

MARUDHAR KESARI JAIN COLLEGE FOR WOMEN
(AUTONOMOUS)
VANIYAMBADI

PG DEPARTMENT OF CHEMISTRY

I -M.Sc Chemistry- Semester-I

E-Notes (Study Material)

Chemistry in Consumer Products	Code:24PCHA11
Unit-IV	
Skin Care Products:	
Preparation of cosmetics - skin and hair - skin lighteners, sun screen lotions - skin toners, anti wrinkling creams. Lip care- lip gloss – lipsticks - lip liners, moisturizers - crack creams, Sun cream and UV rays protecting cream.	
Learning Objectives: To understand the cosmetic formulation principles, including the selection of active ingredients, excipients, and additives to achieve desired skincare effects.	
Course Outcomes: To learn about skin care products and applications	

SKIN CARE PRODUCTS:

Skin care is a range of practices that support skin integrity, enhance its appearance, and relieve skin conditions. They can include nutrition, avoidance of excessive sun exposure, and appropriate use of emollients. Practices that enhance appearance include the use of cosmetics, botulinum, exfoliation, fillers, laser resurfacing, microdermabrasion, peels, retinol therapy, and ultrasonic skin treatment.

Skin care is a routine daily procedure in many settings, such as skin that is either too dry or too moist, and prevention of dermatitis and prevention of skin injuries.

Skin care is a part of the treatment of wound healing, radiation therapy and some medications. Cleansing opens up the pores of your skin, so the nutrients from follow-up skincare products like moisturizers go deeper inside the skin.

Moisturizers

Moisturizers make the skin smooth by the mechanism of increasing the water content, in the stratum corneum, hence exerting its most vital action, which is moisturizing action and maintaining a normal skin pH. Moisturizers are cosmetic creams or lotions that add or restore moisture to the skin. They can help with,

Makeup application:

Moisturizer can smooth the skin's surface, which can help foundation and concealer apply more evenly and stay on longer. It can also help skin look less dull, as applying foundation on dry skin can cause it to look cakey.

Skin protection:

Moisturizers create a barrier the skin and the climate, including cold, dry air that can further dry out the skin. They can also help protect the skin's barrier from irritation and reduce the development of dryness.

Skin health:

UV filter and absorbers such as titanium dioxide or zinc oxide. Sunscreen formulations can be classified into three orders bse on the range of protection:

1. UVB (290 – 320 nm)
2. UVA (320 – 400 nm)
3. Broad-diapason sunscreens that cover the entire spectrum (290 –400nm)

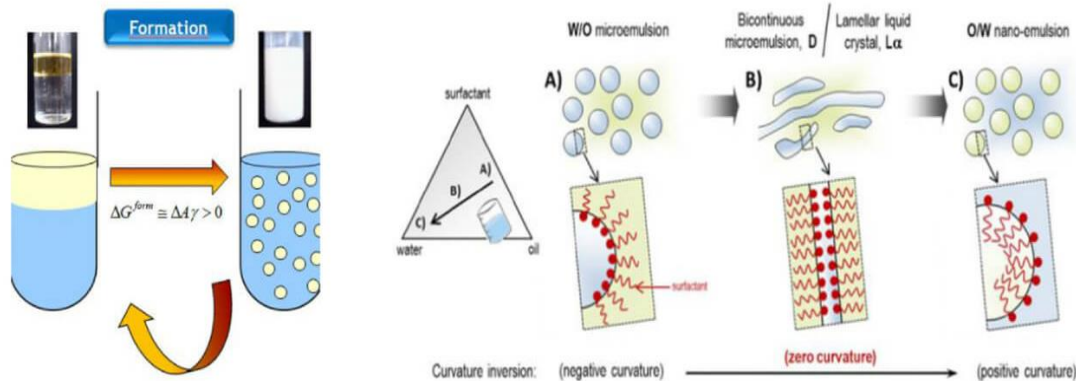
Sunscreen formulations can also be classified as physical an chemical sunscreens.

Physical sunscreens:

These can be formulated by incorporating both ZnO and TiO₂ or their combination with chemical sunscreen ingredients.

