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A Review Study on Different Types of Food Preservatives and their Harmful Effect on Health

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ABSTRACT

Worldwide, people intake packaged food and drinks for its nutritive content, durability, ability to quench their thirst, stimulating effects, and therapeutic benefits. People now frequently prefer packaged food materials over homemade ones due to changing lifestyles and needs.

Although a variety of food products, including beverages, must adhere to a number of quality, safety, and regulatory requirements, customers are worried about food preservatives since generally regarded as safe (GRAS) foods have occasionally been linked to allergic reactions. The study shows how various preservative types are used in the packaged food business, along with their positive and negative effects, and it also emphasises their antioxidant and antibacterial potential to meet customer expectations.

KEYWORDS: *Food preservatives, Sodium benzoate, Chemical preservation, Physical preservation*

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INTRODUCTION

Preservatives are compounds, both natural and synthetic, that are added to a variety of products in order to delay spoilage and avoid early deterioration. Preservatives are frequently found in a wide range of foods and cosmetics. However some people might not be aware that non-traditional products like wood and medications also contain preservatives (TIF, 2023). Because of a substance or chemical that is added to many products like beverages, candies, baked goods, breads, and many more these days, many people are avoiding foods that include less-than-natural substances. They are frequently found in fruits, vegetables, and canned meals. We're talking about preservatives and how consuming them in excess can have long-term health effects.

Food naturally goes bad after a certain amount of time due to the invasion of bacteria, fungus, and moulds. These foods are kept from going bad as quickly by adding preservatives, whether they be natural, artificial, or a combination of the two. Moreover, preservatives are utilised to maintain the food's colour, shape, scent, and size, which might increase customer attractiveness (TIF, 2023).

Over the past few years, the usage of food additives has grown significantly, reaching over 200,000 tonnes annually (Mirza, 2017, Abdulmumeen, 2012 and FDA, 1993). In light of the fact that processed foods make up roughly 75% of the Western diet today, it has been estimated that each person currently consumes an average of 8 to 10 pounds of food additives annually, with some possibly consuming significantly more. Currently, most people choose to eat pre-made items from the market rather than making them from scratch. These foods contain chemicals and preservatives of some sort to preserve their quality and flavour and prevent bacterial and fungal spoilage. There are more than 3000 chemicals and preservatives on the market that are utilised as antibacterial and antioxidant agents.

TYPES OF PRESERVATIVES

Preservatives are the compounds used to prevent and retard the microbial spoilage of food. Section 3.1.4 of FSS (Food Product Standards and Food Additives).

According to Regulations, 2011, a preservative is "a material that, when added to food, has the potential to block, retard, or arrest the process of fermentation, acidification, or other food breakdown."

There are two ways to implement reservations: chemically and physically. Chemical preservation involves adding chemical components to the product. Refrigeration or dry methods are used in physical preservation. Preservative food additives lower the risk of food-borne illnesses, lower microbiological deterioration, and maintain the freshness and nutritional value of food. Dehydration, UV-C radiation, freeze-drying, and chilling are some physical methods for food preservation (Mirza, 2017). Techniques for chemical and physical preservation can occasionally be combined. They are divided into two classes of preservatives, Class I and Class II.

Common salt, sugar, dextrose, glucose, spices, vinegar or acetic acid, honey, and edible vegetable oils are class I preservatives.

In regards to foods like ham, class II preservatives include benzoic acid, sulphurous acid, and salts therein as well as nitrates or nitrites of sodium or potassium.

Preservatives are food additives that, in accordance with EU regulations, guard against the actions of microorganisms (fungi and/or bacteria) and so increase the shelf life of foods. Sodium chloride, also known as salt, is perhaps the oldest preservative still in use today. Organic acids used as preservatives in low pH foods include acetic acid (E260), benzoic acid (E210), propanoic acid (E280), and sorbic acid (E200) (Silva & Lidon, 2016). Often used to prevent Clostridium botulinum growth in foods containing raw meat, such as salamis, ham, bacon, and sausage, nitrates and nitrites are used. Sulphur dioxide (E220) and sulphites (E221-E226 and 224-228) are frequently added to dry fruits, juices, and wines to inhibit the growth of microbes. Antibiotics like nisin (E234) and natamycin (E235) are used to prevent the growth of bacteria and fungi in a variety of foods (Silva & Lidon, 2016).

