

To most men young babies appear to be little more than rather smelly food processors. Their lifestyle makes their skin prone to particular problems:-

- Heat rash: high heat and humidity and undeveloped sweat glands can lead to heat rash.
- Infant acne: when infants are born, they still retain their mother's hormones for a short time and, as a result, infant acne can occur as pink spots.
- Cradle cap: overactive glands in a baby's scalp can cause cradle cap in the form of crusty patches.
- Chafing and chapping: caused by friction between baby's clothing and skin, or where areas of skin rub together.
- Eczema: atopic dermatitis or eczema is a genetically determined common skin condition, occurring as red scaly patches.

Relief from these conditions by using cosmetic products is limited to cleansing and the application of a suitable cream. A baby's skin is dramatically different to that of an adult, and a baby's skin changes as he or she gets older. A newborn doesn't have fully developed sweat glands, the skin is much thinner, has more collagen and it is more elastic. Pores are smaller, and the absence of hair reduces a baby's natural defence against environmental stress. The pH of the skin of a new-born baby is 6.34 but this reduces to pH 4.95 within four days. Microbial colonisation of skin begins immediately after birth and the acid pH assists in the growth of non-pathogenic bacteria that ideally grow in a state of equilibrium that is protective against pathogenic organisms. {Ref 1]

This natural process may be reinforced by the use of Yogurtene Balance from **Givauden**. It is yogurt powder combined with the prebiotic inulin. When combined in a suitable lotion it is said to encourage the growth of protective or neutral bacteria and to reduce harmful bacteria to restore the natural balance of delicate skin. Also containing inulin but this time in association with Alpha-glucan oligosaccharide, Biolin from **Gova BVBA** has a similar activity. A prebiotic is actually a food supplement for the friendly organism, which the harmful organism cannot use. In the presence of a prebiotic the friendly bacteria will recover and grow faster, while the harmful ones are reduced.

When researching this subject in 2008 the author found the majority of products were presented by major brands and appeared to be little different to those offered for adult use. Web browsing the same subject for this feature reveals an explosion in the numbers of products available over the Internet. They are aimed at a niche market and almost without exception they major on claims of being natural and many claim organic certification. Unfortunately it is possible to sell cosmetics over the Internet without showing a list of ingredients so it is difficult to assess such claims. What is obvious however is that mildness and soothing are the key attributes appearing on the majority of products and it is these properties to be explored in this article.

The starting point for baby skin care must be cleansing and various suppliers offer particularly mild surfactants. Of the traditional ones sodium cocoyl isethionate is well known for its combination of mildness and high foaming properties but it has limited water solubility, making it more suitable for syndet bars and cream body washes. However **BASF** have launched ammonium cocoyl isethionate as Jordapon ACI 30G. It is available as a 30% active solution; it is highly water soluble; is mild; promotes high foaming; gives gentle cleansing; has good skin feel and allows the formulation of clear liquid compositions.

Sucrose-based surfactants are increasingly popular because of their mildness; their natural claims and their acceptability by various organic certification bodies. Combining lactic acid from sugar chemistry with fatty acids from palm oil gives rise to the Pationic range of acyl lactylates from **Rita Corporation**. These anionic surfactants are said to be compatible with anionic and non-ionic surfactants; to be mild in action and dermatologically innocuous. Recommended for baby cleansing products is Pationic 138AN, which is decyl glucoside with sodium lauroyl lactylate. It has good foaming properties, is mildly bacteriastatic and is suitable for body washes or as an emulsifier for a body cleansing lotion.

The SugaNate Series of surfactants based on alkyl polyglucoside (APG) derivatives from **Colonial Chemical (USA)**, were described in the **SPC Bathroom feature 2010**. This company offers an extensive range of sugar-based surfactants and has produced a chart of irritancy scores determined by the HET-CAM test, which is used to determine the potential irritancy using an alternative to the Draize rabbit eye test. Very briefly it uses 10 day old fertile chicken eggs and is a qualitative method of assessing the potential irritancy of chemicals. The CAM is a complete tissue containing arteries, veins and capillaries. It responds to injury with an inflammatory process similar to that which would be observed in the conjunctival tissue of a rabbit's eye and it provides an ideal model for ocular irritation studies. Scores of less than 10 are regarded as slight or non-irritating.