PREPARATION OF COSMETICS :

- ❖ Prepare the water phase
- ❖ Combine the water and oil phase with a mini mixer
- ❖ Structure through cooling
- ❖ Add vitamins and active biological substances
- ❖ Aromatize
- ❖ Fill up and wrap



SKIN AND HAIR CARE PRODUCTS:

Skin care is a range of practices that support skin integrity, enhance its appearance, and relieve skin conditions. They can include nutrition, avoidance of excessive sun exposure, and appropriate use of emollients. Practices that enhance appearance include the use of cosmetics, botulinum, exfoliation, fillers, laser resurfacing, microdermabrasion, peels, retinol therapy and ultrasonic skin treatment. Skin care is a routine daily procedure in many settings, such as skin that is either too dry or too moist, and prevention of dermatitis and prevention of skin injuries.

Skin care is a part of the treatment of wound healing, radiation therapy and some medications.

Example

skin care products include

- ❖ serums

- ❖ moisturizers
- ❖ exfoliators
- ❖ body lotions
- ❖ eye creams



Hair Care Products

hairecare is an overall term for hygiene and cosmetology involving the hair which grows from the human scalp, and to a lesser extent facial, pubic and other body hair. Hair care routines differ according to an individual's culture and the physical characteristics of one's hair. Hair may be colored, trimmed, shaved, plucked or otherwise removed with treatments such as waxing, sugaring and threading. Hair care services are offered in salons, barbershops and day spas, and products are available commercially for home use. Laser hair removal and electrolysis are also available, though these are provided (in the US) by licensed professionals in medical offices or speciality spas

Among the ingredients that go into the making of a shampoo are detergents, conditioners, thickeners, sequestering agents, pH adjusters, preservatives and specialty additives. Hair conditioners are designed to improve hair manageability, decrease hair static electricity and add luster.

Example

- ❖ Shampoo
- ❖ Conditioner
- ❖ Hair oils and serums
- ❖ Dry Shampoo
- ❖ Hair wax / Pomade
- ❖ Hair mousse
- ❖ Heat protectant

SKIN LIGHTENERS:

Skin lighteners are products that reduce melanin in the skin to even out tone or lighten complexion. They are also known as bleaching creams, skin brighteners, or fading creams.

Skin lighteners can be used to treat:

- ❖ Acne scars
- ❖ Age spots
- ❖ Discoloration due to hormones
- ❖ Freckles
- ❖ Melasma, a common skin condition that causes brown or blue-grey patches or freckle-like spots

Skin lighteners can be found in creams, lotions, soaps, powders, pills, and injections. Some products contain hydroquinone, corticosteroids, and mercury compounds.

Skin lightening can be dangerous without professional counseling. Mercury in skin lighteners can damage the kidneys, affect the nervous system, or cause pain or rashes. Pregnant women and women of child-bearing age should avoid exposure to mercury.

SUN SCREEN LOTIONS:

Sunscreen lotion is a topical product that protects the skin from the sun's harmful ultraviolet (UV) radiation.

Sunscreen works by absorbing or reflecting UV radiation before it can damage the skin.

Sunscreens are rated by their sun protection factor (SPF), which measures how much UV radiation is blocked.

Types

Sunscreens come in many forms, including lotions, creams, sprays, gels, foams, sticks, and powders.

Benefits

Sunscreen can help prevent sunburn, skin cancer, and skin discoloration.

Sunscreen should be applied every morning and reapplied throughout the day.

Sunscreen should be used in combination with other sun protection measures, such as sunglasses, sunhats, and umbrellas.

Sunscreens that are not broad spectrum or that lack an SPF of at least may only help prevent sunburn, not skin cancer or early skin aging.

SKIN TONERS:

A skin toner is a liquid skincare product that's usually water-based and used to cleanse, balance the skin's pH, and prepare the skin for other skincare products.

Toners remove impurities like dirt, oil, and makeup, and can also help with pore closure, hydrating the skin, and removing dead skin cells. Some toners contain ingredients that can soothe, moisturize, exfoliate, or target specific skin concerns.

Toners are typically used after cleansing and before moisturizing. You can apply toner with a cotton pad by wiping it in gentle upward movements over your skin.

Some toners are infused with natural ingredients like aloe vera and witch hazel to keep inflammation down. K-Beauty toners are designed to mimic the skin's natural pH, which is around 5.5.

Avoid astringents, which are usually alcohol-based and can be harsh and dry out your skin.

