



“Pesticides Hazard”

Pesticides are one of the major hazards to Food Safety; occurrence of pesticides in food is a matter of great concern. Pesticide includes insecticides, herbicides, fungicides, and various other substances used to control pests.

Pesticide residue refers to the pesticide that may remain on or in food after they are applied to food crop. Exposure of the general population to these residues frequently occur through consumption of the treated food. Several chemical residues especially derivatives of chlorinated pesticides, bioaccumulate to harmful level in the body as well as in the environment. Persistent chemicals can be magnified through the food chain and have been detected in products ranging from milk, cereals and pulses, meat poultry and fish, to vegetable oils, nuts and various fruits and vegetables. The contamination of milk is considered as one of the major cause of concern to public health.



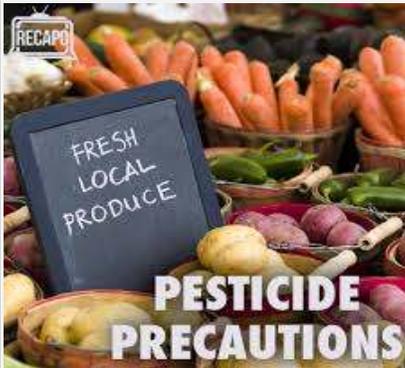
Sources of Pesticides in milk

Milk can be contaminated by residues of organochlorine (OC), Organophosphorous (OP), Pyrethroids and Carbamates through a variety of sources. The dairy animals can be exposed to pesticides through the air, drinking water, forage, feed and fodder. Depending on the type and properties of the pesticides, the residue is excreted in to the milk.

Pesticide Hazard through milk

Presence of toxic residues in milk as well as in vegetables and meat product may cause serious, acute, or chronic health hazard, depending on the length of exposure. Fat soluble pesticides accumulate in animal tissues and are then passed into milk. Higher level of contamination by OC pesticides in bovine milk have been reported in India. BHC is present in 75% of bovine milk, while Methyl Parathion (37.5 %), Dieldrin (12.5%) and 2,4 DDE (12.5 %) exceeding the MRL level.

Types of Chemical pesticides present in milk and milk products



- **Organochlorine pesticides (oc):** Organochlorine is an organic compound containing at least one covalently bonded chlorine atom. **DDT are persistent organic pollutants which are hazardous to the environment.** DDT is found to accumulate in the food chain and cause reproductive problems (i.e. eggshell thinning) in certain bird species.
- **Organophosphate pesticides:** It is a general name of esters of phosphoric acid. It is a group of insecticides or nerve agents acting on the enzyme acetylcholinesterase
- **Carbamate Pesticides:** Carbamates are organic compounds derived from carbamic acid. It includes aldicarb, carbofuran, carbaryl, oxamyl, and methomyl. These insecticides reversibly inactivate the enzymes acetylcholinesterase in the insect thereby killing them.
- **Pyrethroids:** Pyrethroids are insecticides which enter through the porous exoskeleton of the insect. They are axonic poisons and cause paralysis of an organism.



Effects of Pesticides on health

Toxicity can be defined as the ability of a chemical to cause harm to health.

The amount needed to cause harm depends on the chemical nature and the structural characteristics of the chemical. The effect of pesticides can be seen in all age groups but is more fatal to infant and pregnant women.

Following are some major health concern due to residual effect of pesticides:

- **Cancer:** Association of pesticides exposure can cause brain, breast, liver, lungs, kidney, pancreas, prostate and skin cancer. Risk can occur due to residential and occupational exposure.
- **Neurological disorder:** Long term effects of pesticides on the nervous system include cognitive and psychomotor dysfunction and neurodegenerative and neurodevelopmental effects. Pesticide exposure can cause attention deficit, learning disorder, child development disorder and mental disorder.
- **Respiratory disorder:** Pesticides can cause respiratory diseases like asthma, chronic bronchitis, lung disease and respiratory tract allergy.

- **Reproductive disorder:** Pesticides exposure is directly linked to birth defects, death, low birth weight, premature labour and infertility. Pesticides viz. Dibromochlorophane and 2, 4-D can cause infertility in males.

Prevalence of Pesticides Usage in India

Chemical pesticides are used to increase the yields in agriculture by controlling pests and diseases. The use of synthetic pesticide in India began in 1948-49 with the use of DDT for Malaria control and BHC for locust control. India is one of the few remaining countries still engaged in the large scale manufacture, which has to be banned.

Organochlorine insecticides, such as DDT, hexachlorocyclohexane (HCH), aldrin and dieldrin, are among the most widely used pesticides in developed nations; because of their low cost and versatility against various pests. Because of their potential for bioaccumulation and biological effect, these compounds were banned in developed nations two and half decades ago



Effect of Processing on pesticide residue in milk and milk products

Milk is highly perishable food commodity. Raw milk is processed in various forms before consumption and is converted to different forms of milk products viz. cheese, curd, yoghurt and traditional dairy products. **The effect of processing treatments on residues and distribution of pesticides residues in different milk products is essential to determine the degree of hazards cause due to milk and its products,**

Raw milk undergo a numerous processing treatments like pasteurization, sterilization, concentration, separation of fat, fermentation, coagulation, and drying. Depending on the type and nature of pesticides they are transferred from one phase to another or degraded totally or partially to other compounds that may be more or less toxic than parent compounds. Processing of raw milk at 93°C- 100°C for few seconds shows a small effect on beta-BHC and pp'-DDT. Sterilization at 121° C for 15 min showed 83.5%, 91.67% and 68.7% loss of beta- BHC, lindane and pp'- DDT respectively. However pp'- DDD was found in significantly higher concentration in UHT milk.

Occurrence of pesticides in foods is now considered as a formidable threat to public health. Developed and developing nations including India are at greater risk of this hazard and steps are needed to be taken to eradicate this threat. Milk being an essential part of the diet all around the world need to be free from this menace. Effective processing can be seen





Food Safety and Standards
Authority of India

“Food License Number”

According to the Food Safety and Standard Act India (FSSAI) 2006, every food manufacturer should get a license from the Food and Drug Authority or an authority connected to FSSAI. If the food manufacturer has an annual income of less than Rs 12 lakh, a process of registration is enough. The act came into force in August 2011.

As per the union government's notification and the amendment of the FSSAI (packaging and labeling) Amendment regulation 2013, it is necessary to print an FSSAI license/registration number and FSSAI logo on the packaging of the food product. This notification would help Food and Drug administration track who do not have FSSAI license.

This move will bring down the number of bogus manufacturer and put all such manufacturer on FDA'S radar, ensuring more quality checks on food manufactured and sold.

How to Read the number- The 14- digit number provides **information about the manufacturer's license or registration details. The number encompasses essential information about the manufacturer and is divided into five parts.** The **first single digit indicates** whether the manufacturer is a license holder or simply registered, **the next two digits** provide the state code, the following **two digits give** the year the manufacturer was registered with FSSAI. The licensing authority or registering authority is disclosed in the **next three digits** and the remaining are the manufacturer's license number.

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