PIJAR
Parveshana International Journal of Ayuredic Reserach
www.pijar.org
ISSN:2456:4354

ADDITIVES IN THE NAME OF AUGMENT, A REVIEW ON FOOD ADDITIVES

Dr Sathwik M S[1] Dr Smitha Bhat U.S[2]
[1]3 rd. Year PG scholar,[2] Assistant Professor, Department of PG studies in Swasthavritta & Yoga, Alva's Ayurveda medical college Moodbidre, Karnataka, India.
DOI: https://doi.org/10.47071/pijar.2020.v05i05.019

ABSTRACT
Food is considered as one of the most important factors in life and it is believed that the normal and abnormal physiological functioning mainly depends upon the quality of food consumed. Consumption of proper diet in appropriate manner may offer good health status while intake of unwholesome food stuffs can lead to disease condition[1]. As the dietary pattern of the population has been changing in order to meet the demands of a modern and globalized world, they preferred to consume more of easy and instant food product with attractive colour and appearance. To meet the consumer demand for instant, attractive and appealing food product, companies started producing more of ready to eat food and flavoured packed food products, to make all these happen they started adding food additives like preservatives, texturizing agent, colouring agents and flavouring agents[2]. The use of food additives has increased greatly in the recent years, and as a result increased health hazards like hypertension, food allergy, asthma, metabolic disorders, hyperactivity in children's, carcinogenicity and gastrointestinal diseases are also increasing. Giving this foremost importance it is necessary for creating proper awareness and educating the community regarding pros and cons of food additives and its health hazards.
Key words: food additives, health hazards, food safety and awareness.

INTRODUCTION

The concept of adding 'non-food' substances to food products is not a new practice, pickling is an ancient culinary practice aimed at preserving food article like mango and lime for fairly long period by the addition of salt and spices. In recent years due to rising population and greater levels of urbanization have boosted demand for processed food and ready to eat food products, this led to increase the production of synthetic additives[3]. The main purpose of using food additives is to enhance the shelf life, prevent food from getting degraded, giving them desired taste, colour and texture. Majority of the processed foods such as breads, biscuits, cakes, sweets, jams, jellies, soft drinks, ice creams, ketchup and refined oils contains food additives. Food industries claim that by

using additives the quality of the food will increase and safe for consumption but it is safe only when its added with minimal quantity and according to government guide line, it is estimated that each person may consume 3.6 to 4.5 kg of food additives per year on average[4]. It is expected that the food additive market will hit production of 12.82 billion US dollar by 2024.

As food additives are added intentionally to food, it is essential to know their properties to ensure their adequate and safe use, the assessment of the food additives worldwide supported by the control system of the acceptable daily intake (ADI) and developed by Food and Agricultural organisation (FAO) and World health organisation (WHO) at globally[5]. In India there are two regulations, one is the Prevention of food adulteration act and second one is Fruit products order under Food Safety and Standard Authority of India (FSSAI)[6].It is necessity of time that healthy awareness regarding food safety the pros and cons of packed food product the information hidden in food labelling and types of food additives and its health hazards for building up better future.

MATERIALS AND METHODS

MATERIALS

The article is based on the review of literature from the different modern text books, journals and internet sources.

FOOD ADDITIVES

Food additives are non-nutritious substances which are added intentionally to food, generally in small quantity, to improve its appearance, flavour, texture, and storage properties. These additives classified as synthetic additives and natural additives[7].

History of additives: The using of food additives is not a new practice it has been used from many centuries, as great civilisation developed, population grew and so did the demand for food. In ancient Egypt, where the climate was not conductive to food storage, especially due to the heat, people started looking for ways to extend the usability of products. Common practices included the addition of salt, drying in the sun, smoking meat and fish, pickling, and burning sulphur during vegetable preservation. It is said to be during 3000 BC Romans are the one who introduced flavours and colours to food

to increase the taste and to make food more attractive[8]. In modern era in the year 1945, during second world war there was acute shortage of food and to keep food for longer periods people have started using more of preservatives, this has led to modern food revolution and food industial companies started producing more of processed food adding different types of synthetic additives.