ANTI WRINKLING CREAMS:

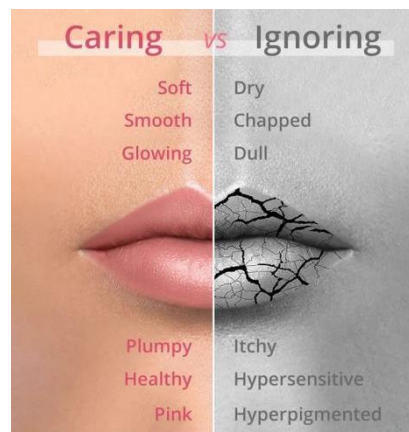
Anti-Wrinkle injections are a simple, safe and effective way to improve fine lines and deep wrinkles of the face. They work to relax facial muscles making lines and wrinkles, such as worry lines, crow's feet and frown lines, less obvious. The result is a softer, younger and more rejuvenated appearance.

An anti-wrinkle agent is used to treating fine lines, wrinkles, frown lines, neck & necklace lines, smile lines, crow's feet, and other aging lines and wrinkles on forehead. An injection is injected a few layers deep into the dermis depth of injection depends upon how deep the wrinkles.



LIP CARE:

A regular lip care routine can help keep your lips soft and smooth. Look for a lip balm with ingredients like shea butter or petrolatum. Apply anytime your lips feel dry. Exfoliate very dry lips once or twice per week, using sugar or salt mixed with nourishing oil, then follow up with a balm. Lip balm or lip salve is a wax-like substance applied to the lips to moisturize and relieve chapped or dry lips, angular cheilitis, stomatitis, or cold sores. Lip balm often contains beeswax or carnauba wax, camphor, cetyl alcohol, lanolin, paraffin, and petrolatum, among other ingredients.



Lip balm: Use lip balm to keep lips moisturized and prevent chapping. You can also try a lip balm with ingredients like shea butter or vitamin E.

Natural remedies: Use natural remedies like aloe vera, coconut oil, or honey to soothe and heal chapped lips. These ingredients have antimicrobial and anti-inflammatory properties.

LIP GLOSS:

Lip gloss is a cosmetic used primarily to give lips a glossy luster, and sometimes to add a subtle color. It is distributed as a fluid or a soft solid (not to be confused with lip balm, which generally has medical or soothing purposes, or lipstick, which generally is a solid, cream-like substance that gives off a more pigmented color.) The product is available in ranges of opacity from translucent to solid and can have variously frosted, glittery, glossy, and metallic finishes.

The main purpose of a Lipgloss is to give lips a shiny lustre slick finish and in some cases to add subtle colour. Lipglosses can be in liquid form or an easy-to-apply solid. They are typically shiny, but can also have a glittery, opalescent, or metallic finish.

lip gloss is a mixture of waxes, oils, and pigments. However, lip gloss contains fewer pigments, and those used are often pale in color or diluted (<3%). Furthermore, the free-flowing nature of the product requires less wax. The principal components are lanolin, which feels good on the lips due to its moisturizing qualities and imparts gloss, and polybutene.

LIPSTICK:

Definition:

Lipstick may be basically defined as dispersion of the colouring matter in a base consisting of a suitable blend of oils, fats and waxes with suitable



perfumes and flavours moulded in the form of sticks to impart attractive gloss and colour, when applied on lips. Lipsticks provide moist appearance to the lips accentuating them and disguising their defects.

Ideal Characteristics of Good Lipsticks:

- ❖ The ideal requirements for the formation of a good lipstick may be as follows:
- ❖ It should efficiently cover lips with colour and impart a gloss which would last long.
- ❖ It should be able to maintain the intensity of colour without any alteration in the degree of its shade.
- ❖ It should be able to adhere firmly to the lips and should not provide any greasy appearance.
- ❖ It should possess good thixotropic property so as to deposit the colour with minimum pressure.
- ❖ It should show a smear proof coloring effect.
- ❖ It should possess required plasticity and be able to maintain all the properties throughout the storage period.
- ❖ It should not be gritty.
- ❖ It should be easily dried.
- ❖ The stick should possess even firmness and should maintain its strength at varying temperatures up to 55°C.
- ❖ The stick should not dry or crumble easily.
- ❖ The lipstick should possess a pleasant fragrance and a good flavour.
- ❖ Should be safe and non-irritating to the lips.
- ❖ Result in blooming or sweating of the lips.

Formulation of lipsticks

The lipstick base is made by mixing the oils and waxes in varying proportions in order to obtain a desirable viscosity and melting point.