Trade Name	INCI Name	HET-CAM Score
Polysuganate 160P	Sodium hydroxypropylsulfonate lauryl glucoside cross polymer	5.5
Polysugaphos 1200P	Sodium hydroxypropylphosphate lauryl glucoside cross polymer	0.5
Polysugasil C-35P	PEG-8 cocoglucoside dimethicone	0.0
Polysuga Betaine L	Lauryl glucosides betaine cross polymer	1.75
Polysugamate L	Disodium lauryl glucosides sulfosuccinate cross polymer	6.5
Polysugacarb LM	Lauryl glucoside sodium maleate cross polymer	8.0

Also mentioned in the **SPC bathroom feature** were Eucarol AGE surfactants based on cocoglucosides from **Lamberti**. They are anionic surfactants derived from renewable raw materials, offered in unpreserved aqueous solution. They show outstanding mildness and can be used to reduce the irritation level of liquid soaps, shampoos and detergents. Eucarol AGE ET is also recommended as the primary surfactant in wet wipes or lotions and is an Ecocert validated product.

Many of the other mild surfactants discussed in **SPC Bathrooms** are suitable for baby and toddler products and the majority are Ecocert approved. Not appearing in that publication were the Crodasinics from **Croda Europe**. They are all based on sodium lauroyl sarcosinate; are anionic in character and reputed to be mild in use with excellent foaming and cleansing properties. They are produced from a natural fatty acid and the amino acid sarcosine, and are available as dry powders or in aqueous solution without added EDTA or preservatives.

For more natural claims **Desert King** suggests Andean Q Ultra extract as a natural source of saponins from the *Quillaja saponaria* tree which grows native in Chile at the foothills of the

Andes. Saponins are natural emulsifiers and surfactants and are ideal for use in gentle cleansing products. Juazirine is *Zizyphus jaozeiro* bark extract from a traditional Brazilian Tree, which contains natural foaming saponins. This Ecocert approved, mild cleansing agent is from Soliance and is ideal for baby wipes. Made from saponified triglycerides derived from Amazon rainforest palm, Chemyoap from Chemyunion is a natural and mild moisturiser for cleansing systems which has been clinically proven to reduce skin dehydration in bar and liquid soaps; INCI: Sodium Astrocaryum murumuru.

From Soliance, Tensolive is an Ecocert certified olive-based betaine, INCI: Olivamidopropylbetaine, for mild cleansing systems and is an alternative to cocobetaine. Olive oil is also the basis for mild foaming surfactants from B&T Srl. Olivem 460 is Sodium PEG-7 olive oil carboxylate, a mild anionic surfactant with cleansing and solubilising properties that also provides a rich, creamy foam. Olivem 460 is extremely mild on skin and its safety is said to be comparable to alkyl polyglucosides.

B&T also use olive oil as the basis for Olivem 300, INCI: Olive oil PEG-7 esters, an emollient, non-foaming cleanser, refatting agent and co-emulsifier for O/W systems. It is a water soluble functional lipid. Olivem 300 does not reduce the foaming ability of other surfactants and it will usually thicken surfactant systems. For emulsification Olivem 1000 is cetearyl olivate with sorbitan olivate and is a non-ionic o/w emulsifier that forms liquid crystal structures. It may be used in conjunction with Oliwax LC, INCI: Cetyl palmitate, sorbitan palmitate and sorbitan olivate. They contain the fatty acid profile of olive oil, similar in composition to sebum, which protects and repairs the epidermal barrier and shows long term hydration effects on skin.

