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AN OVERVIEW ON PHARMACEUTICAL EXCIPIENTS- THEIR ROLES AND APPLICATIONS

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Abstract:

Excipients play an important role in formulating a dosage form. These are the ingredients which along with Active Pharmaceutical Ingredients make up the dosage forms. Excipients act as protective agents, bulking agents and can also be used to improve bioavailability of drugs in some instances; the following review discusses the various types of excipients along with their uses.

The objective of this paper is to indicate the ingredients that possess health effect that can be found in cosmetics and personal care products. The related paper was reviewed in terms of the chemicals that commonly identified in the cosmetic and personal care product. This paper also highlighted the health risk possesses by such ingredients in the products.

As we know that dosage form is a combination of active pharmaceutical ingredient (API) and excipients therefore it is clear that any pharmaceutical dosage forms cannot be formulated without the use of excipients. Excipients are the major part of formulation. They do not show any adverse effect but promotes the therapeutic activity of pharmaceutical product. Synthetic excipients have some toxic properties so the uses of natural excipients are coming in the picture. This review shows the uses of natural excipients in modern time and in medicinal sciences.

Keywords: Excipients, Cosmetic excipients, Natural excipients, Active pharmaceutical ingredients (API).

INTRODUCTION

There are several explanations to pharmaceutical excipients covering origin, regulatory and functionality aspects. "The word excipient is derived from the Latin **excipere**, meaning 'to except', which is simply explained as '**other than**'. Pharmaceutical excipients are basically everything other than the active pharmaceutical ingredient. Ideally, excipients should be inert, however, recent reports of adverse reactions have suggested otherwise." (Australian Prescriber)

"Pharmaceutical excipients are substances other than the active pharmaceutical ingredient (API) that have been appropriately evaluated for safety and are intentionally included in a drug delivery system."

Simply said the excipients enable the drug substance to be applied to the patient in the right form and supports the way and place of action without being active themselves.

{OR}

The phrase Excipient has come from Latin phrase, “excipients” which imply to receive, to collect and to take out. The preferred of any method relies upon on energetic pharmaceutical ingredient (API), production strategies and the excipients used.

Excipient performs a first-rate position with inside the overall performance of the API and to aid the safety & efficacy. Excipients are commonly used as diluents, binders, surfactants, preservatives and sweeteners in not unusual place dosage bureaucracy like syrups, pills and capsules.¹

In the designing and improvement of drug merchandise from lively drug(s), a number of the essential non-healing materials are basically included. These non-healing materials are widely termed as excipients. The pharmaceutical excipients and their importance were reviewed in element on this article. This article emphasizes the essential standards of excipients, motives for the improvement of recent excipients, special types of current excipients, new grades of novel excipients, mixtures of various excipients and a number of the brand-new packages of current excipients.[1]

Ideal properties of excipients

Ideally, an excipient is pharmacologically inactive, non-toxic, and does not interact with the active ingredients or other excipients.

