

# Slow poisoning by slack standards

**P**esticides are man-made chemicals which are being used to produce preserved and market food. Indiscriminate and disproportionate use of pesticides may lead to their residues in food chain which may exert their harmful effect in human beings and animals. Pesticides are not bio-degradable, are highly toxic and find their way into ground water and water bodies, contaminating them and rendering them unfit for drinking purpose.

Pesticides & insecticides are the common potent chemicals sprayed on fruits & other crops to escape attacks and damage from various insects & pests to get higher

As consumer anxiety around the country continues to grow about the invasiveness of pesticides in their lives, *Consumer VOICE* brings a two part comprehensive test report on the complete profile of pesticides used in growing, ripening and increasing shelf life of everyday seasonal fruits and vegetables. The samples were bought across the country from roadside vendors and high-end super stores. The report covers important metros in the country. The test laboratory used was NABL accredited. We take no support from any commercial stake holders and our tests are carried out according to internationally approved procedures.

*Consumer VOICE* subscribers can access the report Online and in print.

## Cherry found with more Endosulfan pesticide:

In our study, sample of cherry was found with more MRL of Endosulfan pesticide ( 5762.92 ppb). Indian maximum limit allowed by the Food Safety and Standard Regulation is 2000 ppb, which is in any case 40 times the EU limit.

Endosulfan, a deadly pesticide:

- Endosulfan is known as a potent poison that can cause harm upon contact, eating food contaminated by it, swallowing, and even inhaling the odour.
- Endosulfan is a suspected endocrine disrupter.
- Endosulfan belongs to the same class of pesticides as DDT; it is highly persistent in the environment and has a high potential for bioaccumulation and biomagnification.
- The US Environmental Protection Agency (EPA) classifies endosulfan as Category Ib – Highly Hazardous so does the European Union.



yields from various agro produce. In tropical countries like India, possibilities of pest damages are maximum due to hot & humid weather.

To examine and assess the level of various pesticides present in the fresh fruits, *Consumer VOICE* conducted a study, testing pesticides on, fresh seasonal fruits.

### Objective of the study:

1. Identify and quantity of the level of pesticides used in fresh fruits.
2. Examine the total level of pesticides used in the individual fruits as per MRL (Maximum Residual Limit) of permitted pesticides.
3. Identify pesticides which are banned due to their potential toxicity impacts.
4. Spread awareness among the consumers & society on presence of pesticides in fresh fruits and possible toxic effects.

### Test Procedures

The samples were purchased from 5 different areas of Delhi metro and some samples from other metro cities of India. In Delhi metro the retail markets chosen were located close to the five whole sale mandis where fresh fruits are transported in bulk to these fruit mandis. These fruits are further transported to the retailers in the entire city for retail sales. To identify and quantify the presence of pesticides, a credible & independent accredited test laboratory was necessary to carry out this task. *Consumer VOICE* identified and approached a NABL accredited laboratory to utilise the state of art test facility where fresh fruits would be tested for identification & quantification of various pesticides.

### Delhi Region:

- Shalimar Bagh (Close to Azad Pur Mandi) North Delhi
- Bhogal Market (Closer to Okhla Mandi) South Delhi

### Consumer Advice:

- Wash fruits thoroughly under running water before eating.
- Peeling of fruits before consumption will also reduce pesticide exposure.
- Switch to organic fruits to reduce exposure to pesticides.
- Do not buy cut fruit from open vendors.
- It is better to eat fruit for its fibre rather than juice.
- Always consume fresh fruits.
- Do not leave cut fruit around.

- Mayur Vihar (Closer to Gazipur Mandi) East Delhi
- Keshopur (Keshopur Mandi) West Delhi
- Daryagunj (Daryagunj Mandi) Central Delhi

### Outside Delhi:

- Selected market places from Kolkata
- Selected market places from Bangaluru

### Test Lab:

Testing of pesticide levels is a very expensive exercise. *Consumer VOICE* joined hands with Arbro Laboratory for conducting the analysis on a corporate social responsibility platform in this venture as a service to consumers. Arbro laboratory is accredited by NABL. The laboratory was suitably equipped with latest instruments and scientists to carry out the relevant tests.

