

The Poison Explosion- Effects of Pesticide Residues on Health

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Ready for lunch or dinner. Serve yourself a handful of rice. Choose your favorite vegetables and mustn't forget salad; cucumber, carrot, tomatoes etc. A bowl of curd and fruit dessert like banana or oranges. Nutritionists will recommend this as a Balanced Diet just to keep you fit and healthy. But have you ever wondered what these food items are being sprayed with in farm before it reaches to your plate. Along with this wholesome food, you daily intake some mgs of toxic pesticide residues into your stomach.

Pesticides: Pesticides are only toxic substances released intentionally into our environment to kill living things. This includes substances that are used to kill weeds (herbicides), insects (insecticides), fungus (fungicides), rodents (rodenticides) and others.

Crops on which Pesticides are sprayed: Fruits, vegetables, wheat, rice and nonfood items like cotton, flowers etc. The OP (organo phosphorus) pesticides namely Malathion and Chlorpyrifos are commonly used on all fruits, vegetables and wheat.

Exposure to Pesticides: Mostly workers working in agricultural fields are exposed directly to these toxic chemicals. Meanwhile, we also can get affected in indirect way like eating contaminated fruits and vegetables or drinking milk of infected animal who ate contaminated plants. Fatty foods can become the main source of pesticide residues. Since pesticides adhere to fatty tissues in body of lactating animals. Milk which has high fat content can be ideal storehouse for these toxins.

Risks associated to Human health and Environment: Pesticides have been linked with wide range of health hazards ranging from short term effects such as headaches and nausea to chronic ailments like cancer, reproductive harm and endocrine disruptions.

Acute dangers include nerve, skin, eye irritation and damage, dizziness, fatigue, and systematic poisoning. Chronic health effects may occur years after even exposure to pesticides in environment or result from pesticide residues which we take through food and water. It has been linked to all kind of diseases and conditions like Parkinson's syndrome to cancer.

Impacts on environment have been well known. Too much pesticide use can damage agricultural land by harming beneficial insect's species, soil microorganisms and worms which naturally limit pest populations and maintain soil health. It will also reduce concentrations of essential nutrients in soil like nitrogen and phosphorus. Pesticides can also reach surface water through runoff from treated plants and soils. Contamination of water by pesticides is widespread.

Fruits and Vegetables which contain most pesticide residues: Apples, peaches, strawberries, grapes, blueberries, potatoes, spinach, lettuce, celery are mostly prone to contain pesticide residues. Meanwhile, there are some fruits and vegetables which are lowest in these residues so making them safer to consume like onions, peas, sweet potatoes, pineapple, avocado, kiwi, watermelons etc. Always wash these eatables before consuming them.

Method of Pesticide residue extraction in foodstuff and Techniques used- QuEChERS Pouch Method Pronounced as 'Catchers' acronym for a technique nowadays being employed to extract pesticide residues from food matrices. (Fruits, vegetables, cereal grains) during sample preparation process.

QuEChERS stands for Quick, Easy, Cheap, Effective, Rugged and Safe. This method is preferred over conventional methods as it is cost effective, simple to use and high quality results are achieved.

After sample preparation, pesticide residues are reconstituted and transferred to vial for further analysis via GC-MS (Gas Chromatography-Mass Spectrophotometry) or GC with selective detectors. MS is an attractive and effective way of detecting and verifying molecules by mass and mass fragmentation following the chromatographic separation. This technique has added multiple dimensions in chromatography.

Pesticides contain inert ingredients in addition to active ingredients that are designed to kill target pests. Unfortunately, public isn't aware and being informed or doesn't want to know about what inert ingredients are there in pesticides in most cases. People, especially farmers have been kept in dark about the contents of pesticide products that may be hazardous. Among the ingredients that are listed as both inert and active, Chloropicrin has been linked to asthma and pulmonary edema and Chlorothalonil is a probable human carcinogen.

In India first report of poisoning due to pesticides was from Kerala way back in 1958 where over 100 people died after consuming wheat flour contaminated with parathion. This prompted GOI to form special committee on harmful effects of pesticides constituted by ICAR to focus attention on problem.

Despite claims made by Govt. and Manufacturers of these toxic chemicals, pesticide products currently in the market aren't safe to use. Being an Analyst and having handled FSSAI's Pesticide Project of Fruits and Vegetables sold in Indian Markets-2015, there are so many flaws in the way pesticides are registered and in our political process that allows Big Corporations to influence Pesticide Policy to allow continued use of their toxic product.

Various government agencies are involved in the regulation of the pesticide industry in India. The Ministry of Agriculture regulates the manufacture, sale, transport and distribution, export, import and use of pesticides through the 'Insecticides Act 1968' and the rules framed there under. The Central Insecticides Board (CIB), advises the Central and state governments on technical matters. The approval of the use of pesticides and new formulations to tackle the pest problem in various crops is given by the Registration Committee (RC) while the Union Ministry of Health and Family Welfare monitors and regulates pesticides residue levels in food.

There are 215 pesticides registered for use in India as on September 25, 2008. There are 25 pesticides banned for manufacture, import and use, 2 pesticides/pesticide formulations banned for use but their manufacture is allowed for export, 4 pesticide formulations banned for import, manufacture and use, and 8 pesticides withdrawn, reports Pesticide Regulation Body in India.

J and K State Scenario- J and K had been bestowed with state-of-art facilitated referral lab in SKUAST in October, 2014 under banner of Research Centre for Residue and Quality Analysis (RCRQA). It is a welcome step as students from different universities in state related with the subject can undergo training and research programs and simultaneously can acquire practical knowledge about various instrument handling like GC-MS, LC-MS, ICP-OES, HPLC, FTIR, Spectrophotometer etc. which by far has tremendous scope both within and outside India in various Food Testing and Research Centre's and Pharmaceutical industries. All activities concerning pesticides should be based on scientific assessment and not on profitable concentration. There is every reason to attain knowledge and aware people about Good Agricultural Practices (GAP) in order to reduce human exposure to pesticides.

Prevention is better than Cure.



(Figure)

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