Purpose of food additives: The demand for the processed food, ready to eat and packed food forced the food industrials to produce food products with increased shelf life, that led to adding synthetic preservatives. Consumers perception is usually influenced by the appearance of the food, especially children's, so make food more attractive and appealing food industries started adding more synthetic colours to food products. To increase the taste and consistency, they started adding artificial sweeteners and texturizing agents, which increased choice of food with availability of non-seasonal foods at any season.

Preservatives: Preservatives are substances or chemical that is added to food and beverages to prevent decomposition by microbial growth or by any undesirable chemical changes. These are antimicrobial, anti-browning and antioxidant agents[9]. Sodium benzoate is one of the most used preservatives in processed food, beverages and including packed Ayurvedic medicines. Other examples, like tomato sauce, which is rich in ascorbic acid will react with added preservative sodium benzoate and form Benzene, it is a carcinogenic agent which increases the risk of carcinogenicity in humans [10].

Nutritional additives: Nutritional additives are added to restore vitamins and other nutritional qualities which may have been lost or degraded during processing. It includes both vitamins and minerals[11]. Now at market we can see there are many food items which we purchase looking at the advertisement claiming that they are rich in vitamins and minerals, it has become the trend in the community to blindly following the statements given by the food industries.

Colouring additives: Colour additives are any dye or pigment or substance that imparts colour when added to food or drink this makes the

food more attractive, appealing, appetizing and informative[12]. The colour has influenced our mind in a huge extent that when we think of any food product, the two things that suddenly come to mind is its taste and its attractive colour. Colourings agents like Red 40 and yellow 5 will cause behavioural changes in children because they may cause chemical changes in the brain, inflammation from an allergic response, and the depletion of minerals will lead to Attention Deficit Hyperactivity Disorder (ADHD)[13].

Flavouring additives: Flavours are used as additives to enhance, modify the taste and aroma of food product[14]. Ajinomoto is one of the familiar names since many years. It is a Japan food and biotechnology corporation product, Ajinomoto also known as Monosodium glutamate is one among them which is used as flavouring agent and taste enhancer. Research has proved Monosodium glutamate will increase the risk of carcinogenicity. Monosodium glutamate is more used in Chinese restaurant, and the people who consume from Chinese restaurant on daily basis had the symptoms of head ache, muscle tightness, weakness, this is known to be Chinese restaurant syndrome[15].

Texturizing additives: Texturizing additives are chemical substances added to food for the purpose of improving the texture and appearance of the food[16]. Gelatine is one of the most used texturizing agents in most of ice creams, cakes, cheese, corns and soft drinks. Gelatines are made up of skin, tendon, bones of pigs and cows, but still food products which is added with gelatines are labelled with vegetarian symbol, most of the vegetarians are not aware of this and they will consume these types of food product unknowingly[17].

Miscellaneous additives: Other numerous chemicals are added to food products for various processing aids such as chelating agent, enzymes, anti-forming agents, catalysts, various solvents, lubricants and propellants[18]. Carbonic acid is added to soft drink to make it fizzy, when the bottle is opened, the pressure decreases and the carbonic acid changes into carbon dioxide and water making it fizzy. More use of carbonic acid will increase the risk of Gastrointestinal diseases[19].

Risk of additives: Daily and continuous use of these food additives

will increase the risk of health hazards like obesity[20], hyperactivity disorders, allergic reactions, gastrointestinal disease, carcinogenicity. Sweetening agents like and High fructose corn syrup increases risk of cardiovascular diseases[21]. Butylated hydroxytoluene (BHT) like synthetic phenol derivatives cause artificial rashes, vomiting and allergens. Artificial colouring agents like red 40, yello5 are main cause of Attention Deficit Hyperactivity syndrome among children[22]. Monosodium glutamate and artificial sweeteners increase the risk of adult obesity. Excess usage of Titanium dioxide the colouring pigment led to colitis.