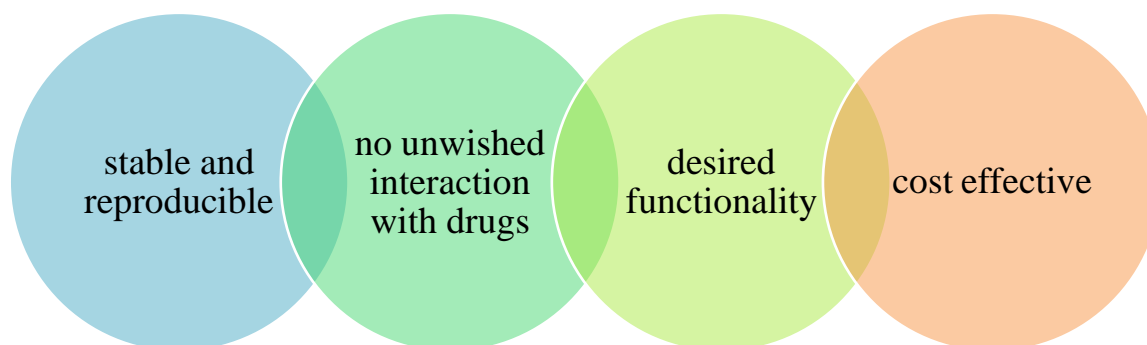


Fig 1 Ideal properties of excipient

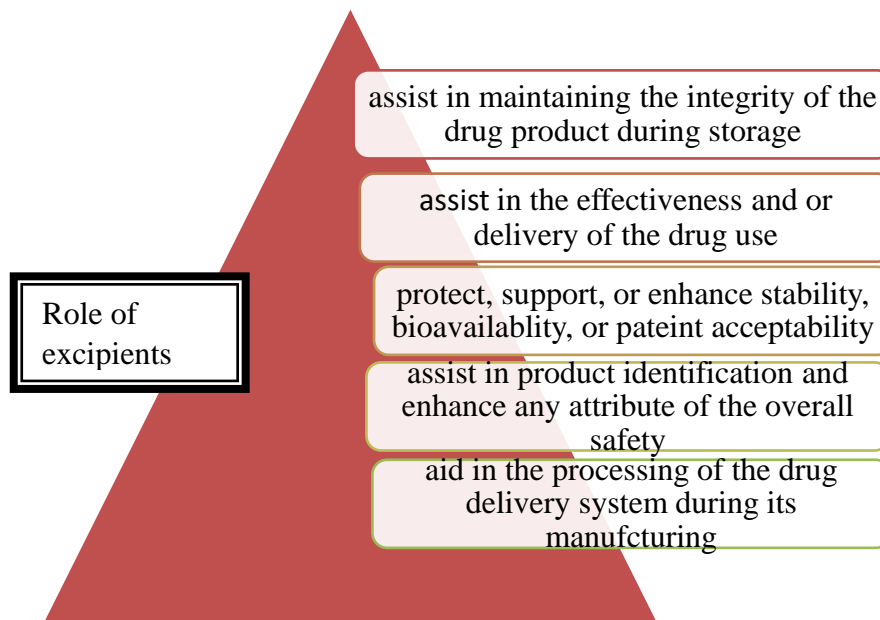


Fig 2 Roles of excipients in pharmaceuticals

PHARMACEUTICAL EXCIPIENTS:

Pharmaceutical substances deemed to be as inactive components which can be combining with medicinally lively compounds to formulate the medicines. The substances, that is an in-lively compound is referred as an Additives, Adjuncts. Excipients integrate with API and enables in enhancing the functioning and effectiveness of the medicinally lively compounds. [2]

COSMETICS EXCIPIENTS:

The excipient constitutes the bottom on which the components of beauty merchandise rests. They have the very best percent in the amount of ingredients, almost 90% of beauty merchandise Example: The maximum vast excipients are water, flower waters, vegetable oil, mineral oil, or artificial oils (silicones). [3]

HERBAL EXCIPIENTS:

Natural excipients are the ones materials which are received from diverse herbal reasserts like Plants, Animals and Minerals and utilized in formulations. Natural excipients are broadly used due to its much less toxicity, much less facet effects [4]