The raw materials involved the formulation of the lipsticks could be as follows:

INGREDIENTS	EXAMPLE
The solid components / waxes : (a) The hydrocarbon waxes (b) The mineral waxes (c) Hard waxes (d) Micro crystalline waxes	White bees wax Ozokerite wax, ceresine wax Carnauba wax, candelilla wax, hard paraffin
The liquid components	Mineral oils, vegetable oils, castor oils,

	butylstearate, Glycol, water, silicon-fluids, IPM (isopropyl maleate)
The softening components	Anhydrous lanoline, lanolin cocoa butter, lecithin, petrolatum
Pearlescent pigments	Guanine crystals, bismuth oxychloride
Opacifying agents	Titanium dioxide
Perfumeries Rose oil, cinnamon oil, lavender oil etc.	Rose oil, cinnamon oil, lavender oil etc.
Miscellaneous agents : (a) Preservatives (b) Antioxidants (c) Flavouring agents	Parabens BHA, BHT, tocopherol etc. Cinnamoniol, spearmint oil etc.

Preparation of lipsticks:

Successful preparation of lipstick shades depend upon the adequate dispersion of the lake colours in the lipstick mass. It is advisable to prepare the dispersion of lake colours in castor oil. Dispersions are generally prepared by milling about 25% concentrations of lakes in castor oil.

Method of Preparation:

If a solvent is used for the dissolution of bromo acid, the solution is first prepared and set aside until required.

If commercial colour pastes are not being used, then lake colours are first dispersed by mixing with suitable quantity of castor oil.

The colour paste obtained is passed through a triple roller mill until it becomes smooth and free from agglomerates and gritty particles.

The colour mixture is then mixed with the bromo acid mixture.

All the ingredients of the base are identified and arranged in the increasing order of their melting points.

This mixture is remilled until it is perfectly smooth.

Preservatives and anti-oxidant are dissolved in remaining oil and are added to the mixture.

Finally, the perfume is added and the mass is stirred thoroughly, but gently to avoid entrapment of air.

Automatic ejection mould is preferred for the large scale production.

The mould is lubricated with liquid paraffin or isopropyl myristate before pouring the mass into the mould.

It is important to prevent settling down of the coloring mass when the moulds are chilled. Lubrication facilitates easy removal of sticks.

Evaluation of Lipsticks

The evaluation studies are important in order to determine the efficiency, stability and the consistency of the finished product. The evaluation tests for the lipsticks are as follows:

1. Melting Point Determination Test: The determination of melting point is done in order to determine the storage characteristics of the product. The inciting point of lipstick base should be between 60 to 65°C in order to avoid the sensation of friction or dryness during application. The method of determination is known as capillary tube method:

(a) In this method, about 50 mg of lipstick is taken and is inserted into a glass capillary tube open at both ends.

(b) The capillary tube is ice cooled for about hrs and then placed in a beaker containing hot water and a magnetic stirrer.

(c) The temperature at which material starts moving through the capillary is said to be the melting point temperature.

(d) Another important parameter is the droop point which determines the temperature at which the product starts oozing out the oil and becomes flattened out.

(e) The melting point should be higher than the droop point which determines the safe handling and storage of finished product.

2. Breaking Load Point Test: This test is done in order to determine the strength and hardness of the lipstick. In this method, the lipstick is placed horizontal position 1 inch from the base and weights with increasing loads are attached to it. the weight at which the lipstick starts breaking, known as the breaking load point. The test shall be carried out in specific condition and at about 25 ° C temperatures.

3. Determination of thixotropic character: This is a test for determining the uniformity in viscosity of base. The instrument used for the determination of thixotropic character is known as the penetrometer.

4. Microbiological tests: The test is carried out in order to determine the extent of contamination either from the raw materials or mould. The test involves the plating of known mass of sample on two different culture media for the growth of microorganism and incubating them for a specific period of time. The extent of contamination can be estimated by counting the number of colonies.

5. Test for rancidity: the oxidation of oil such as castor oil and many other ingredients may result in bad odour and taste and also result in a sticky product. The test for rancidity can be done by using hydrogen peroxide and determining its peroxide number.

6. Test for the Application Force: This is a test to determine the force to be applied during application. In this method, two lipsticks are cut to obtain flat surfaces which are placed one above other. A smooth paper is placed between them which is attached to a dynamometer to determine force required to pull the paper indicates the force application.

