



# DART

## DETECT ADULTERATION WITH RAPID TEST



FOOD SAFETY AND STANDARDS  
AUTHORITY OF INDIA.

**Inspiring Trust, Assuring Safe & Nutritious Food**  
Ministry of Health and Family Welfare, Government of India



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# COMMON QUICK TESTS FOR DETECTION OF SOME FOOD ADULTERANTS AT HOUSEHOLD

Food is essential for sustenance of life. Adulteration of food deceive the consumer and can cause risk to their health. The purpose of this manual is to list out common methodologies available for food adulterants generally found in India.

The scope of this manual is meant for household, which can induce awareness among the consumer about food safety.

## **DISCLAIMER:**

The main aim of this manual is to create awareness in consumers about detection of food adulteration and not for any other purpose.

## QUICK TESTS FOR SOME ADULTERANTS IN FOODS

### INDEX

Milk and Milk Products .....	01
Oils and Fats .....	04
Sugars and Confectionery .....	07
Food Grains and its Products .....	10
Salt, Spices and Condiments .....	16
Fruits and Vegetables .....	27
Beverages .....	30



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# **Milk and Milk Products**



## TEST 1

### Detection of water in milk

#### Testing method:

- 1 Put a drop of milk on a polished slanting surface.
- 2 Pure milk either stays or flows slowly leaving a white trail behind.
- 3 Milk adulterated with water will flow immediately without leaving a mark.



Pure milk



Adulterated milk

## TEST 2

### Detection of detergent in milk

#### Testing method:

- 1 Take 5 to 10ml of sample with an equal amount of water.
- 2 Shake the contents thoroughly.
- 3 If milk is adulterated with detergent, it forms dense lather.
- 4 Pure milk will form very thin foam layer due to agitation.



Pure milk



Adulterated milk

### TEST 3

#### Detection of starch in milk and milk products (khoya, chenna, paneer)

##### Testing method:

- 1 Boil 2-3 ml of sample with 5ml of water.
- 2 Cool and add 2-3 drops of tincture of iodine.
- 3 Formation of blue colour indicates the presence of starch.  
(In the case of milk, addition of water and boiling is not required)



Pure milk



Adulterated milk

### TEST 4

#### Detection of mashed potatoes, sweet potatoes and other starches in ghee/butter

##### Testing method:

- 1 Take 1/2 teaspoon of ghee/butter in a transparent glass bowl.
- 2 Add 2-3 drops of tincture of iodine.
- 3 Formation of blue colour indicates the presence of mashed potatoes, sweet potatoes and other starches.



Pure



Adulterated

A stylized illustration featuring a central circle containing various citrus fruits, including lemons, limes, and grapefruit slices. This central circle is surrounded by a large, irregular splash of oil or liquid, with several smaller droplets scattered around it. The entire composition is set against a solid orange background.

## Oils and Fats

## TEST 5

### Detection of other oils in coconut oil

#### Testing method:

- 1 Take coconut oil in a transparent glass.
- 2 Place this glass in refrigerator for 30 minutes: (Do not keep in the freezer).
- 3 After refrigeration, coconut oil solidifies.
- 4 If coconut oil is adulterated, then other oils remain as a separate layer.



Pure



Adulterated

## TEST 6

### Detection of TOCP (Tri-Ortho-Cresyl-Phosphate) in oils and fats

#### Testing method:

- 1 Take 2ml of sample of oil.
- 2 Add on a little amount of yellow butter (Solid).
- 3 Immediate formation of red colour indicates the presence of TOCP.



Pure



Adulterated



## TEST 7

### Proper winterization of refined winterized salad oils

#### Testing method:

- 1 Take 100ml sample oil in bottle, cork tightly and seal with paraffin.
- 2 The bottle is completely submerged in bucket containing finely cracked ice and water is added until it rises to top of the bottle.
- 3 The bucket is kept filled solidly with ice by removing any excess water and adding ice when necessary.
- 4 After 5 hours remove the bottle and examine oil.
- 5 If it is properly winterised, sample will be brilliant, clear and limpid.



Refined winterized salad oils

A stylized, light brown illustration of a sugarcane plant serves as the background for the page. The plant has a central stalk with several long, pointed leaves extending outwards. The overall color scheme is a warm, monochromatic brown.