DIFFERENT TYPES OF EXCIPIENTS

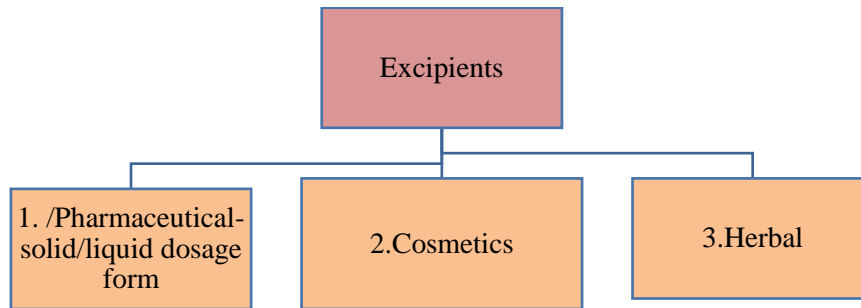


Fig3. Classification of excipients

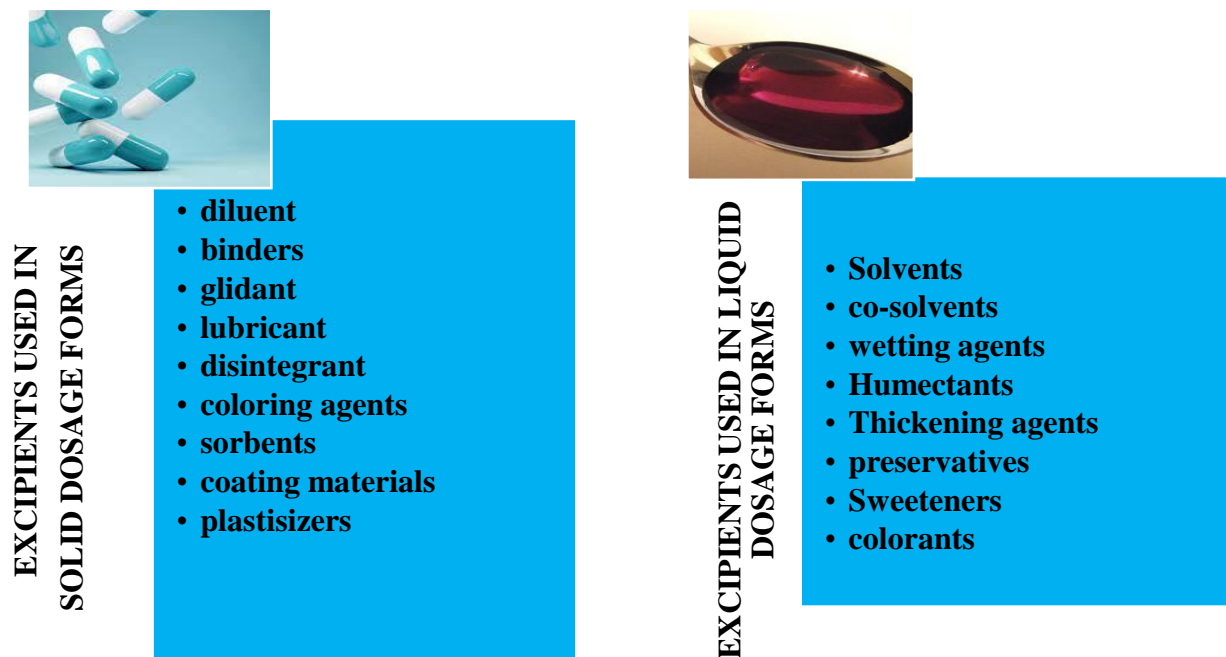
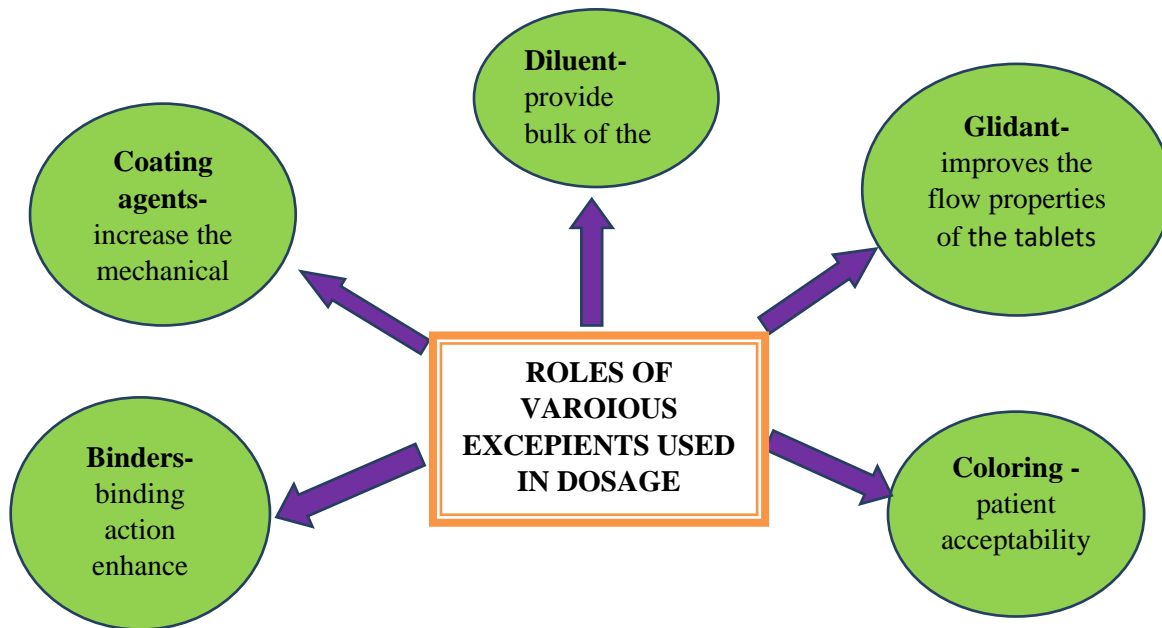


