DART

DETECT ADULTERATION WITH RAPID TEST

fssai

FOOD SAFETY AND STANDARDS AUTHORITY OF INDIA

Inspiring Trust, Assuring Safe & Nutritious Food

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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 food adulteration methodology and not for any other purpose.

PREFACE

As a part of a mandate to ensure safe food to the citizens, Food Safety and Standards Authority of India (FSSAI) conducts testing of food for different type of adulterants, chemical and micro-biological contaminants and other safety parameters for food. Such food testing is done by FSSAI through a network of FSSAI notified laboratories across the country. Hundreds of thousands of tests are conducted in these labs by FSSAI laboratories every year. A consumer can also take samples of food and get it tested in such labs. If on such testing the food is found to be unsafe, the cost of testing is reimbursed to the consumers. Simultaneously the food safety officers take samples of such products for enforcement purposes.

While the above tests often require sophisticated equipment and highly trained personnels, there are some common adulterants and contaminants that can be tested by citizens themselves. This book is a compilation of such common tests for Detecting Adulterants with Rapid Testing (DART) and covers common adulterants such as artificial and toxic colours, extraneous matters deliberately for otherwise added with food etc.

It is hoped that the citizens find this compilation of common tests useful. Any suggestions or feedback for any other common tests that could be added in such a compilation would be appreciated. This compilation has been done by expert team at FSSAI with the support of scientists from ITC Life Sciences and Technology Centre at Bengaluru. The help of the centre in preparation of manual is gratefully acknowledged.

Pawan Agarwal
Chief Executive Officer
Food Safety and Standards Authority of India

QUICK TESTS FOR SOME ADULTERANTS IN FOODS

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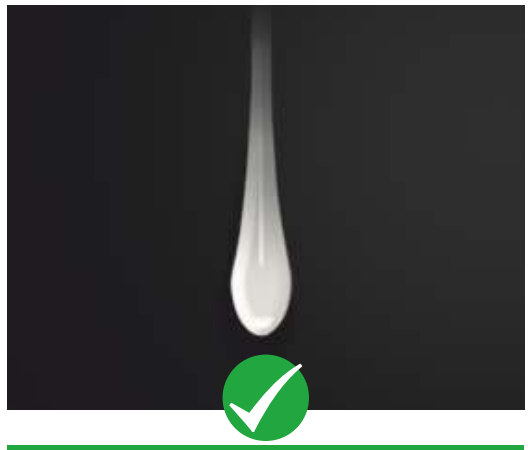
Milk and Milk Products

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 ½ 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

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.

Pure

4. If coconut oil is adulterated, then other oils remain as a separate layer.

Adulterated

Sugars and Confectionery

TEST 6

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.

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.

Pure

Adulterated

TEST 7

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

Food Grains and Its Products

TEST 8

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 9

Detection of ergot (a fungus containing poisonous substance) in food grains

Testing method:

1. Put some grains in a transparent glass containing 20% of salt solution. (20g of table salt/iodised salt in 100ml of water)
2. Ergot floats over the surface while sound grains settle down.
3. Purple black, longer sized grains show the presence of ergots.

Pure

Adulterated

TEST 10

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 11

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

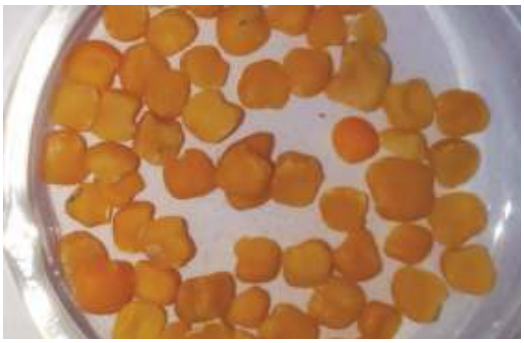
TEST 12

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. Pure dal will not have any such impurities.
4. Khesari dal which has edged type appearance showing a slant on one side and square in appearance can be separated out by close examination.

Pure dal



Khesari dal

TEST 13

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 14

Detection of iron filings in atta/maida/suji (rawa)

Testing method:

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

Pure

Adulterated

TEST 15

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 16

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

Spices and Condiments

TEST 17

Detection of foreign resin in asafoetida (hing)

Testing method:

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

TEST 18

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 19

Detection of papaya seeds in black pepper

Testing method:

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

TEST 20

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 21

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.

Cinnmon

Cassia

TEST 22

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 23

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, inside it is white in colour.

Mustard seeds

Argemone seeds

TEST 24

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 25

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 26

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 27

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

Testing method:

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

Pure

Adulterated

TEST 28

Detection of fennel seeds in cumin seeds

Testing method:

1. Take small quantity of cumin seeds in a glass plate.
2. Examine visually for the fennel seeds.
3. Fennel seeds can be separated out by close examination.

Fennel seeds

Cumin seeds

Miscellaneous

TEST 29

Detection of malachite green in green chilli and green vegetables

Testing method:

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

TEST 30

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 31

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

TEST 32

Detection of white powder in iodised salt

Testing method:

1. Stir ¼ teaspoon of sample of salt in a glass of water.
2. Pure salt dissolves completely and gives a clear solution or gives slightly turbid solution due to the presence of permitted anticaking agent in the salt.
3. If salt is adulterated, solution turns dense white turbid in the presence of chalk powder and other insoluble impurities will settle down at the bottom.