## **Sugars and Confectionery**

## TEST 8

### Detection of sugar solution in honey

#### Testing method - 1:

- 1 Take a transparent glass of water.
- 2 Add a drop of honey to the glass.
- 3 Pure honey will not disperse in water.
- 4 If the drop of honey disperses in water, it indicates the presence of added sugar.



Pure

#### Testing method - 2:

- 1 Take a cotton wick dipped in a pure honey and light with a match stick.
- 2 Pure honey will burn.
- 3 If adulterated, the presence of water will not allow the honey to burn if it does; it will produce a cracking sound.



Adulterated

## TEST 9

### Detection of chalk powder in sugar/pithi sugar/jaggery

#### Testing method:

- 1 Take a transparent glass of water.
- 2 Dissolve 10g of sample in water.
- 3 If sugar/pithi sugar/jaggery is mixed with chalk, the adulterant will settle down at the bottom.



Pure



Adulterated

## TEST 10

### Detection of aluminium leaves in silver leaves

#### Testing method:

- 1 Take some portion of the leaf and crush it between two fingers.
- 2 Pure silver leaves will be easily crushed and crumble to the powder form while aluminium leaves will only break into smaller shreds.
- 3 Further take the suspected silver leaves and make it in the form of a ball and burn it with the help of a flame.
- 4 Pure silver leaves burn away completely leaving glistening balls while aluminium leaves are reduced to grey ash.



Silver leaves



Aluminium leaves



Silver leaves



Aluminium leaves





## **Food Grains and Its Products**

## TEST 11

**Detection of extraneous matter (dust, pebble, stone, straw, weed seeds, damaged grain, weeviled grain, insects, rodent hair and excreta) in food grains**

**Testing method:**

- 1 Take small quantity of sample in a glass plate.
- 2 Examine the impurities visually.
- 3 Pure food grains will not have any such impurities.
- 4 Impurities are observed visually in adulterated food grains.



**Pure**



**Adulterated**

## TEST 12

**Detection of dhatura in food grains**

**Testing method:**

- 1 Take small quantity of food grains in a glass plate.
- 2 Examine the impurities visually.
- 3 Dhatura seeds which are flat with edges and blackish brown in colour can be separated out by close examination.



**Dhatura seeds in food grains**



**Dhatura seeds**

## TEST 13

### Detection of excess bran in wheat flour

#### Testing method:

- 1 Take a transparent glass of water.
- 2 Sprinkle a spoon of wheat flour on the surface of water.
- 3 Pure wheat flour will not show excess bran on water surface.
- 4 Adulterated wheat flour shows excess bran floating on water surface.



Pure wheat flour



Excess bran in wheat flour

## TEST 14

### Detection of khesari dal in dal whole and split

#### Testing method:

- 1 Take small quantity of dal whole or split in a glass plate.
- 2 Examine the impurities visually.
- 3 Khesari dal which has edged type appearance showing a slant on one side and square in appearance can be separated out by close examination.
- 4 Pure dal will not have any such impurities.



Pure dal



Khesari dal



## TEST 15

### Detection of added colour in food grains

#### Testing method:

- 1 Take a transparent glass of water.
- 2 Add 2 teaspoons of food grains and mix thoroughly.
- 3 Pure food grains will not leave any colour.
- 4 Adulterated food grains leaves colour immediately in water.



Pure



Adulterated

## TEST 16

### Detection of turmeric in sella rice

#### Testing method:

- 1 Take a tea spoon of rice in a glass plate.
- 2 Sprinkle a small amount of soaked lime (commonly known as chuna which is used in pan) on the rice grains.
- 3 Pure grains will not form red colour.
- 4 Adulterated grains will form red colour.



Pure



Adulterated



## TEST 17

### Detection of rhodamine B in ragi

#### Testing method:

- 1 Take cotton ball soaked in water or vegetable oil. (conduct the test separately)
- 2 Rub the outer surface of the ragi.
- 3 If cotton absorbs colour, then it indicates the adulteration of rhodamine B for colouring the outer surface of ragi.



Pure



Adulterated

## TEST 18

### Detection of chakunda beans in pulses

#### Testing method:

- 1 Take small quantity of pulses in a transparent glass plate.
- 2 Examine the impurities visually.
- 3 Chakunda beans can be separated out by close examination.



Chakunda beans

## TEST 19

### Detection of sand, soil, insects, webs, lumps, rodent hair and excreta in Atta, Maida, Suji (Rawa)"

#### Testing method:

- 1 These can be identified by visual examination.