Fig-4 Pharmaceutical Excipients-solid, liquid



TABLET EXCIPIENTS



Tablet excipients

=

tablets

-

drug substance

CLASSIFICATION OF PHARMACEUTICAL EXCIPIENTS

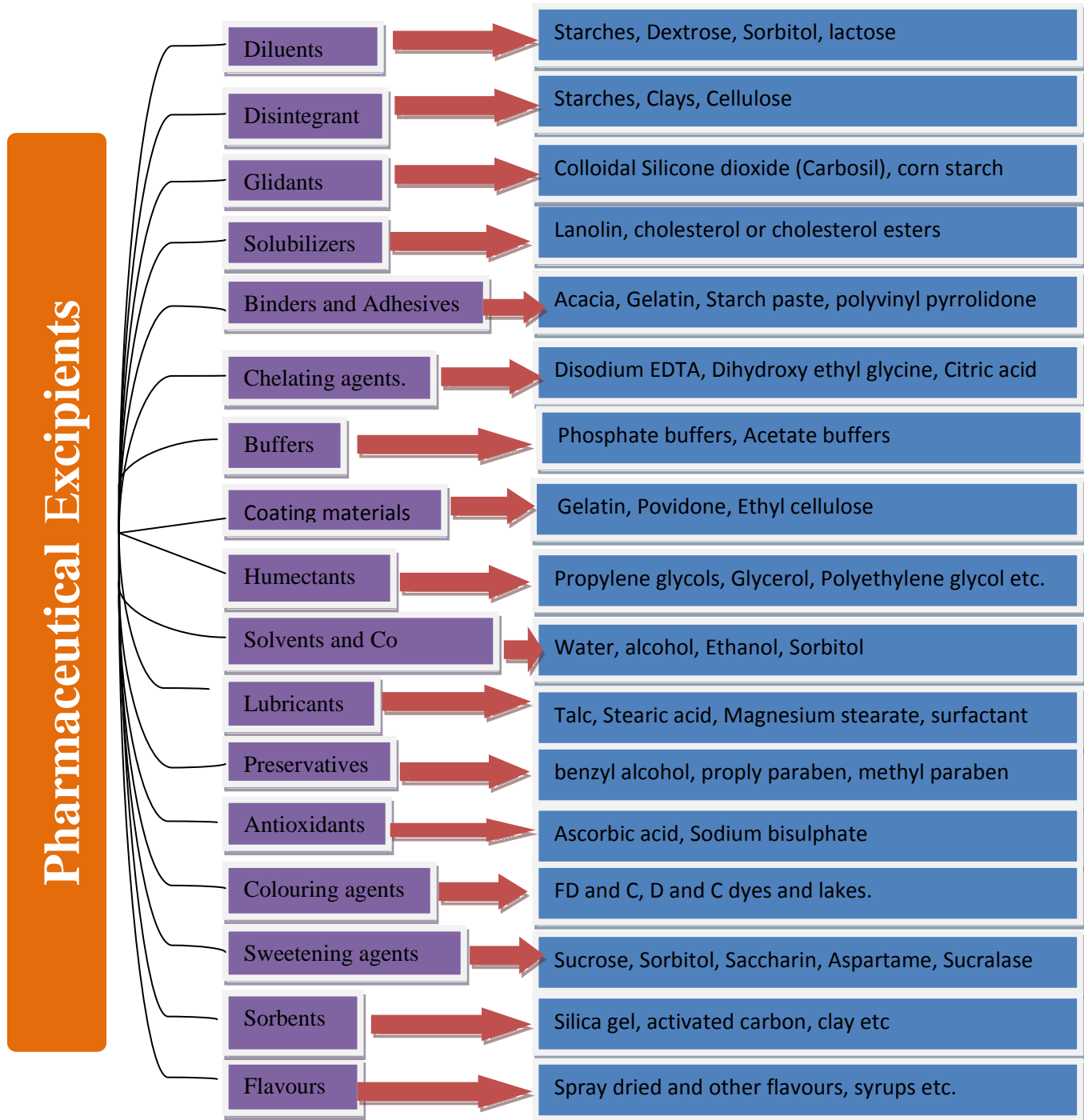


Fig 5. Pharmaceutical classification

S.no	Excipients	Example	Mechanism of action	Purpose
01	Diluents	Lactose Sorbitol Mannitol Starch	Make up the bulk of solid unit dosage forms when drug itself is inadequate to produce the bulk.	Lactose is widely used as a filler or diluents in tablets, capsule and infant feed formula beside in dry powder inhalation[4]
02	Disintegrant	Cellulose CMC Calcium Alginate	Function by drawing water into the tablet, swelling it and causing the tablet to burst apart.	Controlled release [5]
03	Glidants	Corn Magnesium stearate Starch	Added in dry state prior compression, it reduces friction between particles.	Starch is used as an excipient primarily in oral solid dosage Formulations where it is utilized as a binder, diluents and disintegrates[6-8]
04	Binder and adhesive	Acacia Tragacanth	Improves free flow qualities by formulation of granules to desired hardness and size.	It possesses useful emollient properties
05	Chelating agent	EDTA Disodium EDTA	Chelating agents form complexes with metal ions inactivating their catalytic activity in oxidation of medicaments.	Used in the management and treatment of heavy metal toxicity
06	Buffer	Phosphate buffer Acetate buffer	Act by binding hydrogen ions in acids and donating hydrogen ions in bases	Maintain the ph. value of essential components of the drug [9-10]
07	Humectants	Glycerol Propylene glycols	They are hygroscopic in nature which helps in preventing evaporation of solvent.	It is used to prevent the drying of creams and ointment
08	Coating material	Gelatine HPMC Alginates	Drug release rate can be control by altering thickness, permeability of the coating layer	Use of gelatine as a binder is limited in general purpose tablets because it produces tablets characteristics by high hardness and slow disintegrant[11]