7. Storage Stability: This test is done in order to determine the stability of product during storage.

8. Stability to Oxidation: The oxidation characteristics of the finished product are determined in order to check the stability of the product to oxidation. The extent of oxidation can be determined by peroxide number of product after exposure or substance to oxygen for a specific period of time.

9. Determination of Surface Characteristics: the study of surface property of the product is carried out in order to check the formation crystal on the surface or the contamination by microorganism or formation of wrinkles and the exudation of liquid.

10. Determination of Colour dispersion: the test is done in order to determine the uniform dispersion of color particle. The size of the particle is determined by the microscopic studies and it should not be more than 50 μ .

LIP LINERS:

Lip liner, also known as a **lip pencil**, is a cosmetic product. It is intended to fill in uneven areas on the outer edges of the lips before applying lipstick to give a more even shape. It is also used to outline the lips, keeping lipstick inside the lip area and preventing it from "bleeding", to suggest the illusion of larger size, or to create a sharper demarcation between lips and skin so that the lips stand out more.



Alternatively, lip liner can be used to fill in the entire lip before the application of lipstick; in some cases, it is worn as a lip color on its own. The product is usually sold in a retractable tube or a pencil form that can be sharpened. Lip liner is usually available in the same range of colors as lipsticks: e.g., reds, pinks, browns, plums, etc., and the customer is advised to match the liner to lipstick so that its effects appear natural. Lip liner may also be colorless, for giving the illusion of smooth lips without adding or affecting color.

Lip liners come in different textures with harder pencils creating sharper lines

MOISTURIZERS:

A moisturizer is a skincare product that's applied to the skin or hair to increase its water content and restore its protective barrier function. Moisturizers are an important part of a basic daily skincare routine. They can help treat dermatoses associated with dry skin, such as atopic disorders and dermatitis.

Moisturizers typically contain a blend of humectants and emollients:

Humectants

Ingredients that draw moisture from the air and surface layers of skin and retain it. Examples include hyaluronic acid and glycerin.

Emollients

Ingredients that help trap moisture in skin and soften its texture. Emollients can also be used as a specific ingredient in moisturizers.

Moisturizers are different from lotions, which are also hydrating products but are typically used on the body. Body lotions have a higher water content and are more easily spread across a wider surface area than face creams.

CRACK CREAMS:

Crack creams, also known as crack heal creams, are topical creams that help heal cracked skin, especially on the hands and feet. It Heals cracked skin, dry skin disorders, chapped hands, fissures, chilblains, minor burns, cuts, and wounds

examples

Krack Heel Repair Cream

A topical cream that contains seven healing herbs, including daruharidra, kampillaka, pashanabheda, manjishtha, payasvini, and tila taila. It's suitable for all skin types and is meant for external use only.

Hansaplast Cracked Heel Ointment

Contains ingredients like paraffin liquidum, cera microcristallina, ceresin, lanolin alcohol, panthenol, bisabolol, and glycerin.

No Crack Repair Cream

A fragrance-free, highly concentrated cream that's ideal for rough, cracked, or damaged areas like hands, heels, elbows, and knees

SUN CREAM AND UV RAYS PROTECTING CREAM.:

Sun cream, also known as sunscreen, sunblock, or sun lotion, is a topical product that protects the skin from the sun's harmful ultraviolet (UV) rays

Sun cream can come in many forms, including lotions, sprays, gels, foams, sticks, and powders

Sunscreen is important for protecting your skin from sunburns, skin cancer, and early skin aging. However, no sunscreen blocks UV radiation 100%. You should also take other steps to protect your skin, such as:



- ❖ Seeking shade, especially between 10 AM and 2 PM
- ❖ Wearing sun-protective clothing, such as long-sleeved shirts, pants, a wide-brimmed hat, and sunglasses with UV protection
- ❖ tanning beds
- ❖ Using extra caution near water, snow, and sand

Practice Questions:

1. What is skin toners ?
2. Explain manufacturing process of lipsticks.
3. What are the uses of Suncream?
4. Explain about crack cream
5. Evaluate the application of skincare products.

Reference Book:

1. Michael Showell, Hand book of detergents
2. Industrial chemistry - B.K. Sharma

3. Charles Sell, Chemistry of Fragrances: From Perfumer to
of Chemistry, 2006

Web resources:

1. <http://openlibrary.org/>
2. <http://www.aad.org/>