Even though there are many researches proved the risk and negative impact of chemical additives, there are few hard realities which are still happening in our country. One among them is ban of famous noodles company in India, due to presence of Monosodium glutamate (MSG) and impermissible levels of lead. This instant noodle, which became India's favourite since its arrival due to its taste and easy to cook snack. The incident happened during routine inspection of food samples done by a food safety and drug administration officer of Utter Pradesh state, who collected samples of noodles from a store on March 10th 2014, the test revealed that, sample contained 17 ppm, it is 1000 times than that of permissible limit. The discovery of harmful chemical in the popular snack triggered the suspicion in the rest of the country, according to the instruction given to the government by the Food Safety and Authority of India (FSSAI) to conduct the tests, samples collected from random store all over the India, which revealed that 10 out of 13 samples failed the laboratory test and were found to be unsafe. FSSAI banned that company all over India by June 2015 alleging it contained harmful Monosodium glutamate and excess lead, latter the company decided to wide recall of the instant noodles off the shelves. The company moved the supreme court after the National consumer disputes Redressal Commission (NCDRC) entertained the centre's class action suit and ordered fresh lab test. The supreme court then on January 13, 2016, asked Central Food Technological Research Institute (CFTRI) Mysuru to test noodles sample

afresh and report was submitted on April, 2016 with report found lead content in noodles to be with in the limit. By the end of the 2016 Maharashtra high court lift the ban on company and came to market more powerful than before with different flavours[23].

Another incident is that of bread product, bakery items especially breads in order to increase its texture, food industries add potassium bromate, researches said to be it is one of carcinogenic agents. The study conducted by the Centre for Science and Environment (CSE) has found that among 38 commonly available bread brands contain 84% of potassium bromate, July 2016 Food Safety and Standard Authority of India (FSSAI) banned potassium bromate in India[24].

Again, a recent incident happened were, Formalin one of the liquid preservatives which is used for preserving cadaver and specimens, recently Kerala food safety department officials seized nearly 9,600 kg of fish preserved in formalin at a border check post in Kollam district. The seize was part of the 'operation sagar rani'. Consumption of formalin laced fish lead to increased risk of cancer, allergic and gastrointestinal distress[25].

NATURAL FOOD ADDITIVES

Natural food additives are substances found naturally which are obtained from other food, which is to be used in another. In a time where the public is more aware and interested with what they eat, natural additives have been gaining interest both from the food industries and the consumers. Some recent studies have shown that consumers prefer food prepared with natural additives rather than chemical ones, due to health reason and risk of synthetic additives[26].

Salt has been used as preservative for ages, salt draws water out of food and dehydrates it, all living things require water and cannot grow in the absence of water including bacteria, high salt is toxic to most microbes because of the effect of osmolarity, or water pressure.

Vinegar is made from fermentation of sugar and water solution and it act as an effective natural preservative. The acetic acid present in vinegar inhibit food spoilage.

Cloves have been used for thousands of years in Indian medicines as a natural preservative, containing high amounts of phenolic compounds,

which have antioxidant properties which keep food from growth of fungus and bacteria.

Lemon is used for preservation of food, its juice contains ascorbic acid which is powerful antioxidants that prevents spoilage and rotting, draws out water content and balance the p^H factor and natural acids in food.

Annatto is an orange red condiment and food colouring derived from the seeds of the achiote tree, it is often used to impart a yellow or orange colour to foods and it can be used for flavour and aroma.

Turmeric powder can used as colouring agent, the staining property of turmeric can be employed in various histochemical techniques and it can be a potential replacement of synthetic dyes.

Spices like Cardamom, cinnamon, cloves, coriander, cumin, saffron and pepper is used as natural flavouring agents[27].

DISCUSSION

Food safety is not the responsibility of government alone, its responsibility of everyone, knowing all the fact and health hazards of chemical food additives, it is important to know the preventive aspect. Food industries should be responsible enough to add minimal quantity of additives according to the government guidelines, there are set of additives which government has accepted as safe[28]. Food and safety department is the one which gives permission for marketing the foods. They should be aware of malpractices happening in food industry and they should conduct regular food inspection. Proper education and awareness should be given to public about health hazards of chemical food additives. The way to reduce chemical additives is, people should reduce the intake of processed and ready to eat foods and should eat the healthy and local available organic foods. Should give the preference to seasonal foods rather than chemical preserved packed foods, start to use more natural available additives rather than chemical additives. One who consumes packed food products, should be aware of the food labelling and its content. Because food labelling is the only source which contain the information of packed food product. It helps to consumers to know the added additives. There are few commission and regulation which control the food labelling. Codex Alimentarius

commission (1963) is a commission which is established by World Health Organisation (WHO) and Food and Agricultural Organisation (FAO), to protect consumers health and promote fair practices in food trade. Codex Alimentarius commission is the one which introduced International Numbering System (INS) for food additives in Worldwide, because the name of the additives often lengthy and complex chemical structure, so it is difficult to understand for common people and to make it more familiar and easier to identify INS number introduced. INS numbers are divided according to the additives[29].