### Test Method:

The test method as prescribed in the Indian standards was followed on quantification of pesticides and also



Sample being processed for making uniform paste.

Name of Fruits	No. of fruit samples bought	Names of Pesticides Found
Apple	11	Thiacloprid, Captan
Banana	5	-
Cherry	4	Endosulfan Sulfate
Chikoo	2	-
Grapes	2	-
Khubani	3	Captan, Methyl Parathion
Kiwi	3	Captan
Ltichi	3	Captan
Mango	11	Captan, Methyl Parathion, DDT p,p
Musk Melon	4	Captan, Methyl Parathion
Papaya	4	Captan, Methyl Parathion, Captafol
Peach	5	Captan, Captafol
Pears	4	Acetamidrid
Pineapple	4	-
Plum	5	Captan, Methyl Parathion
Pomengrade	5	Captan
Watermelon	4	Captan

non-permitted, if found. Besides, reference for MRL of EU & Codex has also been considered. Since identification and quantification requires very sophisticated instruments to carry out such tests, test laboratory has utilised most relevant test methods and instruments for conducting various pesticides by following well recognised test methods.

### Test Instruments:

- GCMS/MS (Gas Chromatography-mas spectrometry)

(Triple Quadrupole)

- LCMS/MS (Liquid Chromatography-mas spectrometry)

(Triple Quadrupole)

### Tests conducted:

The testing was conducted for all the pesticides as per PFA/EU requirements (MRL for each pesticide) as specified.

### Pesticide Profile:

#### Multiple Pesticide Residues

Pesticide risk assessment is so difficult because an average person's

### Pesticide Facts:

India uses about 30,000 tons of pesticides a year, more than 60% of it on food crops. Use of excessive pesticides contaminates soil, water and finally enters the food chain and contaminates the food produced. About 20% of Indian food products contain pesticide residues above the tolerance level compared to only 2% globally. No detectable residues are found in 49% Indian food products compared to 80% globally.

The United Nations Environment Program estimates accidental pesticide poisoning causing 20,000 deaths and 1 million cases of illness per year worldwide. Pesticides have been implicated in human studies with leukemia, lymphoma, aplastic anemia, soft tissue sarcoma and cancers of the breast, brain, prostate, testis and ovaries. The International Agency for Research on Cancer has found "sufficient" evidence of carcinogenic potential in most of the pesticides beyond the threshold limit.

Source: *Toxics Link*, January 2009

daily diet consists of many different foods, and many of those foods contain pesticide residues. People are not exposed to a single pesticide chemical at a constant dose level, the way laboratory animals are in toxicity tests; instead, they consume a constantly changing mixture of many different pesticides at variable levels.

### Banned Pesticides:

In India, there are 27 pesticides which are banned for manufacture,

import and use. We also tested fruit samples for following 4 banned pesticides:

- Aldrin
- Chlordane
- Endrin
- Heptachlor

No detectable residues were found, may be as their manufacturing have also been banned.

## Legal Provisions for consumer safety:

### Section 21 of the Food Safety and Standard Act, 2006 states that

1. No article of food shall contain insecticides or pesticides residues, veterinary drugs residues, antibiotic residues, solvent residues, pharmacological active substances and micro-biological counts in excess of such tolerance limits as may be specified by regulations.
2. No insecticide shall be used directly on article of food except fumigants registered and approved under the Insecticides Act, 1968.

### Explanation -For the purposes of this section

"Pesticide residue" means any specified substance in food resulting from the use of a pesticide and includes any derivatives of a pesticide, such as conversion products, metabolites, reaction products and impurities considered to be of toxicological significance and also includes such residues coming into food from environment;

The Insecticides Act, 1968

An Act to regulate the import, manufactures, sale, transport, distribution and use of insecticides with a view to prevent risk to human beings or animals and for matters connected therewith. It extends to the whole of India.

