

**AN OVERVIEW ON TOXINS IN OUR DAILY FOODS****Jyothi Sajayan<sup>1</sup>, Anusree Mohan<sup>2</sup>**<sup>1</sup>,<sup>2</sup>nd year P.G Scholar, Dept of Agadatantra, SDMCA, Hassan, Karnataka, India.<sup>2</sup>, <sup>2</sup>nd year P.G Scholar, Dept of Agadatantra, SDMCA, Hassan, Karnataka, India.**ABSTRACT**

Health is wealth. For good health nutritious and safe food is required. Scientist and dieticians asked to eat more nutritious food but now a day's food has been intoxicated with many additives, adulterants or pesticide residues etc. This is mainly done for degradation in the quality of food and also for increasing quantity for maximizing the profit. Exposure to toxic elements in food and drinks represents an important public health problem worldwide. Alarming increase in heart attack, stroke, cancer, skin diseases etc also can be attributed to this. This represents a major challenge to general as well as high risk population. Presence of any kinds of toxins in our food has a profound impact in the quality of food. This will directly affect the consumers life quality since both are interrelated.

**Key Words**-Health, Food, Toxins.

**INTRODUCTION**

Food is fundamentally different from any other consumer products, since it is necessary on a daily basis for our growth and development. It is bound up in our culture and tradition. Quality of life largely depends on quality of food and water we consume. Now on 21<sup>st</sup> century, world is becoming more conscious about the nutritional requirements and we are asked to eat more fruits, vegetables, fish, poultry etc. On the other hand, we are warned that these foods contain dangerous toxins. Scientists and health authorities agree that we are enjoying a relatively safe food supply especially when it is stored and prepared properly. Even then microorganisms and chemicals are still present in our food. So obviously consumers are confused. Here arises the question, HOW SAFE IS OUR FOOD? Our daily food is now filled with one or other type of

natural or artificial toxins. Exposure to toxic elements in food and drinks represents an important public health problem worldwide. Alarming increase in diseases like heart attack, cancer, stroke etc can also be attributed to this.

**AIMS AND OBJECTIVES**

This article is aimed to do an overview on toxins in our food which we are exposing daily.

Food is any material usually plant or animal origin that contains essential nutrients such as carbohydrates, fats, proteins, vitamins or minerals and is ingested and assimilated by an organism to produce energy stimulate growth and maintain life.<sup>1</sup>Food is classified on the basis of nutritive value as energy yielding(tubers, cereals, ghee etc.) body building(milk, meat, fish etc) and protective foods (green leafy vegetables, fruits ). Co-

dex classification of food and animal feed classified food as Class A-Primary Food Commodities of Plant Origin. Class B-Primary Food Commodities of Animal Origin. Class C-Primary Feed Commodities. Class D-Processed Food of Plant Origin. Class E-Processed Food of Animal Origin. Another classification based on extent and purpose of processing as Group 1- Unprocessed and minimally processed food. Group 2-Processed cutinary or Food industry ingredients. Group 3-Ultraprocessed food products.<sup>2</sup> Toxins can be small molecules, peptides, or proteins that are capable of causing disease on contact with or absorption by body tissues interacting with biological macromolecules such as enzymes or cellular receptor.<sup>3</sup> Toxins in food can be broadly classified as Natural and Artificial. Natural toxins are chemicals that are naturally produced by living organisms. These toxins are not harmful to the organisms themselves but they may be toxic to other creatures including humans when eaten.

#### **SOME IMPORTANT NATURAL TOXICANTS CEREAL SPECIES**

In *Latyrossativus* (Kesar dal) a toxic compound named BOAA is present which produce Neurolathyrisism. Pyrimidin based toxic glycosides present in Faba beans causes Favism, which manifest as haemolyticanaemia. Ergotamine, a toxic alkaloid found in rye seeds is responsible for producing Ergotism. Pea nut contains *Aspergillus* species fungi Aflatoxin B1, B2, G1, G2 which causes liver and kidney disorders.

#### **FRUITS AND VEGETABLES**

Ackee fruit contain two aminoacids, hypoglycine A and hypoglycine B which is having strong hypoglycaemic action causing vomiting sickness, severe depletion of liver glycogen etc. Potato shoots and green spots on

potato skin contain Solanine, which inhibits the action of neurotransmitters. Two varieties of mushroom named *Aminitamuscaria* and *Aminitaphalloides* contain a toxic alkaloid muscarine, which is hepatotoxic. In spinach Oxalic acid is responsible for binding calcium and iron.

#### **RICE VARIETIES**

Some Rice varieties contain certain organisms like *Islandium*, *Citrinum*, *Citerovirede* and *Rugulosum*, which will produce toxic compounds like *Islandin*, *Citrinin*, *Citroviridin*, *Rugulosin*.