Atta, Maida, Suji (Rawa)



Sand, Soil, insects, webs, lumps, rodent hair and excreta



## Salt, Spices and Condiments

## TEST 20

### Detection of foreign resin in asafoetida (hing)

#### Testing method-1:

- 1 Burn small quantity of asafoetida in a stainless steel spoon.
- 2 Pure asafoetida will burn like camphor.
- 3 Adulterated asafoetida will not produce bright flame like camphor.



Pure



Adulterated

#### Testing method-2:

- 1 Powder a gram of asafoetida and take it in a glass container.
- 2 Add one tea spoon of water. Mix thoroughly by shaking.
- 3 Milky white solution with no sediments represents pure asafoetida.



Asafetida



Non-Edible Gum/Resin



## TEST 21

### Detection of papaya seeds in black pepper

#### Testing method - 1:

- 1 Add some amount of black pepper to a glass of water.
- 2 Pure black pepper settles at the bottom.
- 3 In the adulterated black pepper, papaya seeds float on the surface of water.



**Black pepper**



**Papaya seeds**

### Detection of papaya seeds in black pepper

#### Testing method - 2:

- 1 Spread spice on a white paper.
- 2 Observe the appearance of the sample using the magnifying glass.
- 3 Black pepper is brown in colour. It has a wrinkled surface and has a characteristic smell and pungent taste.
- 4 The papaya seeds have shrunken smooth surface and oval shape. It is greenish brown or blackish brown in colour and has a repulsive flavour.



**Black pepper**



**Papaya seeds**

## TEST 22

### Detection of light black berries in black pepper

#### Testing method

- 1 Press the berries with the help of fingers.
- 2 Light berries will break easily while black berries of pepper will not break.



**Black pepper**



**Light black berries**

## TEST 23

### Detection of soap stone or other earthy matter in asafoetida (hing)

#### Testing method:

- 1 Shake little portion of the sample with water and allow to settle.
- 2 Pure asafoetida will not leave any soap stone or other earthy matter at the bottom.
- 3 If asafoetida is adulterated, soap stone or other earthy matter will settle down at the bottom.



**Pure**



**Adulterated**

## TEST 24

### Detection of artificial/water soluble synthetic colours in chilli powder

#### Testing method:

- 1 Sprinkle chilli powder on the surface of water taken in a glass tumbler.
- 2 The artificial colourants will immediately start descending in colour streaks.



Pure



Adulterated

## TEST 25

### Detection of light black berries in black pepper

#### Testing method:

- 1 Float the sample of black pepper in alcohol (rectified spirit).
- 2 The mature black pepper berries sink while the light black pepper floats.



Black pepper



Light black berries

## TEST 26

### Detection of saw dust in chilli powder

#### Testing method:

- 1 Add the sample to water.
- 2 The saw dust will float at the surface of water while Chilli powder will settle down in bottom.



Chilli powder



Saw dust

## TEST 27

### Detection of starch in asafoetida

#### Testing method:

- 1 Tincture of iodine is added to the sample of asafoetida.
- 2 Appearance of blue colour shows the presence of starch.



Asafoetida



Starch



## TEST 28

### Detection of chalk in common salt

#### Testing method:

- 1 Stir a spoonful of sample of salt in a glass of water.
- 2 The presence of chalk will make solution white and other insoluble impurities will settle down.



Common salt



Chalk

## TEST 29

### Detection of exhausted cloves in cloves

#### Testing method:

- 1 Take some water in a glass and put cloves.
- 2 Genuine cloves will settle down at the bottom while exhausted cloves will float on surface.



Cloves



Volatile oil extracted cloves

### TEST 30

#### Detection of cassia bark in cinnamon

##### Testing method:

- 1 Take small quantity of cinnamon in a glass plate.
- 2 If adulterated, on close visual examination, cassia bark that comprises of several layers in between the rough outer and inner most smooth layers can be differentiated from cinnamon.
- 3 Cinnamon barks are very thin that can be rolled around a pencil or pen. It has a distinct smell.



Cinnamon



Cassia

### TEST 31

#### Detection of grass seeds coloured with charcoal dust in cumin seeds

##### Testing method:

- 1 Rub small amount of cumin seeds on palms.
- 2 If palms turn black; adulteration is indicated.



