Overview on Natural And Synthetic Preservatives Used In Pharmaceutical Dosage Form And It's Impact on Health

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Abstract-*Preservatives are commonly used as additives in pharmaceutical product, liquid preparation and cosmetic some food product Such preparation is protected by preservatives which avoids degradation of product. Natural substances like (sugar, honey, vinegar, salt, spices) natural preservation obtained from plant, minerals, animal. Artificial preservatives (sodium benzoate, potassium sorbate, methylhydroxybenzoate, methylparaben, polyparaben, phenol, benzylkonium chloride etc…artificial preservatives can cause allergy, asthma, hypersensitivity, neurological damage and cancer skin rashes an ditching gastrointestinal upset. Every living organism needs food to live. Food shave many nutrients like carbohydrates, fats, protein, vitamins, minerals etc. Preservatives may have some harmful effects. Preservatives are substances which prolong the shelf life of food stuffs by protecting them against microorganisms. The preservatives are one of the 26 major additives categories that are used in the food processing. Inhibit the growth of microorganisms like bacteria and fungi. Artificial preservatives are a group of chemical substances improving nutritional value of foods and pharmaceutical product. Low water content help to protect against microbial growth.*

Keywords- Preservatives, anti-microbial, antioxidant, anti-enzymatipersensitc and hypersensitivity.

I. INTRODUCTION

The preservatives are added to prevent contamination deterioration and spoilage by bacteria and fungi since many of the components pharmaceutical preparations serve as substrates for this microorganisms.

The USP uses the term "harmful" to refer to microbial organisms or their toxis that are responsible for human disease or infections examples of organisms that must not be present in a product are given namely salmonella species Escherichia coli certain species of including P.aexiginosa and staphylococcus aureus.

Preservatives are not added to enhance stability to the formulation but rather to give exhibility in the use of the drug product.The high concentration of glycerin and electrolytes make the environment less favorable to microbial growth thus enhancing the effectiveness of the preservative.Preservative action depend on the concentration of the free preservation in the active phase the paraben esters of P-hy-droxy benzoic acid are popular as preservatives because their toxicity is low they are odourless they do not discolour and they are irritating to the skin.On the negative side the parabens have a low solubility in water and or less effective against gram negative bacteria then molds and yeasts.The other three classes of preservatives have been widely used in ophthalmic nasal and parenteral products but non frequently in oral liquid preparations.The natural preservatives are volatile alcohols their volatility introduce problems of odour and less of preservatives on aging in multidose preparation. New preservatives are being marketed, but all of these substances must be thoroughly evaluated for their effectiveness in the product, and effect on the physicochemical stability of the product.

II. IDEAL CHARACTERISTCS OF A PRESERVATIVE

- It should not interfere with the other ingredients.
- It should be non-toxic and non-irritant.
- It should be inert.
- It should be physically and chemically stable.
- It should be effective.
- It should be bactericidal.

III. CLASSIFICATION OF PRESERVATIVES

The preservatives are classified on variety of the basis and some of these are as follows.

A. CLASSIFICATION BASED ON MECHANISM OF ACTION:

1. ANTIMICROBIAL AGENT:

The agent which active against gram positive and gram negative micro-organism which cause degradation of pharmaceutical preparation which are active in small inclusion level.

Eg: Sodium benzoate
Benzoic acid
Potassium benzoate

2. ANTIOXIDANTS:

The agent which prevent oxidation of Active pharmaceutical ingredient which otherwise undergo degradation due to oxidation as they are sensitive to oxygen.

Eg: Vitamin C
β-Carotene
Flavonoid

3. CHELATING AGENT:

The agent which form the complex with pharmaceutical ingredient and prevent the degradation of pharmaceutical formulation.

Eg: EDTA
Pyrophosphoric acid
Tripolyphosphoric acid
Glycine
Citric acid

B. CLASSIFICATION BASED ON SOURCE:

1. Natural preservatives
2. Artificial preservatives

1.NATURAL PRESERVATIVES:

These drugs are obtained by natural sources that are plant, mineral sources, animal, plant, etc.

Eg: Salt (sodium chloride)
Honey, sugar, lemon, neem oil, edible oil.

2. ARTIFICIAL PRESERVATIVES:

The preservatives are man made by chemical synthesis active against by various micro-organisms in small concentration.

Eg: Sodium benzoate sorbates,
Propionets,
Benzoates.

IV. MECHANISM OF ACTION

PRESERVATIVES HOW THEY ACT?

Natural preservatives such as salt, sugar, vinegar, and honey used as traditional preservatives. Certain processes such as freezing, pickling, smoking and salting can also be used to preserve food.

