determined by the satisfaction that the consumer gained from using that product, and mostly this is very subjective. Thus skin feel may be described as tingling, refreshing, smoothing, moisturising, oily, sticky etc. In her paper [Ref 2] on sensory analysis Tracy Sanderson described sensory profiling whereby trained panels are used to evaluate such properties. The main use of the technique is to compare one brand against another, and of course it may be used during the development process to evaluate different formulations. It also reveals which properties most affect a consumer's perception of a products appeal.

A shower product that leaves a slight residual skin feel is generally preferred, providing it is not sticky or slimy. Silicones are a favourite for conferring skin feel and Patent USP 6,489,274 describes the use of capryl trimethicone in shampoos and shower products to add gloss to hair and to increase the emolliency and water repellency of the skin. During application it is claimed to provide enhanced spreading and lubricity of the product and to reduce tackiness. As little as 0.1% is said to be effective although usage at from 0.5% to 1.5% is to be preferred. The capryl trimethicone may be solubilised using a suitable non-ionic solubiliser or dispersed within a pearlised system and the applicants claim that the presence of capryl trimethicone greatly enhances the stability of such systems.

Mildness is a claim that is made for many products. Cosmetic cleansers should cleanse the skin or hair gently, without disrupting structural lipids and/or drying the hair and skin and without irritating the ocular mucosae or leaving skin taut after frequent use. Anionic surfactants can penetrate the stratum corneum membrane and the cuticle and destroy membrane integrity and loss of barrier and water retention functions. This interference with skin and hair protective membranes can lead to a rough skin feel and eye irritation and may eventually permit the surfactant to trigger an immune response thus creating irritation.

Certain synthetic surfactants are known to be mild. However a major drawback of some mild synthetic surfactant systems is that they have a slimy rinse feel, which is not liked by consumers. The use of certain surfactants such as potassium laurate can yield acceptable rinse feel performance but at the expense of clinical skin mildness.

## **Personal Care Feature: Bathroom Products 2003**

**John Woodruff**

**Published in SPC; February 2003**

These two facts make the selection of suitable surfactants in the rinse feel and mildness benefit formulation process a delicate balancing act.

According to patent USP 6,444,629 consumers prefer a "draggy" rinse feel which is associated with an increase in wet skin friction. During rinsing, the water film is considered to be the lubricant for the skin, and if a material increases the hydrophobic nature of the skin the water film is destabilised. There is a loss of continuity in the water film and friction occurs between hand and body, producing the "draggy" rinse feel required. The applicants claim that incorporating from 1% to 5% of a surfactant that crystallises from solution in the presence of calcium ions overcomes the slimy feel of mild synthetic systems. Such surfactants include lauroyl and myristoyl glutamate, lauroyl and myristoyl isethionates and lauryl and myristyl phosphate. An anionic material like ammonium laureth sulfate is added to provide additional foam and cleansing properties and an amphoteric material is used for mildness. Hydrogenated C6-14 olefin polymers and cetaryl methicone may also be added to contribute skin feel properties. Although skin feel is usually a subjective assessment the applicants describe an instrumental method for determining tackiness using an Instron 4301 Tensile Tester, which measures the force required to separate two discs joined together by a liquid film.

Improvements in skin feel generally depend on the deposition of suitable ingredients. A method to improve deposition and the period of deposition is described in USP 6,156,713 and this may be used to improve the benefits of active ingredients such as emollients, antimicrobial agents, sunscreens, fragrances, insect repellents, anti fungal agents, and anti inflammatory agents. Enhanced deposition is achieved using a delivery system comprising a hydrocarbon like polyisobutene or petrolatum and a cationic polymer such as polyquaternium-6 or polyquaternium-7. It is claimed that the combined improvement in deposition from the combination of hydrocarbon and cationic polymer in association with a hydrophobic additive is greater than expected and a series of tests are described to determine the optimum combinations.

Cream body washes are often advertised as containing x% of a moisturising lotion. Formulation of these products is not easy as the surfactants used to give foam and lathering characteristics can destabilise the moisturising emulsion. Patent USP 6,407,044 describes a cream body wash in aerosol format whereby a moisturising emulsion is included with up to 10% of a lathering surfactant system. This comprises an anionic surfactant with an amphoteric and possibly a cationic surfactant. The mixture is packaged with a low-pressure hydrocarbon propellant and it is believed that the moisturising agent partially solubilises the hydrocarbon propellant to form a distinct lamellar phase crystal structure which results in increased deposition of the moisturising agent on application. The product is dispensed as a lotion onto a sponge and lather is formed by mechanical action during application. The moisturising benefits to the skin are due to increased deposition of the lipophilic agent, which is about 50 micrograms/square centimetre.

Cream body washes have a lower surfactant level than conventional shower gels; the system disclosed in USP 6,165,479 uses even less surfactant, as low as 0.3% is said to be sufficient. The product is based on a bi-liquid foam dispersed in an aqueous gel. The bi-liquid foam is prepared by blowing air through a 0.3% solution of lauryl betaine in water. A mixture of paraffinum liquidum (mineral oil) with 0.9% POE (3) lauryl ether is slowly

## **Personal Care Feature: Bathroom Products 2003**

**John Woodruff**

**Published in SPC; February 2003**

added to the foam with stirring and then 30 parts of this is added to 70 parts of an aqueous carbomer gel. The resultant product has the superficial appearance of a cream but exhibits gel-like characteristics. It is said to be mild and refreshing upon application to the skin, is an effective skin-cleansing agent and may easily be removed from the skin either by wiping with tissue or rinsing with clear tepid water.

A cleansing system that does not use any surfactants is described in patent USP 6,500,107. Instead water is pressurised to 200 - 800 bar in a container and then explosively released through fine jets into a sealed bathing cubicle. With the sudden release of pressure the water explodes into a fine mist. The system is said to be analogous to a steam bath but without the necessity of high temperatures and that the skin is cleaned by the positively charged droplets of water. Dead Sea salts may be dissolved in the water for added benefit and oils, including vitamin oils may be also be dispensed as a fine mist using the same system.

1. J. Cosmet. Sci., 52, 369-375, 2001) A modified cup scrub method for assessing the antibacterial substantivity of personal cleansing products, Ward L., et al.
2. Sanderson T., Sensory analysis as an aid to formulating better products; SCS Symposium May 2000, Personal Cleansing