Pure



Adulterated

## TEST 32

### Detection of argemone seeds in mustard seeds

#### Testing method:

- 1 Take small quantity of mustard seeds in a glass plate.
- 2 Examine visually for the argemone seeds.
- 3 Mustard seeds have a smooth surface and when pressed, inside it is yellow in colour.
- 4 Argemone seeds have grainy, rough surface and are black in colour. When pressed, it is white in colour from inside.



Mustard seeds



Argemone seeds

## TEST 33

### Detection of lead chromate in turmeric whole

#### Testing method:

- 1 Add small quantity of turmeric whole in a transparent glass of water.
- 2 Pure turmeric will not leave any colour.
- 3 Adulterated turmeric appears to be bright in colour and leaves colour immediately in water.



Pure



Adulterated

## TEST 34

### Detection of artificial colour in turmeric powder

#### Testing method:

- 1 Add a teaspoon of turmeric powder in a glass of water.
- 2 Natural turmeric powder leaves light yellow colour while settling down.
- 3 Adulterated turmeric powder will leave a strong yellow colour in water while settling down.



Pure



Adulterated

## TEST 35

### Detection of sawdust and powdered bran in powdered spices

#### Testing method:

- 1 Sprinkle powdered spices on the water surface.
- 2 Pure spices will not leave any saw dust/powdered bran on the surface of water.
- 3 If spices are adulterated, saw dust/powdered bran will float on the surface.



Pure



Adulterated



## TEST 36

### Differentiation of common salt and iodised salt

#### Testing method:

- 1 Cut a piece of potato, add salt and wait for a minute.
- 2 Add two drops of lemon juice.
- 3 If it is iodised salt, blue colour will develop.
- 4 In the case of common salt, there will be no blue colour.



Iodised salt



Common salt

## TEST 37

### Detection of coloured dried tendrils of maize cob in saffron

#### Testing method:

- 1 Genuine saffron will not break easily like artificial. Artificial saffron is prepared by soaking maize cob in sugar and colouring it with coal tar.
- 2 Take a transparent glass of water and add small quantity of saffron.
- 3 If saffron is adulterated, the artificial colour dissolves in water rapidly. A bit of pure saffron when allowed to dissolve in water will continue to give its saffron colour so long as it lasts:



Saffron



Coloured tendrils





## Fruits and Vegetables

## TEST 38

### Detection of malachite green in green vegetables like bitter gourd, green chilli and others.

#### Testing method - 1:

- 1 Take a cotton piece soaked in water or vegetable oil. (conduct the test separately)
- 2 Rub the outer green surface of a small part of green vegetable/chilli.
- 3 If the cotton turns green, then it is adulterated with malachite green.



Pure



Adulterated

#### Testing method - 2:

- 1 Take a small part of the sample and place on a piece of moistened white blotting paper.
- 2 The impression of colour on the paper indicates the use of malachite green, or any other low priced artificial colour.



Green Vegetables



Malachite Green

## TEST 39

### Detection of artificial colour on green peas

#### Testing method:

- 1 Take little amount of green peas in a transparent glass.
- 2 Add water to it and mix well.
- 3 Let it stand for half an hour.
- 4 Clear separation of colour in water indicates adulteration.



Pure



Adulterated

## TEST 40

### Detection of rhodamine B in sweet potato

#### Testing method:

- 1 Take a cotton ball soaked in water or vegetable oil. (conduct the test separately)
- 2 Rub the outer red surface of the sweet potato.
- 3 If cotton absorbs colour, then it indicates the usage of rhodamine B for colouring the outer surface of sweet potato.



Pure



Adulterated

## Beverages

## TEST 41

### Detection of clay in coffee powder

#### Testing method:

- 1 Add  $\frac{1}{2}$  teaspoon of coffee powder in a transparent glass of water.
- 2 Stir for a minute and keep it aside for 5 minutes. Observe the glass at the bottom.
- 3 Pure coffee powder will not leave any clay particles at the bottom.
- 4 If coffee powder is adulterated, clay particles will settle at the bottom.



Pure



Adulterated

## TEST 42

### Detection of chicory powder in coffee powder

#### Testing method:

- 1 Take a transparent glass of water.
- 2 Add a teaspoon of coffee powder.
- 3 Coffee powder floats over the water but chicory begins to sink.



Pure



Adulterated



## TEST 43

### Detection of exhausted tea in tea leaves

#### Testing method - 1:

- 1 Take a filter paper and spread few tea leaves.
- 2 Sprinkle with water to wet the filter paper.
- 3 Wash the filter paper under tap water and observe the stains against light.
- 4 Pure tea leaves will not stain the filter paper.
- 5 If coal tar is present, it will immediately stain the filter paper.

