

# **CHEMICALS PRESENT IN FRUITS AND VEGETABLES AND THEIR HEALTH EFFECTS – FAQ**

## **1. Which chemicals are allowed / banned in Fresh Fruits and Vegetables?**

Fruits and vegetables are highly nutritious and form as key food commodity in the human consumption. They are highly perishable due to their low shelf life. These food commodities are reported to be contaminated with toxic and health hazardous chemicals. Chemicals like calcium carbide / ethephon and oxytocin are reportedly being used in fruit and vegetable mandis / farms for artificial ripening of fruits and for increasing the size of fruits and vegetables respectively. Calcium carbide more commonly known as 'masala' is a carcinogenic agent and banned under PFA Rules, 1955. Ethephon is a pesticide and so it is not recommended as a ripening enhancer. Oxytocin is a mammalian hormone, used as a drug in veterinary services which is not advised for use in fresh fruits and vegetables.

Rule 44-AA of the PFA Rules, 1955 prohibits the use of carbide gas for ripening of fruits.

**“Rule 44-AA** Prohibition of use of carbide gas in ripening of fruits:- No person shall sell or offer or expose for sale or have in his premises for the purpose of sale under any description, fruits which have been artificially ripened by use of acetylene gas, commonly known as carbide gas.”

Ministry of Agriculture has clarified that the fruits are exposed to ethylene gas (fruit ripening plant hormone) in low concentration of 10-100 ppm exogenously to trigger their ripening. It is considered safe in the concentration varying from 0.001-0.01% depending upon the crop, variety and maturity. There is no specific provision in PFA for ripening agents.

Many instances have been reported that some unscrupulous elements are following the practise of dipping green vegetables in artificial colours to give them a fresh, attractive and pleasant appearance. PFA prohibits use of colours in fruits and vegetables.

As per rule 48-E of the PFA Rules, 1955, fresh fruits and vegetables shall be free from rotting and also from coating of waxes, mineral oils and colours. However, there is provision for coating fresh fruits with food additive viz. bee wax (white / yellow) carnauba wax or shellac wax as glazing agent in accordance with the Good Manufacturing Practice for use of food additives under proper label declaration as defined in sub-rule (ZZZ) (24) of Rule 42.

## **2. Other contaminants their source in Fruit and Vegetables and ill health effects**

Pesticide residues, crop contaminants (aflatoxins, patulin, ochratoxin, etc.) naturally occurring toxic substances and heavy metals are the major contaminants found in fruit and vegetables. Pesticides are used in management of pests and diseases in Agricultural and Horticultural crops. Heavy metals are present in the irrigation water and other manures. Infested seeds, irrigation water and soil act as the source of the fungal toxins.

Pesticides can leave adverse effects on the nervous system. Some harmful pesticides can cause several hazardous diseases like cancer, liver, kidney, and lung damage. Certain pesticides can also cause loss of weight and appetite, irritability, insomnia, behavioural disorder and dermatological problems. The pesticide residue found in fruit and vegetables include residues of both banned (Aldrin, Chlordane, Endrin, Heptachlor, Ethyl Paration, etc.) and restricted pesticides for use in India (DDT, Endosulfan, etc.).

Heavy metals also causes adverse effect in human metabolic system, skin diseases, heart problems, etc.

### **3. What are their residue limits?**

- Bee wax (white and yellow) or carnauba wax or shellac wax are permitted to be used in accordance with the Good Manufacturing Practice for use of food additives.
- Since use of carbide gas is prohibited in ripening of fruits under PFA, no tolerance limit for its residue is permitted.
- No tolerance limit for colour and mineral oil on fruits and vegetables has been allowed.
- The Maximum Residual Limit (MRL) of pesticide residues are given under PFA Rules, 1955 (**Rule 65**).
- The presence of heavy metal in the food item (fruit and vegetables) shall not exceed the value given under PFA Rules, 1955 (**Rule 57**).
- The presence of crop contaminants and naturally occurring toxic substances in fruit and vegetables shall not exceed the maximum limit prescribed under PFA Rules, 1955 (**Rule 57A and 57 B**)

### **4. Advice to Consumer:-**

- Select fruits and vegetables without spots or necrosis (lesions) and any abnormality.
- Wash fruits and vegetables thoroughly with water (preferably) running potable water before eating and cooking.
- Purchase fruits and vegetables from known dealers.
- Peeling of fruits before consumption and vegetables before cooking will reduce exposure to pesticide.
- Do not buy and consume cut fruits from open market.
- Throw away fruits and vegetables infected by mould/fungus.

- To minimize the hazards of pesticide residues, discard the outer leaves of leafy vegetables such as lettuce and cabbage.
- Do not wash fruits and vegetables with detergents as they may get absorbed inside.
- Ensure the quality of fruits and vegetables by sending them to voluntary testing laboratories.
- Wash your hands with soap and potable water, use clean utensil and clean cutting board with stainless steel knives.

### **5. Regulation of Food Law:**

Implementation of Prevention of Food Adulteration Act and Rules rests with State/U.T. Governments. The Commissioner Food Safety / Food (Health) Authority of States/U.Ts. have been advised to keep strict vigil to check the use of carbide gas and other hazardous chemicals for ripening of fruits and colouring of fruits and vegetables and to take legal action for violation of the provisions of the Act/Rules.

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