INS number

Additives	INS number	Example
Colouring additives	INS 100-182	Yellow 5 INS 102
Preservatives	1NS 200-330	Sodium benzoate INS 211
Texturizing additives	INS 331-580	Sodium phosphates INS340
Flavouring additives	INS 620-915	Monosodium glutamate INS 611
Miscellaneous additives	INS 916-1529	Calcium iodate INS 916

Table no.1 INS number

In the year 2011, Food Safety and Standard Authority of India (FSSAI) has passed regulation in India that all packed food product must contain detailed food labelling[30]. Food and Drug Admistartion (FDA) has introduced Nutritional supplement label (2016)[31], this make nutritional label compulsory in all packed food product. There are few things must be labelled in the packet.

Food labelling

1.Name of the food	6. Indication for minimum durability	11. Nutritional information
2.List of ingredients	7. Storage condition	12.Voluntary labelling (veg or non-veg)
3.Quantity of ingredients	8. Name of business and address	13.FSSAI Lic no
4. Net quantity	9.Place of origin	
5.Instruction for use	10.Food allergens	

Table no.2 Food labelling

Increased population, socioeconomic progress, disease and constantly changing pace of the life and lifestyles of consumers worldwide required food to be improved and tailored to meet the needs of purchasers. The produced food is convenient, attractive, tastier and should be enriched, to achieve all these industries should add food additives. Now a days, food additives are very widespread in the human diet, not all synthetic additive are harm

full on human health but most of the synthetic additives are harmful and increase the risk of health hazards when we consume certain combination and in excess quantity. To prevent the malpractices and reduce the usage of synthetic additives there should be strict rules and regulation from the government side, there are few commission and organisation which ensure the food safety at global level, that is Codex Alimentarius commission, Food and Agricultural organisation (FAO), Food and Drug Admistartion (FDA). Food and safety department and Food safety and standard Authority of Indian (FSSAI) will regulate food safety in India. With all these evidence about risk of additives and health hazards, still consumers not aware of food labelling and food additives mention in the labelling, it is very important check the additives list, it helps to choose the product with limited amounts of unconventional additives or safer additives. All the additives are not harmful when it added in accordance with government guidelines, but to make more profit industial companies do malpractice to increase the taste, appearance and attract the consumers. Here comes the role of food and safety department, they should implement more rules and strict action to be taken against them, more awareness should be given to public regarding harmful effect of synthetic additives and promote natural additives and local healthy food.

CONCLUSION

Man was always behind the everlasting quest of understanding and discovering new aspects of life, and he never forgot to use his abilities to satisfy one of his most deceiving organs that is tongue. In the search of making food more delicious and attractive he had made significant discoveries and developments. One among them is additives. But the question arises whether these are really needed or are they appropriate for humans or say, are they complementing to the dimensions of health. With the aid of the recent studies we can understand about the ill effects of the additives and the shocking fact how great is the abuse of additives happening on an industrial scale. Now it is up, to us to make a decision whether to flow negligibly with the pace of life, leading us to a fast pace death, or to feast on the

natural delicacies to live a healthy and vibrant life.

