

**Short communication****Food preservatives and their uses: A short report****Abstract**

Beverages are consumed all over the world for their nutritional value, thirst quenching properties, stimulating effect or for their medicinal values. With changing lifestyle and requirements, people now often prefers packaged food products over home products. Although, beverages products passes through several, quality, safety and regulatory mandates, consumers are concern about food preservatives as in some cases allergic reaction to generally recognized as safe (GRAS) has been reported. The study represents the usages of different forms of preservatives in packaged food industry along with their beneficial and adverse effects and also highlights their antioxidant and antimicrobial potential to serve the consumers needs.

**Keywords: Beverages, Preservatives, Health, Shelf-life, Antimicrobial, Antioxidant**

**Introduction**

Packaged food industry has been serving as one of the fastest growing network in the present era. With changing lifestyle and requirements, peoples now prefers readymade packaged food rather than preparing at home. Numerous forms of preservation techniques have been designed to extend the shelf-life of the food products, not only by reducing the microbial growth, but also to maintain the antioxidant potential to serve the consumers needs [1, 2]. To make the packaged food quality stable for a reasonable time period preservatives are often used in different quantity and concentrations. Traditionally, food preservation has three goals; the preservation of appearance, the preservation of nutritional characteristics, and a prolongation of the time that the food can be stored. Hence, food preservatives can be defined as the “food additives used to inhibit the growth of micro-organisms like yeast, molds and bacteria and prevent the spoilage by different anti-oxidative reactions in order to maintain the quality, texture, consistency, taste, colour, alkalinity or acidity” [3, 4]. Several forms of chemical preservatives are being currently in use in food and beverages industries such as Sodium benzoate, Benzoic Acid, Sodium Sorbate, Potassium Sorbate, Sorbic Acid, Sodium Nitrite, Sulfites, Vitamin E,

Vitamin C, Pine bark extract, Grape Seed extract, Sodium Erythorbate Sodium Diacetate, Sodium Succinate, Sodium Dehydro Acetate, Succinic Acid and Ascorbic Acid, Parabens, Erythorbic Acid, Propylphenols, Disodium ethylenediaminetetraacetic acid (EDTA) and Polyphosphates [5, 6]. Preservatives can mainly divide into two groups based on their purpose of usages *i.e.* preservatives as antimicrobial and preservatives as antioxidants (Fig. 1).

### **Antimicrobial**

Antimicrobial preservatives reduce the microbial spoilage of foods by inhibiting the contamination and growth of bacteria, yeasts and molds. Benzoates (E210 -E219), Sorbates (E200 – E209), Nitrates (E240 – E259), and Sulfites (E220 – E229) come under such groups of microbes [7]. Sodium Benzoate (Produce Benzoic Acid when dissolved in water) and Benzoic Acids are the most common used preservative and widely used in acidic food products like fruit juice, carbonated drinks, pickles and jams [8]. The maximum level of benzoates approved by FDA is 0.2% and when used along with Ascorbic acid is 0.1%. Sulfites like Sodium bisulfite and Potassium meta-bisulfites are used in food by dissolving in cold water. Upon dissolving they produce Sulfurous Acid that inhibits the growth of bacteria and molds and to some extent yeast also. Sorbates like Potassium Sorbate, Sodium Sorbate are use as the preservatives in products having high pH value up to 6.5. Nitrites are mostly use to prevent the growth of yeast and molds in food products. The maximum level allowed is 0.1%. Nisin peptide is an alternate food preservative which is prepared during the food fermentation by *Lactococcus*, lactic bacteria. It is highly effective on the gram positive bacteria and their spores. Though it is less effective on gram negative micro-organisms and fungi, the FDA and WHO recommend this to use because of its non-toxicity and less adverse reaction. Nisin is a polypeptides containing about 34 nos. of amino acids [9].

### **Antioxidants**

Chemicals that prevent oxidation in other molecule are known as antioxidants. Ascorbates (E300 – E305), Tocopherols (E306 – E309), Erythorbates (E310 – E319), Lactates (E320 – E329), Phosphates (E340 – E349), Succinates (E360 – E369) are all effectively used as antioxidants for food and beverages. Ascorbic Acid (E301) is a common antioxidant beverages and pickles. Foods containing unsaturated fats are easily attacked by oxidation. Oxidation causes

64 them to turn rancid in order to discoloring and unpleasant tastes like metallic or sulfurous [10].  
65 Hence, the Tocopherols (Normally Vitamin E) are used in rich fat foods for preservation.