### Imprisonment & Fine:


- Section 50 of the Food Safety and Standard Act-2006 states that any person who sells food which is not in compliance with the provisions of this Act or the regulations made there under shall be liable to a penalty not exceeding five lakh rupees.
- Whoever uses an insecticide in contravention of any provisions of The Insecticides Act, 1968 or any rule made there under shall be punishable with up to six months imprisonment and fine ₹ 500-5000.


### VIOLATIONS AS PER EU & INDIAN STANDARDS OF PESTICIDES FOUND IN THE TESTED FRUITS

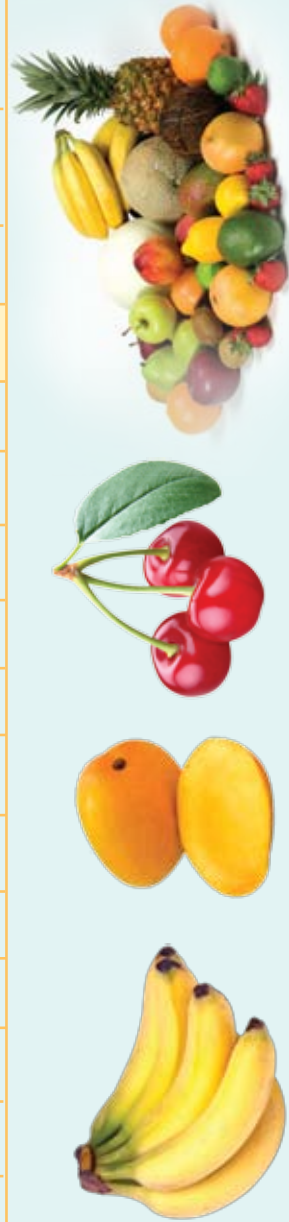
Pesticide and Permitted Level EU/India in ppb	Apple		Cherry (light red)	Khubani	Kiwi	Litchi	Mango				Musk Melon	Papaya (desi)	Peach (desi)	Pears (Naspati)	Plum (small verity)	Pomegranate (kandhari red)	Water Melon (sugar baby)
	Imported	Indian					Safeda	Chausa	Dasahari	Langra							
Thiacloprid (20/15000)	23.06	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Captan (20/15000)	23.78 -	36.61	ND	518.42 -	232.08 -	105.83 -	44.15 -	48.14 -	567	352.94	146.91 -	21.08 -	23.41 -	ND	20.26 -	38.69 -	23.29 -
	91.87			757.95	291.54	1216.91	153.88	108.82			337.63	50.78	100.81		25.75	189.70	147.31
Endosulfan Sulfate (500/2000)	ND	ND	5380.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Parathion (20/200)	ND	ND	ND	59.64	ND	ND	63.74	24.7	ND	ND	28.33 -	85.33	ND	ND	21.62 -	ND	ND
DDT, p,p (50/3500)	ND	ND	ND	ND	ND	ND	106.12	85.55	ND	ND	60.88	ND	ND	ND	67.24	ND	ND
Captafol (20/NP)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	122.16 -	20.86	ND	ND	ND	ND
Acetamiprid (10/NP)	ND	ND	ND	ND	ND	ND	ND	82.29	ND	ND	ND	295.98	ND	17.93	ND	ND	ND

ND - Not Detected in Test  
NP - Standard Not Provided  
DDT found in mangoes

Maximum violations were of captan pesticide.

 Pesticides were found beyond the EU MRL

 Pesticide was found beyond the Indian MRL



## Harmful effects of pesticides:

1. DDT: Chronic liver damage cirrhosis and chronic hepatitis, endocrine and reproductive disorders, immuno suppression, cytogenic effects, breast cancer, non hodkins lymphoma, polyneuritis.
2. Captafol: Captafol has oncogenic damaging development of mammals in the womb.
3. Methyl Parathion: It generally disrupts the nervous system by inhibiting. It is absorbed via skin, mucous membranes, and orally. Parathion is very toxic to bees, fish, birds, and other forms of wildlife.
4. Thiacloprid: Thiacloprid is classified as carcinogen category 3. Harmful to aquatic organisms. Dangerous for the environment.
5. Acetamiprid: Acetamiprid has low acute and chronic toxicity in mammals. The U.S. Environmental Protection Agency (EPA) considers moderately toxic to bees.
6. Captan: Captan is a possible carcinogen and mutagen. Toxic to aquatic organisms.

