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IMPACT OF FOOD ADDITIVES ON HUMAN HEALTH: A DISCUSSION

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Abstract:
The researcher's goal in writing this essay was to examine how food additives affect people's health. It also covers the many kinds of food additives. Additives are chemicals added to food in order to enhance its flavour, texture, appearance, or shelf life. They are an essential component of the contemporary food business and have been used for ages to improve and preserve food. While a large number of food additives are safe and have regulatory agency approval, some have been linked to negative health outcomes. This has raised questions about the safety of food additives and the need for laws to guarantee their proper usage. In order to avoid negative consequences, "the research recommends that food safety monitoring authorities should constantly monitor and direct the management and regulation of national and international health authorities while operating under the auspices of the World Health Organization (WHO)".
Keywords: *Food Additives, Quality, Management, Transportation, Distribution,*

Introduction:

Foods were cultivated and consumed straight from the comparatively clean Earth in the past. Repaired lakes, rivers, and seas provided us with wholesome fish. Town marketplaces exchanged a variety of items among a diverse range of people, farming advanced, trade specialties' emerged, and the globe expanded as the human population increased. Pickling, salting, and smoking are examples of food preparation and preservation techniques that were created in response to the emerging issues of food waste, storage, and food-borne diseases. The current food business is becoming more and more dependent on processing and additives due to advancements in technology. The food business has been developing new chemicals to alter, preserve, and modify our food for decades. Through the application of chemicals, scientists can imitate the tastes of nature, give food a more ―natural‖ or ―fresh‖ appearance, extend the shelf life of food, and produce customized versions of breads, crackers, fruits, vegetables, meats, dairy products, and numerous other frequently used foods[1].

Special chemicals known as food additives are intentionally added to our food supply and are intended to be present in the food when it is consumed. Preservatives to prolong shelf life; colouring and flavouring to enhance appearance and taste; and dietary supplements, such as vitamins and minerals, are examples of additives. Indirect food additives can include impurities from the production, storage, and packaging processes. Generally speaking, food additives are meant to provide significant advantages to food producers or consumers. However, sometimes these additions have unfavourable or unhealthy impacts. Food additives may have unfavourable consequences when they are used excessively, unintentionally, at the wrong time of manufacture, processing, or storage, or when their purity or quality is compromised[2].

"Since the 20th century, sustained research innovations and advancement in food technology have led to introduction of over 3000 natural and artificially made substances that are added to food during preparation or processing to impart specific desirable characteristics"[3] . Many of these ingredients have little to no nutritional value, but they are added in trace amounts when food for humans and animals is processed, seasoned, packaged, stored, or displayed. Food additives have been shown to be helpful in preserving the food supply chain and bringing convenience by preparing nutritious, safe, and enticing meals that are ready to eat

[1] Kyaw Myint Oo 2019
[2] Food Additives 2018
[3] "Griffiths JC, Borzelleca JF. Food additives. In: Encyclopedia of Toxicology. Third ed. 2014. pp. 622-627"

from farm to fork. The history of food production, storage, and consumption, as well as preservation, flavouring, pest control, and quality assurance, all depend heavily on chemistry[4].

Conceptual Framework:

Any item that is not typically taken as food on its own but is purposefully added to food in modest amounts such that it does not define or form a substantial component of the meal—regardless of whether or not it has nutritional value—to achieve a particular desired effect is considered a food additive[5]. "The purpose of food additives may be to enhance or maintain some food characteristics that consumers demand; whether physical, chemical, biological, or sensorial characteristics"[6] . Apart from the particular desired effect it produces, a food additive does not fulfil the requirements to be considered a key ingredient or a distinctive nutritional component of the food in question, even whether it is a naturally occurring or artificially made material.

A food additive is any substance or combination of substances that are added to food as a consequence of any step in the manufacturing, processing, storage, or packaging process and are not considered fundamental foods, according to the definition provided by the Food and Drug Administration of the United States and the Food Protection Committee.

Additional ingredients added to food in order to improve its flavour or retain its appearance are known as food additives. "Certain additions have been used for decades; pickling (preserving food with vinegar), salting (like in bacon), canning sugary foods, and using sulphur dioxide (like in certain wines) are just a few examples. Many additional additives, both natural and artificial, have been added during the second half of the 20th century with the introduction of processed foods"[7].Food Additives are defined by the United States Food and Drug Administration (FDA, 1993) as "any substance, the intended use of which results or may reasonably be expected to result, directly or indirectly, in its becoming a component or otherwise affecting the characteristics of any food". Put otherwise, an additive is any material that is included into food. Chemical compounds added to food on purpose, either directly or indirectly, in known proportions to aid in food processing, food preservation, or to enhance food taste, texture, or appearance are sometimes referred to as food additives[8].