Moreover, different preservatives may be utilized singly or in combination. Citrol (R), for instance, is an antimicrobial preservative that combines the synergistic effects of two ingredients to prevent the growth of mould. Citric acid (E330) and sorbic acid are dissolved in alcohol (E200). Citrol is a preservative that can be found in bakery goods including pizza dough, soft buns for "hot dogs" or hamburgers, and biscuit dough.

HARMFULL EFFECTS OF PRESERVATIVES

Preservatives can have negative side effects, while some are important. The slowing of food oxidation is one example of a beneficial side effect of preservatives (natural preservatives). Moreover, they increase food's nutritional content, make it more readily available all year long, and even improve flavor. Preservatives have unfortunate side effects that outweigh their benefits. The following are only a few examples of the harmful side effects of food additives and preservatives (induced by artificial preservatives).

Food distributors are facing difficulties with regard to the safety and quality of their products due to the rising demand for ready-to-eat fresh food products. (Daniel, 2007 & Heldman 1994). Artificial preservatives address some of these issues by extending the freshness of foods, but they may also have unfavorable side effects. To stop botulism, sodium nitrite is a preservative used in lunch meats, hams, sausages, hot dogs, and bacon.

Sodium nitrite performs the crucial task of preventing the growth of the bacteria that cause botulism, but it can also interact with proteins or create carcinogenic N-nitrosamines when food is cooked at high temperatures11. Moreover, it has been connected to cancer in lab animals (Antinoro, 2008). It has been discovered that the frequently used sodium benzoate can keep canned tomato paste fresh for an additional 40 weeks without sacrificing quality. Yet, when mixed with vitamin C, it can create the carcinogen benzene.

Although many food producers have changed their goods to exclude this combination, there is still a risk (Kumar et al, 20013). Sodium benzoate consumption may also result in hyperactivity. The possibility that preservatives and other food additives can contribute to hyperactivity has been a topic of discussion for more than 30 years.

According to RDC n° 65, dated November 29, 2011 (ANVISA), the maximum limit of sodium benzoate as preservative is 0.05 g/100 mg or 0.05 g/100 mL (Zhang and Ma, 2013). According to the European Food Safety Authority (ESFA), the Lethal Dose (LD50) for the preservative is 2000 mg.kg-1 (EFSA, 2017). According to reports, tiny doses have little to no effect while oral amounts of 8 to 10 g can cause nausea and vomiting (Nair, 2001). Although it has been accused for being careless in its judgements in light of publications that show discrepancies, the FDA has never imposed a restriction for sodium

benzoate and considers it to be quite safe (FDA, 2017).

Average consumers are generally never going to exceed the IDA, but significant daily soft drink and juice customers might (Tfouni and Toledo, 2002). Sodium benzoate, a benzyl alcohol metabolite, is quickly absorbed by the digestive tract after consumption and then conjugated with glycine to generate pyruvate in the liver (Pongsavee, 2015). This conversion takes place over the course of two steps in the mitochondria (Bridges et al., 1970). As soon as the preservative enters the cell, process 1 uses an ATP-dependent acid to change it into benzoyl-CoA.

For curing meat products, nitrates and nitrites are utilized as additives. Yet, occasionally it reacts to produce urticarial, itching, and anaphylaxis in people. To prevent botulism, sodium nitrite is added to meat products before cooking. But, at high temperatures, it combines with the proteins to create carcinogenic N-nitrosamines, which have been associated to several malignancies, including liver cancer, intestinal cancer, and esophageal cancer (Anon 1991 & Theron 2007).

Asthma patients must absolutely avoid meals containing benzoates because they make their disease worse. In other circumstances, benzoates have also been linked to flushing, chronic urticarial, and rhinitis (Sharma, 2015). Long utilised as a self-life enhancer, sodium benzoate has been discovered to produce carcinogenic benzene when combined with ascorbic acid or vitamin C. Benzene is present in modest amounts, yet it is nevertheless a risk factor for cancer (Jha, 2013). Moreover, benzoates have been linked to brain injury.

Sorbates can cause urticarial and contact dermatitis in some cases. (Kinderlerer, 1990). Peas and other crops are typically coloured with copper sulphate. It has been discovered that adding copper to vegetables creates a chemical that is difficult for the body to absorb (Elhikim, 2007).