## Harmful effects of pesticides on humans:

- Cause low birth weight and birth defects;
- Interfere with child development;
- Cause neurological problems;
- Disrupt hormone function;
- Cause a variety of cancers, including leukemia, kidney cancer, brain cancer, and non-hodgkin's lymphoma.

## Carbide or 'masala' ripening of fruits harmful!

Calcium carbide, a banned ripening chemical in many countries,

Children and fetuses suffer more from pesticide effects than do adults because children's bodily systems are still developing. Additionally, children are much less able than adults to detoxify most pesticides. Pesticide effects in the unborn and in infants can have lifelong effects. For instance, the risk of neurological or behavioural problems following early pesticide exposure extends through puberty, as the reproductive system, nervous system, and brain continue to grow.

Farm workers suffer more than their share of bad pesticide effects; and birds, beneficial insects, and other wild critters are impacted, too.

Pesticides in Foods Linked to ADHD.

According to National Academy of Sciences, India, the major source of pesticides exposure for children is dietary intake, and much of that exposure comes from some of their favourite fruits and vegetables.

Exposure to pesticides used on many foods appears to boost the chances that children will be diagnosed with ADHD (Attention Deficit Hyperactivity Disorder). ADHD is one of the most commonly diagnosed ailments in children, causing disruption in both class and home life affecting self-esteem.



*Samples being loaded for GC MS-MS instrument for data acquisition of pesticides*

including India, is openly and commonly used for ripening fruits. The fruit vendors use this deadly chemical as it is cost effective, easy to use and give better and quick results. It is popularly known as 'masala'. Vendors artificially ripen mangoes, papayas, guavas, bananas, pears, plums, apples, chickoo, watermelons and muskmelons.

Acetylene gas produced during ripening effects of the neurological system and can cause headache, dizziness, mood disturbances, sleepiness, mental confusion, memory loss, cerebral oedema and seizures. Calcium carbide is known to contain arsenic and phosphorous which are highly harmful. It is a carcinogenic substance and can cause mouth

## Acknowledgement

"It is a sad story where all of us know that there is blatant pesticide over use and that helpless consumers are being slowly poisoned. But the Indian standards and health authorities prefer to sleep over this alarming situation."

*Prof. Sri Ram Khanna, Sr. Vice Chairman of VOICE Society.*

## Comparison of Indian and Codex Maximum Residue Limit (MRL) of some pesticides in fruits

S.No.	Name of Pesticide	Indian MRL Unit- ppb (Times higher than Codex)	Codex MRL Unit- ppb
1	Malathion	4000 (8)	500 (Apple)
2	Carbofuran	100 (Same)	100 (Banana)
3	Endosulfan	2000 (4)	500 (Mango)
4	Carbendazim	1000 (5) (Banana)	200 (Banana)
5	Dimethoate	2000 (2)	1000 (Mango)
6	Captan	15000 (5)	1000 (Plam)

### What is MRL?

Maximum Residue Limit or MRL for pesticides are established in most countries to safeguard consumer health and to promote Good Agricultural Practice (GAP) in the use of insecticides, fungicides, herbicides and other agricultural compounds. MRL is the maximum concentration of a substance, expressed in milligrams per kilogram (parts per million, ppm) or in micrograms per kilogram (parts per billion, ppb) that is legally permitted in a food commodity.

### What is Codex Alimentarius?

The Codex Alimentarius, literally translated from Latin, a "Food Code", was set up jointly in the 1960s by two United Nations organisations: the Food and Agriculture Organisation (FAO) and the World Health Organisation (WHO). Its purpose was to guide and promote the elaboration and establishment of definitions and requirements for foods, to assist in their harmonization and, in doing so, to facilitate international trade. India is also member of Codex Alimentarius.