09	Solvents	Water, alcohol	Breaking of bonds and reducing effective charge on ions thus increasing Solute-Solvent forces of attraction which are eventually greater	Ethanol has been used as an antimicrobial preservative, possessing bacterial and fungicidal activity[12-15]

			than Solute-Solute and Solvent-Solvent forces of attraction.	
10	Lubricants	Magnesium stearate Sodium lauryl sulphate	Interpose a film of low shear strength that interface between the tableting mass and die wall	It is capable of forming films on other tablet excipients during prolonged mixing, decrease in hardness, increase in disintegration time
11	Preservatives	Benzyl alcohol Butylated Hydroxy toluene Butylated Hydroxy Anisole	For preserving the formulation	It has anaesthetic properties reduce pain at injection site
12	Colouring agent	FD& C Titanium dioxide Indigo	To enhance patient acceptability	Substances which colour other substances that are devoid of colour or change the colour of the substances that has a different colour
13	Sweeteners	Sucrose Lactose	Mask unpleasant taste	It used to impart a more pleasant taste to often unpalatable chemicals[16-17]
14	Flavours	Orange, vanilla	Mask unpleasant taste	It used as a flavouring agent
15	Sorbents	Silica gel	Limits the fluid sorting, taking up of liquid or gas either by adsorption or absorption in dry state.	It used as a solvent in drug delivery system and also as a penetration enhancer
16	Solublizer	Lanolin	Enhance solubility of the active pharmaceutical ingredient	Used as a moisturizer to treat or prevent dry, rough, scaly, itchy skin and minor skin irritation[18]
17	Anti-oxidant	Ascorbic acid	Act by getting preferentially oxidized or by blocking an oxidative chain reaction	To prevent and treat scurvy[19]