Preservatives targets enzymes in fruits and vegetables that continue to metabolize after they are cut.The citric and ascorbic acids (vitamin c) from lemon or other citrus juice can inhibit the action of the enzyme phenolase which turns surfaces of cut apples and potatoes brown.

FDA standards do not currently require fruit and vegetable product labels to accurately reflect the type of preservatives in the products.

HEALTH RISK CAUSED BY ARTIFICIAL PREAERVATIVES

The artificial preservatives are mostly negative and potentially life thretening side effect

NITRATES AND NITRITES

Nitrates are converted to nitrites that can react with hemoglobin to produce met hemoglobin in that may be cause the loss of consciousness and leads to death, especially in children.

The protein are present in thestomach in which when they react with the nitrites and produce nitrossmines and leads to carcinogenic

Research claim that increased levels of nitrates in food and increased deaths from parking and Type 2 diabetes ,Alzheimer's symptoms such as redness of skin , sweating, headache, and food containing monosodium glutamate [MSG].

SULFITES

Sulfite may cause severe allergic reaction and asthma

PARABENS

The paraben toxic chemical areofften used along with the methyl chloroisothiazolinone and methyl isothiazolinere

parabens cause the neurological damage in rats and are potent irrtants and allergens

The toxic chemical by pregnant women may adversely affect featal brain development.

FORMALDEHYDE

Formaldehyde causes the imidazolidinyl used are all potent skin, eye and lung irritants high level toxins like these can cause the DNA damages reasearch has shown that the food additives used in hundreds of children's food and drinks can cause disruptive behaviorcommonly used preservatives along with health risk namely hypersensitivity, asthma and cancer.

TABLE 1 FOODS PRODUCTS CONTAINING DIFFERENT TYPES OF PRESERVATIVES.

Preservatives	Foods containing
Ascorbic acid(vitamin C)	Fruit products,acidic foods
Benzoic acid	Fruit products,acidic foods,margaine
BHA(butylatedhydroxyanisole)	Bakery products,cereals,fats and oils
BHT(butylatedhydroxyanisole toluene)	Bakery products, cereals, fats and oils
Calcium lactate	Dairy products,olives,frozen desserts,jams,jellies
Calcium propionate	Breads and other baked products
Calcium sorbate	Syrups,dairy products,cakes,mayonnaise,margarine
EDTA(ethylene diamine tetra acetic acid)	Dressings,margarine,canned vegetables
Methyl paraben	Beverages,dressings,relishes
Potassium propionate	Breads and other baked goods
Potassium sorbate	Dairy product,syrups cakes, processed meats
Propionic acid	Breads and other baked goods
Propylparaben	Beverages,cakes pastries,relishes
Propylgallate	Cereals,snack foods, pastries
Sodium benzoate	Fruit products, margarine,acidic foods
Sodium nitrate and nitrite	Cured meats,fish, poultry
Sodium propionate	Breads and other baked products
Sodium sorbate	Dairy products,mayonnaise,processed meats
Sorbic acid	Dairy products,fruit product,sweet, fermented product
TBHQ(Tetra butyl hydroquinone)	Snack food,fate and oils
Tocopherol(vitamin E)	Oils and shortenings

TABLE 2 :PRESERVATIVES USED IN VARIOUS FORMULATIONS.

Category	Products	Preservatives
Oral	Tables, captions, suspensios, syrups	Methyl,ethyl,propylparabens and their combinations,sodium benzoate,benzoic acid calcium lactate,sorbates of calcium,sodium and potassium,sorbic acid
Dermal	Creams, lotions, ointments,soap,bath gel , shampoo	Benzalkoniumchloride,cetrimide,EDTA,benzoicacid,thiomersal,phenyl salicylate
Dental	Tooth paste, mouthwash, gargles	Sodium benzoate,benzoicacid,potassiumsorbates,sodium phosphate,triclosan
Ophthalmic	Eye drops, ointments, contact lens and solutions	Amino propylbiguanide,sodium per borate,boric acid
Nasal	Nasal sprays, drops, aerosols	Benzalkoniumchloride,phenylcarbinol,potassiumsorbate,chlorobutanol,chlorocresol,EDTA
Rectal	Suppositories, enema	Benzyl alcohol,benzoic acid, sodium benzoate,methyl hydroxyl benzoate,chlorhexidine
Parenteral	Small and large volume parenterals including vaccines	Methyl,ethyl,propyl,butyl parabens and their combinations,benzylalcohol,chlorobutanol

IV. NATURAL PRESERVATIVES: ALTERNATIVES TO THE ARTIFICIAL PRESERVATIVES

The excipients used in foods, cosmetics and pharmaceuticals are of plan orgin like carrageenan, acacia, guar gum, tragacanth, aliginates, starch, agar, gelatin, sustaining agent, colloids, suppositories, stabilizers, Thickening agent, binding agent, disintegrants, xanthum, gelatin.