AAK provides natural oils and waxes and derivatives of them including Lipex Shea Betaine, INCI: Shea butteramidopropyl betaine, and bioactive shea butter, which is the unsaponifiable fraction of Shea butter with high triterpene alcohol ester content and anti-inflammatory and skin soothing properties. Exotic oils and butters are very popular and Beraca Ingredients provide organic Cupuacu Butter, which is a triglyceride with a balanced composition of saturated and unsaturated fatty acids to provide long lasting moisturisation. It has a low melting point and a high capacity for water absorption. Zenitech has a number of butters in its product portfolio including those of raspberry, cranberry and pomegranate.

Talcs are not recommended for application to babies because of the dangers of inhalation. An alternative is the use of starch powders which have a pleasant sensory feel and are absorbent. Tapioca Pure starch from Akzo Nobel Personal Care is specifically targeted for the cosmetics market and is recommended for use in powder form in body powders as a talc replacement. Zea mays (corn) starch in the form of Pure-Dent Topical Starches from Grain Processing Co. are also suggested as a replacement for talc and aluminium starch octenylsuccinate from Akzo Nobel under the trade name Dry-Flo also finds applications in this regard. Dry-Flo powders are hydrophobically modified natural polymers with the ability to mitigate the greasiness produced by occlusive agents used in lotions, creams and ointments. In both aqueous and anhydrous products for skin care, Dry-Flo reduces the perceived oiliness of formulations, leaving a soft, dry and matte finish on the skin.

An interesting rheology modifier with organic certification is Naviance Tapioca from Akzo Nobel. This tapioca starch is an all natural rheology modifier which also has the ability to form films. The biopolymer is supplied as a powder that provides thickening and film formation properties and at the same time is widely compatible with typical cosmetic raw materials over a pH range of 4 – 7. It is used at a concentration of 1% to 5% and above and it is reasonably salt tolerant.

Another starch-based product is Zeina B860, a hydroxypropyl starch from the **Grain Processing Co.** that is a cold water-soluble polymer designed to combine outstanding film-forming properties with a smooth and silky skin feel. It has very low viscosity and is recommended for formulations requiring water-soluble film properties such as personal wash products, body lotions and creams. Zeina B860 contributes mildness to personal care formulas and adds functionality without adding high viscosity.

The **Grain Processing Co.** also provides Pure-Gel modified starches designed to provide stable viscosity in applications where there is heat, acid, shear, or freeze/thaw stress on the product. Manufactured from corn, they share the INCI name sodium hydroxypropyl starch phosphate and exhibit low viscosity in hot solution, making them easy to process. Once cool, they develop high viscosity without forming a rigid gel. They can suspend solids and provide stable viscosity and water-holding capacity while leaving a smooth, silky feeling on skin.

Gel-type products appear to be popular for babies. Versagel M 750 from Penreco is a mix of paraffinum liquidum, ethylene/propylene/styrene copolymer and butylene/ethylene/styrene copolymer and is described as a gel based on mineral oil that promotes improved skin occlusivity and improves moisture retention. A natural alternative is available from **Strahl and Pitsch** composed entirely of natural ingredients under the trade name of Natural Wax Jelly.

Sucragels from **Alfa Chemicals** are the result of blending sucrose laurate with glycerine, an oil phase and water to gel oils and produce emulsions. Through a range of formulation techniques Sucragel can provide a number of products for the baby care market. Sucragel CF is caprylic/capric triglyceride, glycerin, aqua and sucrose laurate. Sucragel AOF is Prunus amygdalus dulcis (Sweet almond) oil, aqua and sucrose laurate and Sucragel AOF BIO is glycerin, Prunus dulcis (Sweet almond) oil, sucrose laurate and Citrus aurantium dulcis (Orange) fruit water. All have Ecocert approval.