### 67 **Adverse effects of preservatives**

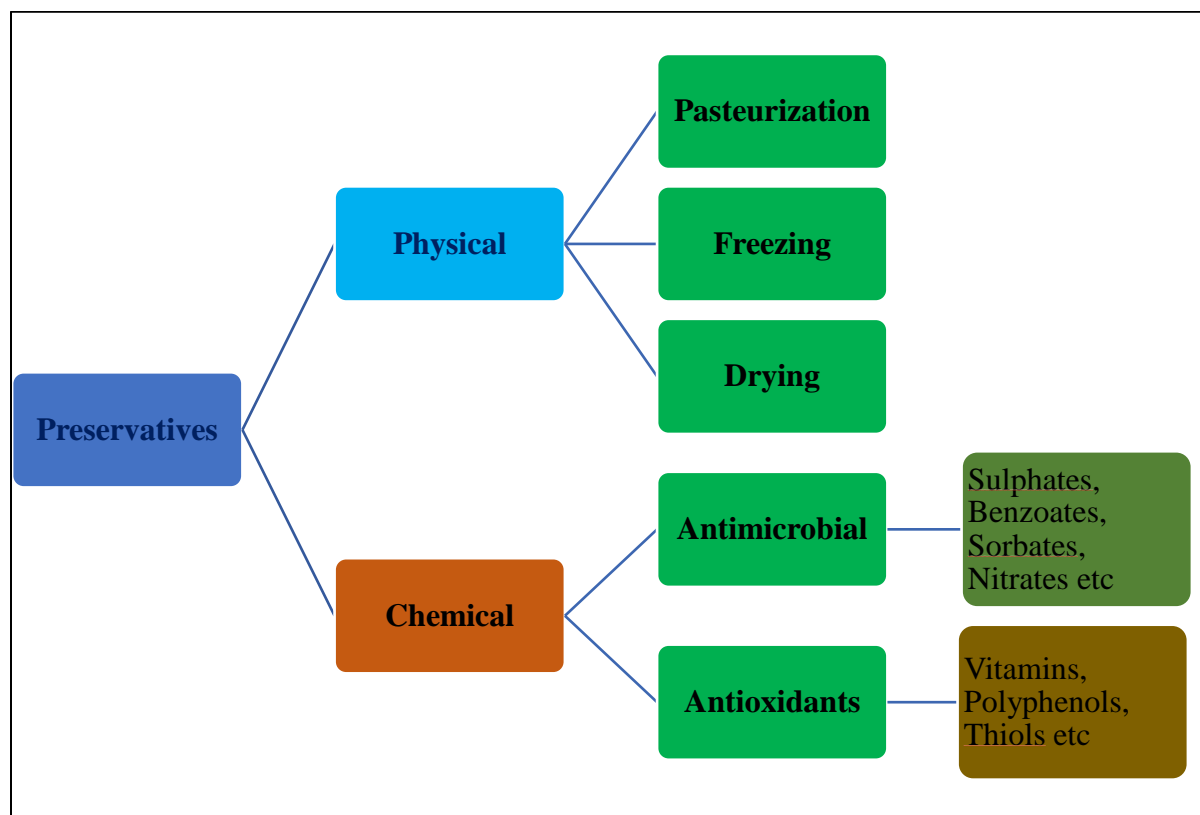
68 Though preservatives are a beneficial to packaged food, they do have some negative  
69 effect on human health. All preservatives cause hyper activity on regular usage. Some of the  
70 common preservatives and their harmful effects on human health are listed below;

- 71
- 72 a) **Nitrates and Nitrites:** For curing of meat products these additives are used. But  
73 sometimes it reacts to cause urticarial, itching and anaphylaxis in human beings. Sodium  
74 Nitrite is used in meat product during cooking to prevent botulism, but during high heat it  
75 reacts with the proteins to produce carcinogenic N-Nitrosamines which are linked to  
76 different forms of cancer [11, 12].
  - 77 b) **Benzoates:** Benzoate contained foods are strictly abandoned for asthma patients because  
78 it worsening the condition. Benzoates are also reported to cause rhinitis, chronic urticarial  
79 and flushing in some cases [6]. Sodium Benzoate which is used to enhance the self-life  
80 for a long time is found to form carcinogenic benzene while use with vitamin C or  
81 Ascorbic acid. Though the amount of benzene form is low but it is a risk factor to cause  
82 cancer [13]. It is also reported that Benzoates can cause brain damage [14].
  - 83 c) **Sorbates:** Sorbates can cause urticarial and contact dermatitis in some cases [15].
  - 84 d) **Sulphates:** Copper sulphate is generally used in coloring of peas and other vegetables. It  
85 is found that the copper, when added to the vegetables, forms a compound which is not  
86 easily soluble in the human body [16].

### 88 **Conclusion:**

89 Food preservation presents an opportunity to move alternative food practices away from  
90 an individualistic, consumer-oriented politicsto a politics based upon relationships to self, others,  
91 and the earth, enabling activist's to connect more deeply to the goals of food movements.  
92 Although there are certain risk in use of preservatives but its importance and contributions to  
93 packaged food industry can't be overlooked. A lot of researches are needed to be done to find out  
94 the natural and harmless preservatives like Nisin Peptide. The food manufacturer should give

special attention during their formulation for healthy preservatives as combination of different preservatives has been known to improve not only the shelf live of the product but also enhance the quality and health benefits.



**Fig 1: Diagrammatic representation of usages of preservatives**

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