Pure

Adulterated

TEST 33

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

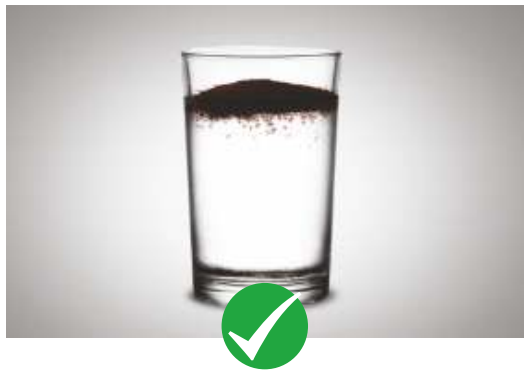
Common salt

TEST 34

Detection of clay in coffee powder

Testing method:

1. Add ½ 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 35

Detection of colour in supari pan masala

Testing method:

1. Add small amount of supari pan masala in a glass of water.
2. Pure supari masala will not leave any colour in water.
3. If adulterated, then colour dissolves in water immediately.

Pure

Adulterated

TEST 36

Detection of exhausted tea in tea leaves

Testing method:

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.

Pure

Adulterated

TEST 37

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

TEST 38

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 39

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

TEST 40

Detection of wax polishing on apple

Testing method:

1. Take a blade and scratch the surface of the apple.
2. Wax comes out if wax polishing has been done.

Pure

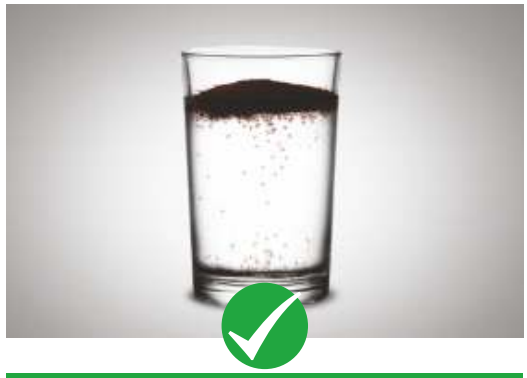
Wax polished

TEST 41

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

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:

Ms. Kanika Aggarwal
Technical Officer
Food Safety and Standards Authority of India
FDA Bhawan, Kotla Road, New Delhi – 110002
Email: labs@fssai.gov.in

फीडबैक फॉर्म

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

क. मैनुअल के बारे में आपकी सामान्य राय :

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ख. क्या आपके विचार में इस मैनुअल 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 मैनुअल 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 मैनुअल 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:

सुश्री कनिका अग्रवाल
तकीनीकी अधिकारी
भारतीय खाद्य संरक्षा एवं मानक प्राधिकरण
एफडीए भवन, कोटला रोड, नई दिल्ली–110002
ई–मेलः labs@fssai.gov.in

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

Food product	Adulterant	Method of sensory evaluation
Milk	Synthetic milk	1. Synthetic milk gives bitter after taste. 2. If adulterated, it gives a soapy feeling on rubbing between the fingers.
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	1. Take teaspoon of chilli powder in a glass of water and examine the residue. 2. When the residue is rubbed & if any grittiness is felt it indicates the presence of brick powder/sand. 3. When the white residue is rubbed, soapy and smooth feel indicates the presence of soap stone.
Cloves	Volatile oil extracted cloves (exhausted cloves)	1. Exhausted cloves can be identified by its small size and shrunken appearance. 2. The characteristic pungency of genuine cloves is less pronounced in exhausted cloves.
Sugar	Urea	1. Rub little sugar on palm and smell. If adulterated with urea, it will smell of ammonia. 2. Dissolve a small amount of sugar in water 3. If adulterated, urea in sugar gives a smell of ammonia.
Wheat, Rice, Maize, Jowar, Bajra, Channa, Barley etc.	Kernel Bunt	1. Separate out the non-characteristic grains and examine. 2. Kernel bunt has a dull appearance, blackish in colour and rotten fish smell.
Atta	Resultant atta/ Maida	1. When dough is prepared from resultant atta, less water is needed. 2. The normal taste of chapati prepared out of atta is somewhat sweetish whereas those prepared out of adulterated will taste insipid (tasteless).
Sago	Sand or talcum	1. Put a little quantity of sago in mouth. 2. If adulterated, it will have a gritty feel.
Powdered spices	Common salt	1. Taste for addition of common salt. 2. If present, it will taste salty.
Sweet meats	Artificial Sweetener	1. Taste small quantity of sample. 2. Artificial sweetener leaves a lingering sweetness on tongue for a considerable time and leaves a bitter after taste. (Note: This method is applicable if artificial sweetener is used in addition to sugar)

FOOD SAFETY AND STANDARDS
AUTHORITY OF INDIA

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CONTACT US

For more information, visit our website
www.fssai.gov.in/snfathome

Write to us at snfathome@fssai.gov.in with your suggestions and queries

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