Although the standards adopted by Codex Alimentarius are not legally binding, the World Trade Organisation (WTO) refers to Codex standards when trying to settle trade disputes involving food stuffs or food products.

ulcer, gastric irritation, food poisoning or even cancer.

### Punishment & Fine

Rule 44-AA of the Prevention of Food Adulteration (PFA) Rules, 1955 prohibits the use of carbide gas for ripening of fruits. An extract of rule 44-AA is reproduced below -

"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."

Vendors found to be ripening fruits with the help of carbide gas will face a 6- month jail term and a fine of ₹ 1,000.

### Remedies to minimise its impact on Human Health:

- Education to farmers about judicious use of chemical pesticides and adopting good agricultural practices & ill effects of



### Reasons of Pesticide Menace:

- Indiscriminate / injudicious use of chemical pesticide.
- Lack of awareness on the part of farmers with regard to judicious use of chemical pesticides.
- Non-observance of prescribed waiting periods, incorrect application techniques, more use than recommended dosages.
- Use of sub-standard pesticides.
- Wrong advice to farmers by pesticide dealers.
- Continuance of DDT and other pesticides in Public Health Programs.

### Acknowledgement

"The pesticide tests done are in line with what many other countries do to safeguard the interest of consumers. We enhanced the scale to pan India coverage with kind cooperation and collaboration from Arbo and the results are revealing. Government should wake up. Consumers should read the next issue where we cover pesticides in vegetables."

*Ashim Sanyal, COO of Consumer VOICE.*

indiscriminate use of chemical pesticides.

- Awareness about harmful effects of chemical pesticides, specially to farmers as they and their families will be exposed to it first.
- Monitoring and re-evaluation of pesticide residue limits in food chain by Union Ministry of Health and Family Welfare.
- Reviewing and reduction of pesticide residue limits by Government.
- Increasing the punishment, besides fine, incorporate stringent provision of punishment to all offenders in the Food Safety and Standards Act, 2006 of food chain such as manufacturer/importer, dealer/retailer, farmer.
- Use of Bio-pesticides to be encouraged. To encourage the use of Bio-pesticides, farmers should be given assistance/subsidy by Government.

## Comparison of Indian and European Union (EU) Maximum Residue Limit (MRL) of some pesticides in fruits

S.No.	Name of Pesticide	Indian MRL Unit- ppb (Times higher than EU limits)	EU MRL Unit- ppb
1	Dichlorvos	100 (10)	10
2	Dimethoate	2000 (100)	20 (Apple)
3	Malathion	4000 (4)	500 (Apple)
4	Phosphamidon	200 (20)	10 (Apple)
5	Carbofuran	100 (5)	20 (Apple)
6	Parathion Methyl	200 (10)	20
7	DDT	3500 (70)	50
8	Endosulfan	2000 (40)	50 (Cherry)
9	Captan	15000 (5)	3000 (Apple)

**Bhopal Disaster:**  
In 1984, Bhopal disaster occurred when Union Carbide plant released 40 tons of methyl isocyanate gas, a chemical intermediate in the synthesis of some pesticides. The disaster immediately killed nearly 3,000 people and ultimately caused at least 15,000 deaths.

**Kerala Disaster:**  
The chemical, Endosulfan, came into spotlight in India when at Kasaragod in Kerala it was sprayed aerially and the local population of many villages was exposed to it. What followed was very shocking. It led to physical and mental defects in poor farmers and their families. Studies have shown Endosulfan to accumulate in a mother's breast milk and it has been linked to birth defects such as cleft lip, the like of which are still being observed at Kasaragod, "Kerala's Bhopal".  
Endosulfan is mainly used in cotton, apples, grapes, pears, peaches and various vegetables.



