



IP 190: Cosmetic Product Development

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COSMETIC INGREDIENTS



Cosmetic Ingredients

- Antimicrobial Agents
- Preservatives
- Colorants
- Pearl Luster and Clouding agents
- Skin Feel Agents
- Surfactants
- Thickening Agents
- Foam stabilizing agents
- Complexing/sequestering agents
- Perfumes, scents, and fragrances
- Water
- Actives

Basis of Choice

- Consumer needs
- Dermatological expectations,
- Environmental concerns
- Availability
- Cost

Personal Care Products

33%

Ingredients Linked To Cancer

45%

Ingredients Harmful To
Reproductive System or
Baby's Development

60%

Ingredients Which Can Act Like
Estrogens or disrupt Hormones

*From the 2005 Skin Deep Report



Antimicrobial Agents

- to provide bactericidal or bacteriostatic activity during use
- Skin cleansing products
 - remove “germ-laden” dirt (*S aureus*)
 - Triclocarban (TCC), formaldehyde, chloroxylenol (PCMX), povidone-iodine, iodophor, alcohol, quaternary ammonium compounds, essential oils

Antimicrobial Agents

- Oral care preparations
 - Reduce gingivitis, kill odor-causing germs
 - Triclosan, chlorhexidine, Sanguinarine extract
- Deodorants
 - reduce available moisture and bacterial growth (*S epidermidis*)
 - Aluminum salts, alcohol, triclosan, fluoride

Preservatives

- Protection against degradation
 - Microbial growth
 - Oxidation
- Protection against microbial growth
 - Addition of antimicrobials
 - Stability of product
 - Protection of consumers against infection
 - Sterile or aseptic production and filling into packaging
 - Reduced available amount of water in the product

Preservatives

- Formulation issues
 - Interaction with other components
 - Redistribution in the different phases
 - Low effective concentration
 - Adsorption into polymers or packaging materials
 - Complexation, micellization, low effective concentration
 - Irritation and sensitization potential

Preservatives

- Protection against oxidation
 - Manufacturing and storing in an inert atmosphere
 - Addition of antioxidants
 - True antioxidants
 - Reacts with free radicals and blocks the chain reaction
 - Reducing agents
 - More readily oxidized
 - Antioxidant synergists
 - Reacts with heavy metal ions that catalyze oxidation

Commonly Used Preservatives

- Synergistic mixtures
 - Improved spectrum of activity
 - Lower concentrations
- Parabens, esters of benzoic acid
- Imidazolydinil urea
- Diazolydinil urea isothiazolones
- Formaldehyde
- DMDM hydantoin benzalkonium Cl
- 2-Bromo-2-nitropropane 1,3-diol

Colorants

- Groups
 - Soluble in the vehicle
 - Water- soluble
 - Bath products, creams, soap, toothpaste gels, mouthwash
 - Oil-soluble
 - Oil products, soap
 - Pigments and color lakes insoluble in the vehicle
 - Make-up, toothpaste, soap
 - Water-dispersible pigments with the addition of excipients
 - soap

Colorants

1. Formulate uncolored product
2. Decide market
3. Select and apply colorant (160 approved choices)
4. Perform stability tests (original packaging, light, heat)
5. Validate

Pearl Luster and Clouding Agents

- Insoluble alkalonamides
- higher fatty alcohols
- ethylene glycol distearate
- monoesters from multivalent alcohols
- higher fatty acids
- polystyrol emulsions

Skin Feel Agents

- Performance + complete sensory experience (esthetics)
 - performance of active ingredients + texture + scent + visual esthetics in the container + tactile effects on application
- Key esthetic parameter
 - Smoothness without stickiness or feeling of residual materials on the skin

Skin Feel Agents

- Good skin feel with moisturizing properties
 - Humectants
 - reduce moisture evaporation from the product or from skin surface
 - Glycerin, protein
 - Skin refatting agents
 - PEG-7 glyceryl cocoate
- Good skin feel at very low concentrations
 - Water-soluble cationic polymers
 - Polyquaternium-7 polyquaternium-10, guar hydroxy propyltrimonium chloride
- Silicones
 - used to develop new product appearance, texture, skin appearance, and feel
 - wide range of rheological behavior and product forms
 - Dimethicones, methicones, cyclopentasiloxanes