REFERENCE

1. Ranjitha Niharia, Assistant professor Government Astang Ayurveda Indore, Mariya Husain, Associate professor Parul institute of Ayurveda, Ayurveda and modern perspective on disease associated with Ahara, A review, Journal of Drug and Therapeutics 9(2) 5/4-516.
2. Mike Saltmarsh and Lynn Insall, Essential guideline to food additives, food additives and why they are used, 4th edition, published by Royal society of chemistry 2013.
3. K. Park, Park's textbook of preventive and social medicine, M/s Banarsidas Bhanot, 24th edition.
4. Bruna G.O, Linke, Thais A.C Casagrande and Ligia A.C Cardaso, Industrial Biotechnology program, Universidade positivio, professor Pedro viriato Forigo, De Souza street, campo, comprido, curritibia, Brazil.
5. https://www.who.in//news-room/Facts-sheets/detail/food additive, food additive, world health organization.
6. https://old.fssai.gov.in, guidelines for food and safety and standard authority of India.
7. Mike Saltmarsh and Lynn Insall, Essential guideline to food additives, food additives and why they are used, 4th edition, published by Royal society of chemistry 2013.
8. Bruce Eaton phd's blog, food additives, bruceeatonphd.worldpress.com.
9. A. Larry Branen, P. Micheal Davidson, Seppo Salminen, John Thorngate, food additives, types of food additives, University of Idaho, Moscow, Idaho.
10. https://www.cancer.org,cancer-causes./benzene.html/ benzene, America cancer society.
11. A. Larry Branen, P. Micheal Davidson, Seppo Salminen, John Thorngate, food additives, types of food additives, University of Idaho, Moscow, Idaho.
12. A. Larry Branen, P. Micheal Davidson, Seppo Salminen, John Thorngate, food additives, types of food additives, University of Idaho, Moscow, Idaho.
13. Garm van de Walles, MS, RD, Red dye 40, safety, side effect, healthcare.com.
14. A. Larry Branen, P. Micheal Davidson, Seppo Salminen, John Thorngate, food additives, types of food additives, University of Idaho, Moscow, Idaho.
15. Zehra Kazmi, Iffat Fatima, Shaghufta Perveen, Salma Shakil Malik, Monosodium glutamate: Review on clinical reports, Microbiology and

Biotechnology research lab, Department of Environmental science, Fatima Jinnah women University, Rawalpindi, Pakistan.

16. A. Larry Branen, P. Micheal Davidson, Seppo Salminen, John Thorngate, food additives, types of food additives, University of Idaho, Moscow, Idaho.
17. https://www.aviipgroup.comau/product/gelatine-for-food-additive-11, gelatin for food additive.
18. A. Larry Branen, P. Micheal Davidson, Seppo Salminen, John Thorngate, food additives, types of food additives, University of Idaho, Moscow, Idaho.
19. Philip R. Ashurst, carbonated beverages, Module in food science, 2016.
20. George A Bray, Samara Joy Nielsen, Barry M Popkin, consumption of high fructose corn syrup in beverages may play a role in the epidemic of obesity.
21. Dagfinn Aune, Soft drink, aspartame, and the risk of cancer and cardiovascular disease.
22. Healthline.com/nutrition/red-dye-40/ Garm van de Walles, MS, RD, Red dye 40, safety, side effect, healthcare.com.
23. https://www.greenoptimistic.com/nestle-maggi-banned-india/ Satya Sivani, The economic Times, the green optimistic, Nestles Maggi banned in India due to excessive chemicals used.
24. https://www.thehindu.com/news/national/use-of-potassium-bromate-as-food-add-on-banned/article14435684.ece use of potassium bromate as food add on banned, The Hindu.
25. https://www.ndtv.com/health/is-my-fish-with-formalin-beware-formalin-laced-fish-could-cause-cancer-1889386. NDTV, July 25, 2018.
26. Ravi Nandi, Wolfgang Boklemann, Nithya Vishwanath Gowdru and Gustavo Dias , Consumers motives and purchase preferences for organic food products; Empirical evidence from a consumer survey in Banglalore, south India, Journal of international food and agribusiness marketing , 2016.
27. https://www.sciencedirect.com/science/article/abs/pii/S0924224415001508. Trends in food science and technology, natural food additives, page 284-295, October 2015.
28. https://old.fssai.gov.in, guidelines for food and safety and standard authority of India.
29. https://www.fao.org-who-codexalimentarius/en/ codex Alimentarius, International food standard food and agricultural organization of the United nations and

world health organization, Nutrition and labeling

30. www.fssai.gov.in food safety and standard authority of India, Ministry of Health and family welfare, packaging and labeling regulation 2011.

31. Revision of the nutrition and supplement fact labels technical amendment by FDA, 2016.

Corresponding author:
Dr SATHWIK M S
FINAL YEAR PG SCHOLOR
DEPARMENT OF PG STUDIES IN SWASTHVRITTA &YOGA,
ALVAS AYURVEDA MEDICAL COLLEGE MOODBIDRI,
KARNATAKA, INDIA
E-MAIL**:** drsathwikms@gmail.com

Published BY:
Shri Prasanna Vitthala Education and Charitable Trust (Reg)

Source of Support: NIL
Conflict of Interest : None declared