#### Testing method - 2:

- 1 Take small amount of tea leaves/ dust and place it in the centre of a filter paper.
- 2 Add water drop by drop at the heap of the tea leaves/ dust.
- 3 If the tea is adulterated with a coloured tea, water will dissolve the added colour and leave streak of colour in the filter paper.



Pure



Adulterated

#### Testing method - 3:

- 1 Spread a little slaked lime on white porcelain tile or glass plate.
- 2 Sprinkle a little tea dust on the lime.
- 3 Red, orange or other shades of colour spreading on the lime will show the presence of coal tar colour.
- 4 In case of genuine tea, there will be only a slight greenish yellow colour due to chlorophyll, which will appear after some time.

## TEST 44

### Detection of iron filings in tea leaves

#### Testing method:

- 1 Take small quantity of tea leaves in a glass plate.
- 2 Move the magnet through the tea leaves.
- 3 Pure tea leaves will not show any iron filings on the magnet.
- 4 If adulterated, then iron filings will be seen on the magnet.



Pure



Adulterated

## Quick tests for establishing tentative authentication of food products by sensory evaluation

Food product	Adulterant	Method of sensory evaluation
Milk	Synthetic milk	<ol style="list-style-type: none"> <li>1. Synthetic milk gives bitter taste.</li> <li>2. If adulterated, it gives a soapy feeling on rubbing between the fingers.</li> </ol>
Black pepper/ Cloves	Coated with mineral oil	Black pepper coated with mineral oil gives kerosene like smell.
Chilli powder	Brick powder, salt powder or talc powder	<ol style="list-style-type: none"> <li>1. Take a teaspoon of chilli powder in a glass of water and examine the residue.</li> <li>2. When the residue is rubbed &amp; if any grittiness is felt it indicates the presence of brick powder/sand.</li> <li>3. When the white residue is rubbed, soapy and smooth feel indicates the presence of soap stone.</li> </ol>
Cloves	Volatile oil extracted cloves (exhausted cloves)	<ol style="list-style-type: none"> <li>1. Exhausted cloves can be identified by its small size and shrunken appearance.</li> <li>2. The characteristic pungency of genuine cloves is less pronounced in exhausted cloves.</li> </ol>
Sugar	Urea	<ol style="list-style-type: none"> <li>1. Rub little sugar on palm and smell. If adulterated with urea, it will have smell of ammonia.</li> <li>2. Dissolve a small amount of sugar in water.</li> <li>3. If adulterated, urea in sugar gives a smell of ammonia.</li> </ol>
Wheat, Rice, Maize, Jowar, Bajra, Channa, Barley etc.	Kernel Bunt	<ol style="list-style-type: none"> <li>1. Separate out the non-characteristic grains and examine.</li> <li>2. Kernel bunt has a dull appearance, blackish in colour and rotten fish smell.</li> </ol>
Atta	Resultant atta/ Malda	<ol style="list-style-type: none"> <li>1. When dough is prepared from resultant atta, less water is needed.</li> <li>2. The normal taste of chapati prepared out of atta is somewhat sweetish whereas those prepared out of adulterated will taste insipid (tasteless).</li> </ol>
Sago	Sand or talcum	<ol style="list-style-type: none"> <li>1. Put a little quantity of sago in mouth.</li> <li>2. If adulterated, it will have a gritty feel.</li> </ol>
Powdered spices	Common salt	<ol style="list-style-type: none"> <li>1. Taste for addition of common salt.</li> <li>2. If present, it will taste salty.</li> </ol>
Sweet meat	Artificial Sweetener	<ol style="list-style-type: none"> <li>1. Taste small quantity of sample.</li> <li>2. Artificial sweetener leaves a lingering sweetness on tongue for a considerable time and leaves a bitter after taste.</li> </ol> <p>(Note: This method is applicable if artificial sweetener is used in addition to sugar)</p>

# FEEDBACK FORM

We value your inputs/suggestions as a reader of this manual and we appreciate your feedback on the following:

A. Your general impression about the manual:

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B. Do you think the contents of this manual need improvement? If so, please outline the improvements you would like to see.

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C. Are you aware of any household test for any food product that has not been covered in this manual? If yes, kindly share with us the basic information or a detailed method sheet for inclusion in the next revision.