Skin Feel Agents in Major Brands of Shower Gels

- Soybean Oil (Olay)
- Sunflower Seed Oil (Dove)
- Castor Seed Oil – Caress
- Polyquaternium-7 (Palmolive, Softsoap, Fa)
- Polyquaternium-10 (Caress, Dial, Olay)
- Glycerin (Dove, Caress, Olay, Dial)
- PEG-6 Caprylic/Capric Glycerides – Olay
- PEG-7 Glyceryl Cocoate – Dial, Softsoap, Nivea, Fa
- PEG-200 Hydrogenated Glyceryl Palmitate - Nivea
- Vitamin E Acetate – Dove, Olay, Dial, Softsoap
- Seaweed Extract – Dove
- Petrolatum – Dove, Olay
- Retinyl Palmitate – Olay
- Glyceryl oleate - Fa

Surfactants

- Anionic
 - Alkyl sulfates, alkyl ether sulfates, alkane and alkyl benzene sulfonates, sulfosuccinic acid semiesters, alkyl ether carboxylates, protein-fatty acid condensates (extra mild formulas)
- Amphoteric
 - For sensitive skin
 - Alkyl betaines, amido betaines
- Nonionic
 - Very mild surfactant activity
- Fatty acid alkalonamides
 - Bath and shower preparations, shampoos
 - Toxicity problems: N-nitrosamine by-product

Thickening Agents

- Chlorides and sulfates
- fatty acid partial glyceride polyglycol ethers
- water-soluble polysaccharides
- carboxy vinyl polymers
- PVPs

Foam-stabilizing Agents

- Fatty acid alkalonamides, protein-fatty acid condensates, polymers

Complexing/ Sequestering Agents

- EDTA salts

Perfume, Scents and Fragrances

- important role
- add a satisfying scent to cosmetics for beauty and health
- make people “more attractive”
- main purpose is not only to scent alcoholic fragrances such as perfumes and eau de cologne but also a wide range of body care products
- Used as masking agent

Perfume, Scents and Fragrances

“the sense of smell is the sense of the imagination”

-Rousseau

- Natural fragrances
 - Plant fragrances: essential oils, resinoids
 - Animal fragrances: musk, civet, castoreum, ambergris
- Synthetic fragrances: isoeugenol, vanilla, vanilline

Perfume, Scents and Fragrances

- Scent Families
 - Aldehyde perfumes
 - Synthetic fragrance group
 - Concentrated: like fat or soap when
 - Diluted: flowery, radiant, clear
 - Head note
 - Green perfumes
 - Fresh, green
 - Flowery perfumes
 - Oldest and largest
 - Herbal-spice perfumes
 - Lavender, sage, moss, cinnamon, cloves, sandalwood, cedar
 - Forefathers of men's colognes and perfumes
- Oriental perfumes
 - Heavy, sweet, strong

Water

- Water purity requirements for cosmetics
- aspects of water contamination that need to be investigated thoroughly:
 - inorganic ion concentration
 - presence of microorganisms

Active

- elicits a measurable, desirable change in one or more cosmetic parameters
 - Observed changes are significantly more pronounced than those induced by a placebo
 - A true cosmetic placebo does not exist
- “Functional ingredient”

Actives

- Hydrating Substances
- Silicones
- UV Filters
- Skin Whitening Agents
 - Vitamins
- Anti-Irritants
- Antioxidant
 - vitamins
- Anti-aging
 - Antiwrinkles
 - Antioxidants
 - Peeling agents
 - Ceramides and Lipids
- Plant extracts

Raw Materials

- product should contain only ingredients that comply with the annexes of ACD, and does not contain any ingredients that are banned in the ACD (Annex II)

Annex III - List of substances that cosmetic products must not contain except subject to **restrictions** and conditions laid down

Annex IV – List of coloring agents allowed for use in cosmetic products

Annex VI - List of preservatives allowed for use in cosmetics

Annex VII – List of UV filters which cosmetic products may contain

General Considerations in the Selection of Raw Materials

- excellent functions matching usage purpose
- good safety
- excellent oxidation stability
- constant quality
- regulatory considerations
- supplier
- costs