#### **SPICES AND FLAVOURS**

Brown mustard contains a toxic compound, *Sinigrin* (*Allylisothiocyanate*) which is proved as a potent irritant. *Capsaicin*, which is a mucus membrane irritant and vesicant is present in *capsicum*. *Nutmeg* and *mace* contain *myristicin* which causes headache, cramps,nausea etc.

#### **ARTIFICIAL TOXINS**

Any toxic components that get into our food from outside can be considered as artificial toxins. This artificial toxin sometimes added to our food either intentionally or accidently. Adulterants, additives, pesticides etc can be grouped under artificial toxins.

#### **FOOD ADULTERATION**

According to PFA Act 1954, food adulteration includes

- Intentional addition, substitution or abstraction of any substances which adversely affect the quality of food. Incidental contamination of food with deleterious constituents such as toxins, insecticides, bacteria and fungi etc. due to ignorance, negligence or lack of proper storage facilities. Contamination of food with harmful micro organism during production, storage and handling.<sup>4</sup> Main disadvantage of food adulteration is that consumer is paying more money and

getting low quality products. Some form of adulterations are injurious to health even resulting in death.

**SOME COMMON TOXIC FOOD ADULTERANTS**

<b>FOOD ARTICLE</b>	<b>ADULTERANT</b>	<b>HARMFUL EFFECTS</b>
Tea	Tea Coloured leaves, Used teas & Iron Fillings	Liver Disorder
Coffee Powder	Tamarind seed, date seed powder	Diarrhoea
	Chicory powder	Stomach disorder, Giddiness and joint pain
Milk	Unhygenic water & Starch	Stomach disorder
Wheat and other food grains (Bajra)	Ergot (a fungus containing poisonous substance)	Poisonous
Sugar and salt	Chalk powder	Stomach – Disorder
Mustard powder	Argemone seeds	Epidemic dropsy & Glucoma
Vegetable oils	Argemone oil	Loss of eyesight, heart diseases, tumour
	Mineral oil	Damage to liver, carcinogenic effects
	Karanja oil	Heart problems, liver damage
	Castor oil	Stomach problem

<b>FOOD ARTICLE</b>	<b>ADULTERANT</b>	<b>HARMFUL EFFECTS</b>
Asafoetida	Foreign resins galbanum, colophony resin	Dysentery
Turmeric powder	Yellow aniline dyes	Carcinogenic
	Non-permitted colouring agents like metanil yellow	Highly Carcinogenic
	Tapioca starch	Stomach disorder
Chilli powder	Brick powder, saw dust	Stomach problems
	Artificial Colours	Cancer
Honey	Molasses sugar (sugar plus water)	Stomach disorder
Carbonated water beverages	Aluminium leaves	Stomach Disorder

**FOOD ADDITIVES**

Any non nutritious substances which are added intentionally to food, generally in small quantities to improve appearance, flavour, texture and storage properties. Food additives can be classified as Di-

rect/Intentional additives which are generally considered as safe under limited dose and Indirect/Incidental additives that enter through packing, processing ,or farming practices.

**Some harmful food additives in daily use**

<b>Additives</b>	<b>Food articles</b>	<b>Purpose</b>	<b>Harmfuleffects</b>
<b>Sodium Nitrate.</b>	Processed meats	Extend the life of meats, and to prevent the growth of bacteria.	Nitrosamines are formed after eating. These dangerous compounds are highly carcinogenic.
<b>BHA &amp; BHT.</b>	Butter, meats, chewing gum, snack foods, dehydrated potatoes, and even beer.	Used as a preservative to keep food from spoilage.	Proven carcinogens, behavioral changes.
<b>Transfats.</b>	Cookies, crackers, icing, potato chips, stick margarine and microwave popcorn.	Enhance taste	Pose a higher risk of heart disease
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	Cookies, crackers, icing, potato chips, stick margarine and microwave popcorn.	Enhance taste	Pose a higher risk of heart disease
<b>Propyl gallate.</b>	Vegetable oil, meat products, potato sticks, chicken soup base and chewing gum.	Used to prevent fats and oils from spoiling	Carcinogenic
<b>Monosodium glutamate.</b>	Frozen dinners, salad dressings, chips and restaurant food.	Is an amino acid used widely as a flavor enhancer.	Carcinogenic and brain damager
<b>Food colorings (Blue &amp; , Red, Green Yellow)</b>	Cherries (in fruit cocktails), baked goods and candy.	Enhance colour	It causes thyroid tumors in rats,
<b>Aspartame.</b>	Artificial sugar substitute		Migraines, seizures, vision loss and symptoms relating to lupus, Parkinson’s Disease, Multiple