CLASSIFICATION OF COSMETICS EXCIPIENTS

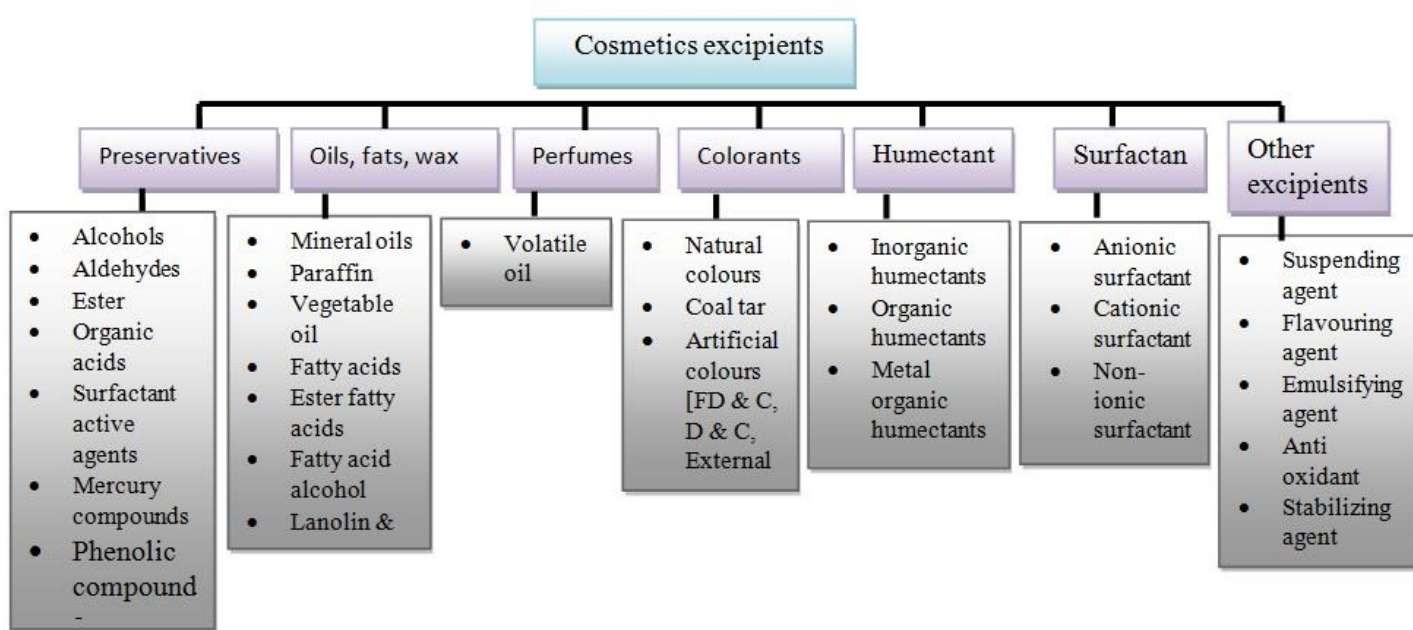


Fig 6. Cosmetics classification

S.no	Excipients	Examples	Mechanism of action	Purpose
01	Preservatives	Ester	It acts as a thickening agent in cosmetics which enhance the viscosity, volume of lotion, creams and other care product	Used as an organic solvent and ester that have fragrance are used in cosmetics[20-22]
02	Oil, fats, wax	Mineral oil	Mineral oil provides a hydrophobic barrier on the surface of the skin	They protect the skin from dehydration
03	Perfumes	Volatile oil	It has anti-bacterial, anti-inflammatory, and anti-viral	It used as an aromatherapy and in perfumes industries
04	Humectants	Inorganic humectants	A moisturizing agent that pulls water into the outer layer of the skin from deeper level of your skin and the air.	Increase skin hydration, relieve dryness, and refresh the skin surface[23-24]
05	Colorants	Natural colours	It functions as a natural colouring agent in cosmetics and skin care product	Improve the appearance of the product

06	Surfactant	Anionic surfactant	Once penetrated into the stratum corneum, anionic surfactants bind to and denature stratum corneum proteins as well as intercalate into and extract intercellular lipids.	It is used for removing the oil and dirt from skin surface
07	Stabilizing agent	Ilanolin	Emollient softens the skin by forming an occlusive oil film on the stratum corneum trans epidermal water loss	Used as a moisturizer to treat or prevent dry, rough, itchy skin and skin irritation