Significance of the Study:

Certain food additives, such as sugar, salt, spices, vinegar, and sulfites, have been employed as preservation agents since ancient times. However, the use of chemicals and preservatives is crucial to preserving the food's flavour and quality and preventing bacterial and yeast deterioration when it is to be kept in storage for an extended length of time. When added, food additives—whether manufactured or fresh—become distinctive elements of the dish. Food additives provide a means of reducing food loss and waste while simultaneously maintaining the supply of easily accessible, reasonably priced, and nutrient-dense food for human consumption, thereby feeding the globe. In the 20th century, food technology advanced significantly, resulting in the development of approximately 3000 natural and artificial compounds that are added to food during processing or preparation to give it certain, desired qualities. Though the use of food additives has aided in the food industry's explosive expansion, there have also been unintended health effects that raise concerns for the general public's health. Given that the primary emphasis of the research is the risks posed by food additives, the current investigation is sufficiently noteworthy in this respect.

Objectives:

The researcher's goal in writing this essay was to examine how food additives affect people's health. It also covers the many kinds of food additives.

Discussion:

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[4]" https://www.fda.gov/food/food-ingredients-packaging/overvie w-food-ingredients-additives-colors.[Accessed: 23 Sep 2022]"

[5] *"file:///C:/Users/Kim/Downloads/CXS_107e.pdf. [Accessed: 22 Sep 2022]"*

[6] "Velázquez-Sámano G, Collado-Chagoya R, Cruz-Pantoja R, Velasco-Medina A, Rosales-Guevara J.Hyper-sensitivity reactions to food additives. Allergy. 2019;**66**(3):329-339.DOI: 10.29262/ram.v66i3.613"

[7] "Boca Raton and Smoley, 1993)"

[8] Daniel, 2007

Need For Adding Food Additives:

Food deterioration may be prevented during production, distribution, and storage by using additives. The objective of food additives is to preserve or enhance the texture, consistency, appearance, and other technical needs of food. Vitamins, minerals, herbs, salt, spices, yeast, hops, starter cultures, malt extract, etc. are not considered food additives[9]. A lot of foods don't store well, especially ones with high moisture content. Every food is vulnerable to microbial invasion. Foods high in fats or oils become rancid easily, especially in humid environments. Preservatives must be added in order to protect food quality against substances that cause this kind of degradation. In addition, additives are employed to provide food colour, aroma, hardness, and the ability to slow down or speed up chemical reactions[10]. Food additives are used to preserve food's nutritional value, improve food stability and reduce waste, enhance food presentation, and provide effective assistance with processing, packing, and transportation.

Types of Food Additives: Colouring Agents:

These consist of colour fixatives, stabilisers, and agents that retain colour, among others. They are made up of both artificial and natural colourants. Most people won't purchase or eat particular goods without specific hues, even though most colours have little nutritional benefit. Therefore, colouring is often added to food preparations to either give them the expected natural hue or to replace the natural colour lost during food processing. Food additives also include a variety of naturally occurring food colours that are taken from seeds, flowers, insects, and foods. The seed coat of the South American lipstick pod plant Bixa orellana is the source of bixin, one of the most well-known and widely used red colours. It is not thought that bicin causes cancer. However, annatto dye, a yellow to red colouring substance made from the orange-red pulp of the seeds, is the plant's main application worldwide. For colouring purposes, anato has been added to butter, cheese, margarine, and other foods. Margarine has another yellow hue, which is a carotene produced from carrots. Food colouring has been achieved by the use of saffron, which has flavour and colouring qualities. The spice turmeric is responsible for the distinctive colour of curries, some meat items, and salad dressings. Among the natural hues used as food additives include a natural red colour, cochineal (also known as carnum), which is extracted from the female coccus cactus bug, grape skin extract, and caramel, a brown colour made from burned sugar. These are used to enhance the visual attractiveness of food and give certain meals a hue that people identify with a specific flavour (green for lime, red for cherries, etc.). Food colouring examples include carmosine and erythrosine. It is known that colour additives have a significant role in many of the foods we consume[11].

Nutrient Supplements:

Supplemental nutrients make compensate for lost nutrients during processing or storage, or they guarantee a better nutritional content than what might have been found in nature. Certain nutrients may be lost during food processing, and additives may be added to restore the meal's natural nutritional content. For instance, the dark, vitamin- and mineral-rich portion of the grain is removed during the milling process of wheat to create white flour. Thiamine, nicotinic acid, iron, and calcium are added to the flour to replenish its nutritional content. Citrus fruits that have been canned also have vitamin C added to them to replace the vitamin that was lost during processing[12].