			Sclerosis
<b>Sodium chloride.</b>	Pickles etc	As preservative	Large dose-heart and blood pressure problems, as well as strokes and kidney failure.
<b>Acesulfame-K</b>	Soft drinks and some baked goods.	New sweetener	Carcinogenic
<b>Potassium bromate. (KBrO<sub>3</sub>)</b>	Bread-making process	Oxidizing agent	Carcinogenic and nephrotoxic

### SOME COMMON PESTICIDES USED IN OUR DAILY FOODS

Pesticides	Purpose	Maximum limit	Harmful effects
<b>Pyrethrum</b>	Used as spray on green vegetables	10 ppm	Asthmatic breathing, sneezing, nasal stuffiness, headache, nausea, in coordination,
<b>DDT</b>	Spray for treatment of storage premises	3 ppm	<b>Carcinogenicity</b> Mainly breast ca
<b>Malathion</b>	Spray or dust for tmt of storage premises	3 ppm	Carcinogen
<b>Carbon tetrachloride</b>	As a fumigant on cereals grains etc	-	affect CNS
<b>Hydrocyanic acid</b>	As a fumigant	10 ppm	Confusion. Convulsions. Drowsiness. Headache. Nausea.

### CONTAMINATION OF FOOD BY SOME HARMFUL MICRO ORGANISM

Micro organism	Food involved	Ill effects
<b>Bacillus cereus</b>	Cereal products	Nausea, vomiting, abdominal pain
<b>Clostridium Botulism</b>	Defectively processed meat fish and honey	Botulism
<b>Cl.perfringens</b>	Defectively processed precooked meat	Nausea, abdominal pain, diarrhoea
<b>Salmonella</b>	Defectively processed meat fish and egg, raw veggies grown on sewage	salmonellosis

<b>Shigella</b>	Foods kept exposed to sale in unhygienic conditions	Dysentery
<b>Staphylococcus aureus</b>	Foods kept exposed to sale in unhygienic conditions	Vomiting, abdominal pain diarrhoea
<b>Streptococcus pyogens</b>	Foods kept exposed to sale in unhygienic conditions	Scarlet fever, sore throat

## DISCUSSION

Food is the fundamental need for all the living organism in this world. In our life time we will eat about 70000 meals and 60 tons of food.<sup>5</sup> Over the past few years tremendous progress has been made in food safety, nonetheless micro organisms and chemicals are still present in our food. A technological advanced country such as United States people die from illness that could be prevented by simply cooking food adequately and properly washing hands.<sup>6</sup> 1.5 billion cases of food-borne disease outbreaks are reported, resulting in 3 million death globally.<sup>7</sup> This article focuses on possible toxins in our food and how real they are and its impact on health of an individual. In present era we are exposing to one or other kinds of toxin through our food. We cannot prevent this as a whole, but by following the instructions and guidelines in various food laws we can reduce exposure to a certain extent- World Health Organization has laid down certain golden rules for Safe Food Preparation like<sup>8</sup>

- Choose foods processed for safety.
- Cook food thoroughly.
- Eat cooked foods immediately.
- Store cooked foods carefully.
- Reheat cooked foods thoroughly.
- Avoid contact between raw and cooked foods.

- Wash hands repeatedly.
- Keep all kitchen surfaces meticulously clean.
- Protect foods from insects, rodents and other animals.
- Use pure water.

### *Some take home points*

- Careful selection adequate processing and cooking is required.
- Avoid potatoes which are sprouted greened rotted etc.
- Thoroughly rinse and scrub fruits and vegetables, peel them before eating.
- Remove outer leaves of leafy vegetables like cabbage.
- Trim fat and remove skin from meat, poultry & fish.
- When buying food products, especially perishables, check the product date for safety.
- Keep hot foods hot and cold foods cold.
- Do not leave cooked or refrigerated foods at room temperature for more than 2 hrs.
- Cook food to proper temperatures and use a food thermometer

## CONCLUSION

Food safety is a major and significant public health issue worldwide. The main threat for food safety is the presence of natural toxins in certain food like spinach, mushroom, capicum, peanut etc. Another important issue

is the introduction of additives and adulterants in our edibles. Pesticide residues and toxic minerals can also add upon to our food in one way or other way. This is a major problem which should be checked by proper implementation of rules and instructions in our food laws. There are many number of places in the supply chain that can contaminate food like a sick cow, an over-use of pesticide, poor handling, broken seals etc. So it is our collective responsibility to keep our food safe. Education and public awareness programme should be conducted regularly to prevent a massive attack since a small ignorance can affect a large number of population within a short period of time. So lets us together keep food safe because it is one of our rights to get safe and wholesome food.

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