CONCLUSION

Food preservation offers a chance to shift alternative food practises away from a politics based on ties to oneself, others, and the land to a politics based on relationships to self, others, and the earth, allowing activists to connect more deeply to the goals of food movements. Although using preservatives carries some danger, their importance and value to the packaged food industry cannot be understated. To identify the natural and safe preservatives like nisin peptide, much research is required. The food maker should pay special attention to the creation of healthy preservatives because it has been shown that combining different preservatives can increase the product's quality and health advantages as well as its shelf life.

REFERENCES

[1] Abdulmumeen, H. A., Ahmed N. R., and Agboola R. S. 2012. Food: Its Preservatives, additives and applications. Int'l J of Chemical and Biochemical Sciences. 1:36-47

[2] FDA. 1993. Toxicological principles for the safety assessment of direct food additives And color additives used in food (draft), "Redbook II." U.S. Food and Drug Administration, Center for Food Safety and Applied Nutrition.

[3] Mirza S. K., Asema U.K. and Kasim S.S. (2017) To Study The Harmful Effects Of Food Preservatives On Human Health, Journal of Medicinal Chemistry and Drug Discovery, 2, 610-616.

[4] Behall K. M., Whole food. Journal of American College of nutrition, (2000), 19(1), 61-70.

[5] Silva M M and Lidon F. C. (2016) Food preservatives – An overview on applications and side effects. Emirates Journal of Food and Agriculture. 28(6): 366-373.

[6] Daniel. M (2007). Reactions to Food Additives and Preservatives.

[7] Heldman E.R, Frozen Foods: Challenges for the future, Food Australia, (1994), 45(8), 374-380.

[8] Anon. M. I. (1991). Food Irradiation – A technique for preserving and improving the safety of Food, WHO, Geneva.

[9] Antinoro, L. (2008). EN Rates 12 Common Food Additives As Safe Or Sorry Ingredients. (Cover story). Environmental Nutrition, 31(5), 1-4.

[10] Kumar, H., Jha, A., Taneja, K. K., Kabra, K., & Sadiq, H. M. (2013). A Study On Consumer Awareness, Safety Perceptions & Practices About Food Preservatives And Flavouring Agents Used In Packed/Canned Foods From South India. National Journal of Community Medicine, 4(3), 402-406.

[11] European food Safety Authority (EFSA) Regulation (2017). Regulation n°1333/2008.

[12] Food and Drug Administration of the United States of America (FDA)(2017).

[13] Nair B (2001). Final report on the safety assessment of benzyl alcohol, benzoic acid, and sodium benzoate. Int. J. Toxicol. 20(3):23-50.

[14] Tfouni AS, Toledo MC (2002). Estimates of the mean per capita daily intake of benzoic and sorbic acids in Brazil. Food Addit. Contam. 19(7):647-654.

[15] Pongsavee M (2015). Effect of sodium benzoate preservative on micronucleus induction, chomosome break, and Ala40Thr superoxide dismutase gene mutation in lymphocytes, Biomed. Res. Int. 2015:1-5.

[16] Bridges JW, French MR, Smith RL, Willians RT (1970). The fate of benzoic acid in various species. Biochem. J. 118(1):47-51.

[17] Anon MI. Food irradiation – A technique for preserving and improving the safety of Food. WHO, Geneva; 1991.

[18] Theron MM and Lues JF.(2007) Organic acids and meat preservation: A review. Food Rev Int.; 23:141-158.

[19] Sharma S. (2015) Food preservatives and their harmful effects. Int J Sci Res Pub.; 5(4):1-2.

[20] Jha KH, Taneja A, Kabra KK, and Sadiq HM.(2013) A study on consumer awareness, safety perceptions and practices about food preservatives and flavoring agents used in packed/canned foods from South India. National J Community Med.; 4(3):402-406

[21] McCann D, Barrett A, Cooper A, Crumpler D, Dalen L, Grimshaw K, Kitchin E, Lok K, Porteous L, Prince E, Sonuga-Barke E, Warner JO, Stevenson (2007). J. Food additives and hyperactive behaviour in 3-year-old and 8/9-year-old children in the community: A randomised, double-blinded, placebo-controlled trial. The Lancet.; 370(9598):1560-67.

[22] Kinderlerer JL, Hatton P. (1990) Fungal metabolites of sorbic acid. Food Addit Contam.; 7(5):657-69.

[23] Elhkim MO, Heraud F, Bemrah N, Tanaka T and Ogata A.(2007) New consideration regarding the risk assessment, intolerance reactions and maximum theoretical daily intake in France. Regulatory Toxico Pharma.; 43(3):308-16.