CLASSIFICATION OF HERBAL EXCIPIENTS

S.no	Excipients	Example
01	FILLERS	Plant Cellulose, Gelatin, Lactose, Sucrose, Glucose.
02	BINDERS	Acacia, Alginic Acid, Corn Starch, Alginate, polymers
03	DISINTEGRANTS	Silicone, Gellan gum, Agar.
04	COATING AGENT	Gelatin, Arabi, Natural polymers.
05	LUBRICANTS	Castor oil, Mineral oil, Paraffin oil.
06	GLIDANTS	Vitamin D, Talc.
07	PRESERVATIVES	Clove oil, Cumin seeds, Neem oil, Cayenne pepper
08	ANTIOXIDENTS	Clove oil, Cinnamon, Turmeric, Cocca
09	SWEATING AGENTS	Glucose, Lactose, Honey.
10	SWEATING AGENTS	Glucose, Lactose, Honey.
11	COLOURING AGENTS	Caramel, Chlorophylls, Carotenoids, Red beetroot, Turmeric, Saffron.
12	SOLVENT	Purified water, oils.
13	CHELATING AGENTS	Onions, Garlics, Chlorella, Brazil nuts.
14	BUFFERING AGENTS	Lemon juice.
15	SURFACE ACTIVE AGENTS	Ski waxes, Tea saponins

Fig 7. Herbal classification

S.no	Excipients	Example	Mechanism of action	Purpose
01	FILLERS	Gelatine	It act mainly as a barrier against external environmental condition including exposure to sunlight	Make skin smooth, prevent wrinkles and diminishing signs of ageing[25]
02	BINDERS	Acacia	It is a natural film forming agent which means that it stays on the surface of the skin and hair to better coat, condition and protect them	Acacia gum provides an instantaneous lifting effect and improves the texture of skin, smoothing over wrinkles and leaving the skin soft and supple[26-27]
03	DISINTEGRANTS	Agar	Stabilize moisturizing product, as well as add thickness in order to provide a smoother, creamier texture.	It perfectly cleanses tones, nourishes, whitens and rejuvenates the skin.
04	COATING AGENT	Polymer	rheological modifiers, have film-forming properties as well as to ensure the global film cohesion once applied, fixations, foam stabilizers	Polymers are used to increase the viscosity of these formulations. It also used in lipstick and form a film on the lips[28]
05	LUBRICANTS	castor oil	which retain moisture by preventing water loss through the outer layer of the skin	Used in cosmetics to promote hydration. These can enhance smoothness and softness when applied to facial skin.
06	GLIDANTS	Talc	helps cut down on friction, making it useful for keeping skin dry	it is an excellent moisture absorber and used to prevent rashes[29-30]
07	PRESERVATIVES	neem oil	Neem is rich in antioxidants and helps to boost immune response in tissues of affected skin area.	Neem is able to balance oil production, heal wounds, stimulate collagen formation, reduce post-acne scars and minimise skin inflammation.



CONCLUSION:

Excipients being an indispensable factor of medicinal merchandise need to be evaluated for his or her protection and stability. The protection warranty of excipients enables the formulator to layout a powerful and secure dosage shape with using green and secure excipients. Thus, for an excipient to be in a method it needs to be incredibly stable, secure and efficacious, and especially it has to follow the anticipated overall performance withinside the formula.

These components assist the improvement of complicated formulations that enhance the nice of human existence in phrases of sickness prevention, fitness maintenance, splendour enhancement and additionally constructing the self-esteem. As the enterprise maintain expanding, and the associated authority maintain reviewing the protection of splendour element and merchandise, client ought to additionally play their position with the aid of using retaining themselves up to date with understanding and privy to the components presence in the goods they used.

The utilization of natural cosmetics has been accelerated to many folds in private care device and there may be first-rate call for the natural cosmetics. The use of bioactive components in cosmetics have an impact on organic features of pores and skin and offer vitamins essential for the wholesome pores and skin or hair. There is amazing scope to release several natural cosmetics the use of suitable bioactive elements with appropriate fatty oil, important oils, proteins and additives.

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