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D. Any other info which you feel is relevant to this manual

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Please send this feedback form by post or email:  
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## फीडबैक फॉर्म

इस मैन्युअल के पाठक के रूप में हम आपके सुझावों का आदर करते हैं और हम आपसे निम्नलिखित के संबंध में फीडबैक चाहते हैं :

क. मैन्युअल के बारे में आपकी सामान्य राय :

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ख. क्या आपके विचार में इस मैन्युअल की सामग्री में कोई सुधार होना चाहिए ? यदि हाँ, तो कृपया वे सुधार बताएँ।

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ग. क्या आप किसी खाद्य उत्पाद के बारे में किसी ऐसे घरेलू परीक्षण के बारे में जानते हैं, जो इस मैन्युअल में शामिल न किया गया हो? यदि हाँ, तो कृपया हमें वह मुख्य जानकारी दें अथवा उसके बारे में उसे अगले पुनरीक्षण में शामिल करने के लिए एक विस्तृत पद्धति बताएँ।

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घ. इस मैन्युअल के विषय पर अन्य कोई संगत जानकारी

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कृपया यह फीडबैक फॉर्म डाक से अथवा ई-मेल से निम्नलिखित को भेज दें:

गुणवत्ता आश्वासन विभाग

भारतीय खाद्य संरक्षा एवं मानक प्राधिकरण

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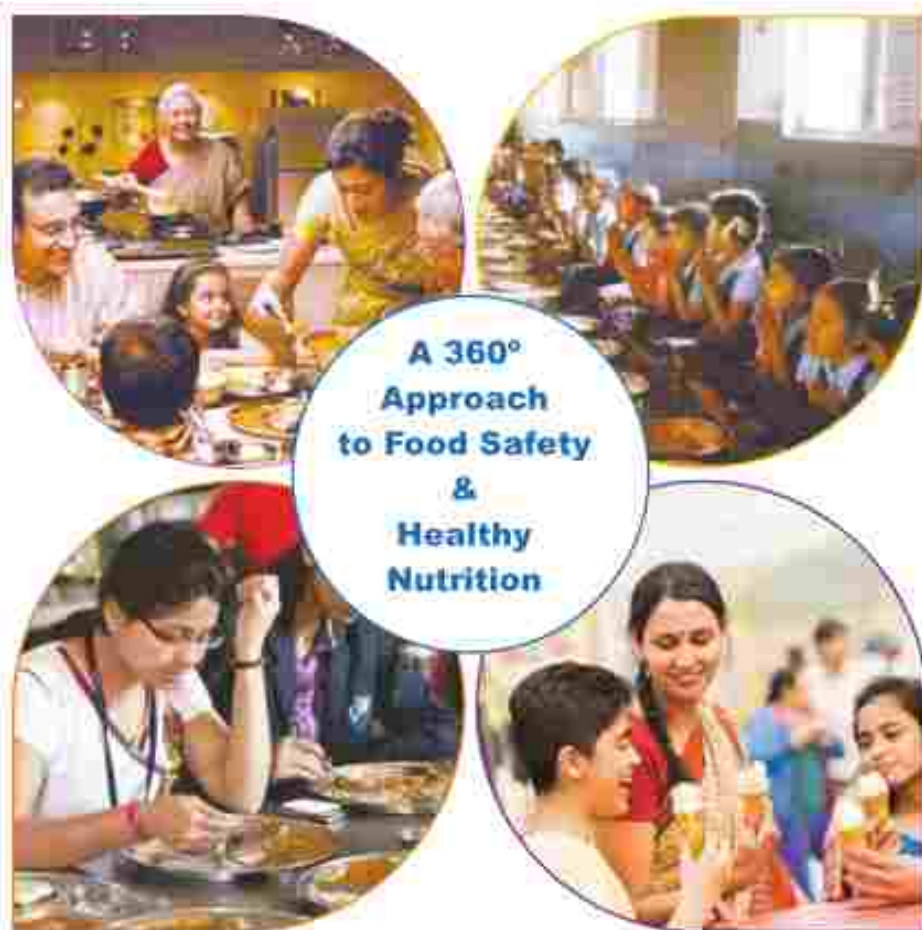
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## Food Safety Connect



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Guidance and Behaviourial Change**

to prevent food borne infections and diseases and for  
complete nutrition for citizens everywhere at all times.



  
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suggestions and queries