## Name Of Pesticides Tested

Sr. No.	Name of Pesticide	Sr. No.	Name of Pesticide	Sr. No.	Name of Pesticide
1	Acephate	36	Carbendazim	71	4-Bromo-2-chlorophenol
2	Diazinon	37	Thiophanate-methyl	72	Captan
3	Dichlorvos	38	Acetamiprid	73	Captafol
4	Dimethoate	39	Clothianidin	74	HCH alpha isomer
5	Ethion	40	Imidacloprid	75	HCH beta isomer
6	Iprobenphos	41	Thiacloprid	76	Lindane
7	Malathion	42	Thiamethoxam	77	Chlorothalonil
8	Methamidophos	43	Dimethomorph	78	Methyl parathion
9	Monocrotophos	44	Buprofezin	79	Chlorpyrifos Methyl
10	Omethoate	45	Cartap hydrochloride	80	Heptachlor*
11	Phosalone	46	Emamectin Benzoate	81	Fenitrothion
12	Phosphamidon	47	Spinosad A	82	Aldrin*
13	Profenophos	48	Spinosad D	83	Chlorpyrifos
14	Quinalphos	49	Abamectin	84	Parathion ethyl
15	Triazophos	50	Difenthiuron	85	Chlorfenvinphos
16	Atrazine	51	Azoxystrobin	86	Chlordane, cis-*
17	Simazine	52	Flufenoxuron	87	DDE, o,p'-
18	Metalaxyl	53	Propargite	88	Endosulfan (alpha isomer)
19	Carbaryl	54	Fenpyroximate	89	Chlordane, trans-
20	Carbofuran	55	Fenamidone	90	DDE, p,p'-
21	Carbosulfan	56	Diflubenzuron	91	Oxyfluorfen
22	Indoxacarb	57	Trifloxystrobin	92	DDT, o,p'-
23	Methomyl	58	Pyraclostrobin	93	Endrin*
24	Thiodicarb	59	Cymoxanil	94	Endosulfan (beta isomer)
25	Fenarimol	60	Famoxadone	95	DDD, o,p'-
26	Bitertanol	61	Etrimphos	96	DDD, p,p'-
27	Flusilazole	62	Ethofenprox	97	Endosulfan sulfate
28	Hexaconazole	63	Phorate	98	DDT, p,p'-
29	Myclobutanil	64	Oxydemeton-methyl	99	Dicofol
30	Penconazole	65	Fipronil	100	Cyhalothrin I (lambda)
31	Propiconazole	66	Metalaxyl-M	101	Permethrin
32	Tebuconazole	67	Iprovalicarb	102	Cyfluthrin
33	Triadimefon	68	Kresoxim methyl	103	Cypermethrin
34	Triadimenol	69	Tridemorph	104	Esfenvalerate
35	Difenoconazole	70	iprodione	105	Fenvalerate
				106	Deltamethrin

\*Pesticides are banned as per Indian Standards (But *Consumer VOICE* tested)

### Acknowledgement

"We have been working with *Consumer VOICE* for a very long time and admire its mission of doing comparative testing for enormous consumer benefits. This time when we were approached for pesticide testing, we decided to contribute under our corporate social responsibility chapter, and did the tests free of cost. After all I am also a consumer".

*Dr Saurabh Arora, Exe. Director of Arbro Pharmaceutical laboratory.*



## Fruit Profiles

### Banana



Long thick-skinned edible fruit that is yellow when ripe.

- Red bananas have a green/red peel and pink fruit flesh. They taste the same like yellow bananas.
- Fruit-bananas are the normal, yellow bananas, 15-30 cm.
- Apple-bananas are smaller, 8-10cm, and ripen faster. They are also yellow;
- The baby-banana is yellow as well and measures 6-8cm. It is the sweetest of the banana family;
- Baking bananas cannot be eaten raw.

### Health Benefits

- Bananas consist mainly of sugars (glucose, fructose and sucrose) and fiber, which makes them ideal for an immediate and slightly prolonged source of energy.
- Bananas contain tryptophan, an amino acid that can be converted to serotonin which reduces

depression. This contains iron and pectin that help in normalising digestive tract and keep blood sugar level up.