Preservatives:

Any agent that may prevent, delay, or stop the development of microorganisms, stop any food degradation caused by them, or hide the signs of such deterioration is considered a preservative. Roughly 25% of the food produced worldwide is thought to be wasted due to microbial deterioration. Chemical preservatives disrupt the genetic systems, enzymes, and cell membranes of microorganisms. Both artificial and natural preservatives, such as sugar, salt, acids, and so on, are employed as preservatives. Preservatives are added to food to prolong its safe-use period by delaying spoiling, preserving taste and colour, and preventing rancidity

[9] "Pandey, R. M. and Upadhyay, S. K., 2012"
[10] "Theron, M. M. & Lues, J. F. (2007)".
[11] McCann *et al*., 2007 & Barrows *et al.*, 2003
[12] Sunitha and Preethi, 2000

in oils. Foods, including cured meats, are shielded by preservatives from harmful chemicals that may cause food poisoning illnesses like botulism[13].

Flavours and Flavour enhancers:

The compounds, both naturally occurring, that give almost all of the foods in our diet its distinctive taste when added are known as flavouring additives. By working in concert, flavour enhancers may bring out the tastes of other substances. They are not flavourings in and of themselves. The biggest class of food additives consists of taste and flavour enhancers. Spices, herbs, roots, and essential oils are examples of natural tastes that have been added to food in the past. There is a very little quantity of flavouring component in the tastes, and they are scarce. A tonne of various spices would be required to yield 1 g of the flavour compounds, and in some situations, only 0.1 g can be extracted. Thus, artificial flavourings are replacing natural food flavours. Ethers, alcohols, ketones, aldehydes, and esters are the agents that give food its taste. It is simple to synthesise these materials and replace natural ones with them. Amyl acetate for bananas, methyl anthranilate for grapes, ethyl butyrate for pineapples, and so on are examples of synthetic taste enhancers. The majority of artificial tastes are often blends of many ingredients. One counterfeit cherry taste, for instance, has fifteen distinct esters, alcohols, and aldehydes in it. Monosodium glutamate (MSG), the sodium salt of the naturally occurring amino acid glutamic acid that may be generated by the bacteria Corynebacterium glutanicum, is one of the most well-known, extensively used, and sometimes contentious taste enhancers[14].

Harmful Effects of Food additives on Human Health:

The rising demand for fresh food goods that are ready to eat has presented food distributors with difficulties concerning the safety and calibre of their products[15].

1. Man-made food Colours may be carcinogenic and may trigger allergies, asthma attacks, and hyperactivity.
2. In the body, nitrites and nitrates may transform into nitrosamines, which have the potential to cause cancer.
3. Reactions such as allergies and asthma may be brought on by sulphites, or sulphur dioxide.
4. Sugar and sweeteners may lead to Candida (yeast) growth, elevated triglycerides (blood lipids), diabetes, hypoglycemia, obesity, and dental cavities.
5. Artificial sweeteners, such as aspartame and saccharin, may be carcinogenic and may result in behavioural issues, hyperactivity, and allergies. Pregnant women and children should not consume any artificial sweeteners, according to official advice.
6. Common allergy and behavioural responses, such as headaches, lightheadedness, and chest pains, may be brought on by MSG (monosodium glutamate).
7. Preservatives may trigger hyperactivity, allergic responses, and may even be carcinogenic; BHT may be harmful to the liver and brain system.
8. Allergy or behavioural responses may result from artificial flavours.
9. Blood pressure spikes and fluid retention are two possible effects of salt.

Food Additives and Malnutrition

Subclinical malnutrition and unsuitable diets may arise from the loss of food's nutritional content, which is another concern associated with additives. The widespread use of food additives has been linked to malnutrition in the following ways: high levels of salt, sugar, and fat are present in the majority of foods containing additives.

By definition, pure sucrose is exclusively made up of calories and zero nutrients; fat, on the other hand, has a high calorie content and very little nutrition. Furthermore, the majority of foods containing chemicals are processed foods, which have had a significant amount of their nutritious content removed during the manufacturing process.

The ratio of vital nutrients to calories is often remains fairly low, even with the occasional addition of vitamins and/or minerals to certain meals after processing, leading to a high calorie but low

[13] "Sunitha and Preethi, 2000"

[14] Lindernann, 2002 & Chiaki, 2009; Yamaguchi, 1998 and Kurihara, (2009).

[15] "Kumar, H., Jha, A., Taneja, K. K., Kabra, K., & Sadiq, H. M. (2013)".

nutritious intake. Due to its high calorie and low nutritional content, this kind of food may promote subclinical and/or marginal malnutrition, which is less than ideal nutrition[16].

Conclusion:

Many health hazards, including those related to allergies, asthma, cancer, irritable bowel syndrome, mood swings, skin irritations or responses, constipation, migraines, autism, sleep disturbances, and nasal congestion, have been linked to a variety of dietary additives. This means that even while the use of food additives in industry is unavoidable due to their cheap cost, low calorie content, low tailor-made meals, and longer shelf life, more study and stringent regulations are needed. For these reasons, in order to avoid negative impacts, food safety monitoring authorities operating under the auspices of the World Health Organization (WHO) should constantly oversee and direct the regulation and supervision of national and international health authorities. Whenever possible, switching to organic foods has proven a long-term method to halt or reverse these impacts.

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