Carbomer gels remain forever popular but can lack emolliency. Emulzomes from **Exsymol** are oil-in-water nano-dispersions prepared by a manufacturing process under pressure that contain 50% aqueous phase and 50% oily phase and stable without incorporating surfactants. They are compatible with hydro-gels and emulsions and may be formulated in hypoallergenic or sensitive skin products. The core product is aqua, hydrogenated polyisobutene, stearyl heptanoate and hydrogenated lecithin to which may be added attractive extras such as Macadamia ternifolia seed oil, Borago officinalis seed oil or Oenothera biennis (Evening primrose) oil and others may be produced to order. Emulzomes may be added to a gel-type product to obtain a final composition with the sensory characteristics of an emulsion but without an emulsifier. This ensures the stability of liposomes, which are usually incompatible with surfactants, and therefore difficult to formulate in emulsions

An alternative addition with liposome properties are the Suprem Activ range of vegetable milks from **Lucas Meyer** that are particularly suited to gentle skincare and baby formulations. A number are available with the typical composition of Prunus amygdalus dulcis seed oil, hydrogenated lecithin, polyglyceryl diisostearate, glycerin and glyceryl stearate. **Sinerga** offer a range of protein milks that provide emollient, moisturising and soothing effects for use in baby skin lotions. The range includes hydrolysed oat protein; potassium palmitoyl hydrolysed oat protein, hydrolysed wheat protein and potassium palmitoyl hydrolysed wheat protein and hydrolysed sweet almond protein.

Young children and particularly babies can suffer from skin dryness and chapped, irritated skin. Various active ingredients are offered to mitigate these problems. **Provital** suggest Xeradin, which

is a functional moisturising ingredient obtained from *Salvia (Sage) sclarea*. **Active Organics** supply a mixture of extracts of *Triticum vulgare* (Wheat) germ; *Olea Europaea* (Olive) fruit; *Coleus forskohlii* root and *Polygonum cuspidatum* (Japanese bamboo) in *Helianthus annuus* (Sunflower) seed oil. It is trade named Actilipid and it is claimed that after a single use dry skin is moisturised for up to 24 hours. Actilipid is said to immediately improve chronic dry skin and repair the skin barrier function; that it increases ceramide levels by more than 40% and reduces skin sensitivity and cosmetic intolerance by 73%.

Edelweiss EP (*Leontopodium alpinum*) from **Pentapharm** displays high performance anti-oxidant and radical scavenging properties. In addition the compounds contained in Edelweiss EP display enzyme inhibiting properties and provide a soothing effect, making it ideal for use in products for stressed and sensitive skin. **Provital** suggests Calendula-ECO based on *Calendula officinalis* flower extract, said to have anti-inflammatory properties and a tissue regenerating action. Chamomile ECO is an extract of *Chamomilla recutita*, also said to have anti-inflammatory properties. Bisabolol from *BASF* is the main active ingredient in chamomile. It protects and heals the skin from daily stresses and accelerates the skins healing process.

**Silab's** Medicalm, rich in hydroxybenzoic compounds from *Boerhavia diffusa* root, is a soothing active for sensitive skin and Calmiskin, rich in mint leaf flavanones, relieves skin irritation by neutralising micro-inflammatory reactions making it suitable for sensitive skins. **Soliance** offers Ocaline for sensitive skin, a combination of sea water and pumpkin seed extract that is ideal for soothing nappy rash. Lanacityn from **Unipex** is a combination of *Alteromonas* ferment extract and *Crysanthellum indicum* extract and is claimed to detoxify baby skin and reinforce the skin for better protection against environmental aggressions while Homeo-Shield is a glycerine extract of *Fucus erratus* that acts as protective shield for baby skin after cleansing.

Zinc Oxide, well known for its skin soothing properties, was the active part of the traditional Zinc and Castor Oil Cream for babies' bottoms. **Antaria** offers ZinClear IM 50 CCT and ZinClear IM 50 JJ; two Ecocert approved zinc oxide dispersions with excellent transparency for use in nappy rash cream and calamine lotion.

Finally, the thought of a baby having happy skin really appeals and that is the name and claim of a material from **Provital**. Apparently skin contains large amounts of endorphins, known as "the chemistry of happiness" The active ingredient of Happy Skin is *Rhodiola rosea* root extract from Arctic Rose, which increases the endorphin levels, thus providing wellness and pleasure, apparently enhancing the appearance of skin and even improving its mood!

**Ref 1. SPC 2007**

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