- Bananas make bones healthy, protect kidney and help control blood pressure.
- Green bananas contain indigestible short chain fatty acids (SCFAs) that are very nutrient to the cells that make up the mucosa of the stomach. These cells, when healthy, absorb calcium more efficiently
- Bananas help keep blood sugar level up.

### Cherries



Cherries are pigment rich fruit and are known to have powerful anti-oxidant properties. Small soft round fruit, red or black when ripe, contains a stone. There are red, black and yellow cherries.

### Health benefits

- Cherries control gout arthritis, fibromyalgia (painful muscle condition) and sports injuries.
- Tart cherries help body to fight against cancers, aging and neurological diseases and pre-diabetes.

- Cherries produce soothing effects on the brain neurons, calming down nervous system irritability which helps relieve neurosis, insomnia and headache conditions.
- They are also good source of minerals such as potassium, iron, zinc, copper and manganese.
- Cherries' anti-inflammatory functions are effective in reducing heart disease risk factors by scavenging action against free radicals.

### Grapes

Grapes are full of about 80% water, making them a delectable low-calorie snack or dessert. Grapes come in more than 50 varieties in black, blue, blue-black, golden, red, green, purple, and white colours with a juicy pulp inside. The two main types of grapes are the American and European. They both come in seeded and seedless varieties. Grapes are consumed as a raw fruit and also used for making edibles such as jelly, jam, juices, vinegar, raisins and edible oil. Dried grapes are also called raisins, sultanas or currants.



## Acknowledgement

"For good health of Consumers, there is urgent need of re-evaluation and reduction of chemical pesticides in all food articles by Central Government. There is also need of farmer's education for judicious use of chemical pesticides."

*Ashok Kanchan, Advisor-Technical, Consumers VOICE*

## Nutritional Value:

- Grapes also contain acids such as tartaric acids, malic acids, succinic, fumaric, glyceric, p-coumaric and caffeic acids.
- Beta-carotene, lycopene, ellagic acid, resveratrol and other sulphur compounds are found in grape skins.
- Grapes have important antioxidants such as anthocyanins, flavones, geraniol, linalol, nerol and tannins.
- Grapes contain all the necessary minerals such as calcium, chlorine, copper, fluorine, iron, magnesium, manganese, phosphorus, potassium, silicon and sulfur.

## Mango

A large number of mango varieties can be found in India. The most popular ones are Alphonso (also called Hapoos), Amrapali, Bangalora, Banganapalli (also known as Benishaan), Bombay Green, Chausa,



Chinna Rasalu, Dashaheri (Daseri), Fazli, Fernandian, Gulabkhas, Himayath (a.k.a. Imam Pasand), Himsagar, Jehangir, Kesar, Kishen Bhog, Lalbaug, Langda (Langra), Mallika, Mankurad, Mulgoa, Neelam, Pairi, Pedda Rasalu, Rajapuri, Safeda, Suvarnarekha, Totapuri, Vanraj and Zardalu.

## Health Benefits:

- Mangoes are packed with vitamins, minerals and antioxidants and contain like all fruits very few proteins, fats and calories. They are perfect to replenish salts, vitamins and energy after physical exercise.
- Mangoes have been found to be quite helpful in treating acidity, poor digestion and anemia.

## Pomegranate

Pomegranate is a tropical fruit that grows wild from Iran to northern India, but they are cultivated throughout India.

## Health Benefits:

- The anti-inflammatory agent in pomegranate juice significantly reduces arthritic pain.
- Drinking concentrated pomegranate juice reduces cholesterol, prevents breast cancer cell from forming and also prevents dental plaque and hardening of arteries.
- Pomegranate fruit helps to remove intestinal worms in children.



## Caution:

If you are on any medication, consult with your doctor before you start consuming pomegranate juice regularly. There is some possibility that the juice may affect the effect of some prescribed medications.