Natural plant based excipients low cost, free from effects, biocompatible. Natural substant extracts obtained from plant animal or minerals can save as beneficial alternatives.
The preservatives are causative agents of hyperactivity even in previously non hyper-active individuals. The benzoates, sorbates, metabisulphites, toxic gases and other synthetic chemical preservatives appear to be numbered.

TABLE 3 HEALTH HAZARDS OF SOME COMMONLY USED PRESERVATIVES

PRESERVATIVE	HYPERSENSITIVITY(H)	DANGEROUS FOOD PRESERVATIVES (A)	CANCER ©
Potassium and calcium sorbates, sorbic acid	H	A	-
Benzoic acid	H	A	-
Sodium benzoate	H	A	C
Propylparaben	-	A	-
Sulphur dioxide	H	A	-
Sodium meta bisulphate	-	A	-
Potassium bisulphate	H	A	-
Hexamethylene tetra amine	-	-	C
Sodium nitrite	H	A	C
Sodium or potassium nitrite	H	-	C
Calcium or potassium or sodium propionates , propionic acid	H	A	C
Propylgallate	-	A	C
Tetra Butyl Hydroquinone (TBHQ)	H	A	-
Butylated Hydroxyl Anisole(BHA)	H	A	C
Butylated Hydroxyl Toluene(BHT)	H	A	C

TABLE 4 SOME ALTERNATIVES OF ARTIFICIAL PRESERVATIVES

S.NO	NATURAL PRESERVATIVES	SOURCE	ACTIVE CONSTITUENTS
1.	Tulsi	Dried and fresh leaves of Ocimum sanctum Family:Labiatae	Volatile oil containing eugenol
2.	Turmeric	Dried secondary rhizome of Curcumlonga Family:Zingiberaceae	Phenoliccurcu,inoids (curcumin), essential oils
3.	Neem	Leaves and seeds of Azadirachtaindica Family:Meliaceae	Limonoids, nimbin, nimbidin, margaolone, margolonone, azadirachtin
4.	Nisin	Lactobacillus lactis	Polypeptide
5.	Ginger	Rhizome of Zingiberofficinale Roscoe Family:Zingiberaceae Essential oils, pungent phenolic compounds, gingerols	
6.	Garlic	Bulb of Alliumsativum Family:Liliaceae	Allin,allicinajoene
7.	Clove	Dried flower buds of Syzygiumaromaticum Family:Myrtacea	Eugenol
8.	Cinnamon	Dried inner bark of shoot or trunk of Cinnamomumverum Family:Lauraceae	Ciinamaldehyde, eugenol, carophyllene,1,8 cineole
9.	Lard	It is the purified internal fat obtained from the abdomem of hog Susscrof Linn Family:Suidae	Olein, stearin, palmitin
10.	Rosemary	Fresh or dried leaf of Rosmarinusofficinalis Family:Labiatae	Phenolic acids, flavonoids, diterpenoid bitter ubstances, carnosol, carnosic acid

V. CONCLUSION

Artificial preservatives are chemical substances that can cause health risk. Awarness about the harmfully effective of these chemical in food, cosmetics pharmaceuticals is increase

Now a day parabensbenzoates, sorbates, metabisulphites, toxic gasses and other synthetic chemical preservatives have appeared.

The manufacturers and retailers are response to cosmetics and to research which has been showed that artificial preservatives are causative agents of several health risk such as hypersensitivity, asthma and cancer.

The natural substances obtained from mineral and plant, animal can serve as beneficial alternatives

The food, cosmetic and pharmaceuticals as flavoring, binding, disintegrated, gelling, thickening or suspending agents, used as preservatives

Natural preservatives offer greater advantages over their artificial counterparts due to their non toxic natural counterparts due to their non toxic nature along with a range of health benefits.

There are many effective and potential uses of natural preservatives in different ingredient, satifactory evidence of its effectively and safety is still lacking.

The beauty brands that have used natural preservatives systems seem to have done so successfully. However, the challenges going forward lie in market challenges lack of development in the area of new and better natural preservatives system. natural preservatives instead of synthetic one, as it provides us so many good effects

Synthetic preservatives are also good but research has reported that they cause many health problems as almost all are carcinogenic in nature.

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