## Watermelon



Watermelon has smooth, deep green or yellow colored thick exterior rind with light green or gray coloured vertical stripes on the outer surface. Internally, the fruit has juicy, pink or red or yellow flesh with numerous small black colour seeds embedded in the middle third of the flesh. They have neutral flavour and taste wise are sweet like sugar syrup with very high content.

## Health Benefits:

- The powerful anti-oxidant in

## Acknowledgement

"Presence of Pesticides in our fruits & vegetables is a well known fact. Besides, in a tropical country, it is very difficult to get a satisfactory output of agro produce, without the use of pesticides. In association with Arbro lab, *Consumer VOICE* decided to conduct the tests to determine if the presence of pesticides was beyond safety levels".

*H. Wadhwa, Head, Product Testing Department*

- watermelon helps in reducing asthma attacks. Its rich beta-carotene and vitamin C reduces inflammation that leads to conditions like osteoarthritis or rheumatoid arthritis.
- Its cleansing and natural diuretic effect is totally healing for kidney and bladder problems.
- Watermelon prevents cholesterol formation and increases HDL, the good cholesterol.
- Its diuretic action helps to eliminate excess fluids from the body especially for women during their monthly menstruation cycle and in pregnant women.
- Its folic acid and other essential vitamins play an important role in reducing the risks of heart attacks, strokes and colon cancer.
- Watermelon juice cleanses the body of toxic wastes.
- Lycopene (from red watermelons) has been extensively researched for its anti-oxidant and cancer-preventing properties, especially against prostate cancer.

**Consumer VOICE** talked to some consumers and fruit vendors to take their opinion. Two of them are given below:

**Meet:** Fruit vendor Mohammad Ruksar  
 Mohammad Ruksar is a fruit vendor in the busy Bhogal market in New Delhi. He also goes door to door trundling his fruit cart in the surrounding colonies. The good quality of the fruits, which he buys at dawn, from the Azad Pur Mandi, come summer or winter, is much appreciated by his regular customers, mostly housewives, who are quite picky and want to buy their supplies of fruit, fresh every day.



*Fruit vendor Mohd. Ruksar (R) and customer Madhu Sahi (L)*

According to Ruksar the Azad Pur Mandi is his preferred place of purchase, as it is one of the largest and busiest fruit and vegetable mandis in Asia and one can buy even 'international' fruit in all seasons here. He says he has customers who demand that besides the rare seasonal Indian fruits like Jamuns, Falsas, and Pomegranates, he also brings Passion fruit, Dragon fruit, Kiwis, green Almonds etc. However, he says that the most bought fruits remain bananas, papayas, apples and oranges. He has observed a recent level of anxiety in his consumers regarding safety issues, especially when buying Mangoes, Apples and Grapes. He has tried to educate himself so that he can allay these fears in his consumers to some extent. He comes from a family, who has been traditional fruit vendors of yore. However the young generation of boys now prefers to be computer savvy and hold office jobs rather than ply their traditional trade. He chose fruit selling because he enjoys it as a profession.

**Meet:** Consumer Madhu Sahi

Madhu Sahi is one of Ruksar's regular customers. Her family is a two member family but her monthly expenditure on fruit ranges from ₹ 3000/- to ₹ 4000/-.

She does not like to buy from super stores and enjoys fruit and vegetable shopping at her doorstep. In her opinion it is possible to shop for quality as well as a good price from the vendors. Their stock is also guaranteed to be relatively fresh as their daily supplies are directly sourced from the mandis or from the adjoining 'farm-houses' in the city.

Super markets depend on cold storage and according to both Ruksar and Ms Sahi are likely to 'dress-up' food for a longer shelf life. Ms Sahi also shared some very interesting bit of information with us. She often visits friends who have fruit orchards in Kullu and Manali, where she observed that after gathering the apple crop, the owners exposed sacks of apples to exhaust fumes from their carrier trucks and cars, before putting them in the cold storage. The explanation she offered for this bizarre practice was that this exposure perhaps kills the pests that might still linger in the freshly gathered fruits!