

# ENSURING SAFETY OF PULSES & BESAN

## SUMMARY

Pulses form a major portion of the Indian diet. They are the main sources of protein in case of vegetarian diets. However, they are sometimes adulterated intentionally or unintentionally. Adulterants such as stones and pebbles in pulses may be incidental or intentional adulteration. An intentional adulteration in pulses is mixing kesari dal in arhar dal since kesari dal is cheap and looks similar. Pulses are also adulterated with colouring matter. Synthetic dyes such as Metanil yellow are used to make pulses look brighter which are injurious to health.

Besan, the flour of Bengal gram, is a popular ingredient in many culinary dishes in India. Because of its high price, it is sometimes adulterated with flours of maize, yellow pea, rice, kesari dal, etc. Synthetic colours such as Metanil yellow is added to besan to enhance colour. Such colours are carcinogenic and may cause stomach disorders. This document will increase consumers' awareness about safety of pulses/besan and serve as a guide to ensure that the pulses/besan we buy are not adulterated.

## KEY TAKEAWAYS

- Consumers should not buy pulses/besan, if odour is unpleasant and taste is bitter or gritty.
- Avoid pulses and besan if living or dead insects are visible in the product.
- Brightly coloured pulses may be artificially coloured. Check for artificial colours as per the test given in para IV.
- Prefer pulses and besan in packed form.
- Prefer pulses and besan certified under AGMARK.
- Check FSSAI license number on the package label.
- Always read the manufacturing/ packaging date and best before date before buying.
- Look for FSSAI Organic logo (Jaivik Bharat) on the pack while buying organic food products.



## I. Introduction

Pulses are one of the major food items in the Indian diet. They play an important role in fulfilling the protein requirements of vegetarians. Pulses and besan are often adulterated by colouring with dyes. Whole and Split Pulses may be adulterated with Dhatura seeds, Chakunda beans etc. Pulses may get contaminated with Ergot, which is a fungus containing poisonous substance. The most dangerous adulteration in pulses is mixing kesari (*Lathyrus sativus*) in arhar since kesari is cheap and looks similar. Sale of Kesari is banned as per the provision in Food Safety and Standards Regulations. Kesari is a hard crop with wild growth and drought resistance and is cheaper than other conventional pulses. Sand, marble chips, stones are some of the unintentional and intentional adulterants in pulses. Synthetic dyes such as Metanil yellow are used by unscrupulous traders to colour pulses to make them look bright.

Besan, the flour of Bengal gram (*Cicer arietinum Linn*), is a popular ingredient in many culinary dishes in India. It has a high demand, which is why besan flour is often adulterated with flours of kesari, maize, rice or yellow pea (*Pisum sativum*) by unscrupulous traders.

## II. Why are Pulses and Besan adulterated

Adulteration is primarily intended for economic gains. Inferior quality pulses are coloured with non-permitted dyes to make them look superior. Many a times, pulses are adulterated with pebbles, stones, weed seeds, weevilled grains etc.

Besan, is a popular ingredient of many culinary dishes in India. However, due to its comparatively high price, it is often adulterated with flours of kesari, rice, yellow pea, maize, etc. by unscrupulous traders for economic gains.



Adulterated

## III. Effects of adulterated pulses and their products on our health

Artificially coloured pulses or besan and those adulterated with kesari lead to serious health risks for the consumers. Consumption of adulterated pulses and besan for prolonged periods may result in cancer, neurological diseases, ulcer, degeneration of reproductive organs, sterility, stomach troubles, etc.



#### IV. How to detect adulteration in pulses and its products (including besan) at home

Adulteration in pulses and its products can be checked at home by using following simple test methods:

##### Whole and Split Pulses

Adulterants	Method of detection
Dust, pebble, stone, straw, weed seeds, damaged grain, insect infestation, weevilled grain, insects, rodent hair and excreta	These may be examined visually to see foreign matter, damaged grains, discoloured grains, insect, rodent contamination, etc.
Clay, stone, gravels, webs, insects, rodent hair and excreta	Visual examination will detect these adulterants.
Ergot (a fungus containing poisonous substance)	Put some grains in a glass tumbler containing 20 per cent salt solution. Ergot floats over the surface while sound grains settle down.
Dhatura seeds	Dhatura seeds are flat with edges with blackish brown colour which can be separated out by close examination.
Chakunda beans	Take small quantity of pulses in a transparent glass plate. Examine the impurities visually. Chakunda beans can be separated out by close examination.
Hidden insect infestation	Take a filter paper impregnated with Ninhydrin (1% in alcohol.) Put some grains on it and then fold the filter paper and crush the grains with hammer. Spots of bluish purple colour indicate presence of hidden insects infestation.
Kesari Dal	<p>i) Kesari dal has edged type appearance showing a slant on one side and square in appearance in contrast to other dals.</p> <p>ii) Add 50 ml of dilute Hydrochloric Acid to the sample and keep on simmering water for about 15 minutes. Development of pink colour indicates the presence of Kesari dal.</p> <p><i>Note: - This test is only for kesari dal. (Metanil yellow, if present, will give a similar colour immediately even without simmering).</i></p>
<b>Colour in Pulses</b> i) Metanil yellow	Take 5 gm of the sample with 5 ml of water in a test tube and add a few drops of concentrated Hydrochloric Acid. A pink colour shows presence of Metanil yellow.
ii) Lead Chromate	Shake 5 gm of pulse with 5 ml of water and add a few drops of HCl. Pink colour indicates Lead Chromate.
iii) Synthetic Colours	Take a transparent glass of water. Add 2 teaspoons of pulses and mix thoroughly. Pure pulses will not leave any colour. Adulterated pulses leave colour immediately in water.

## Besan

Adulterants	Method of detection
Metanil Yellow	<p>Take ½ teaspoon of the besan in a test tube. Pour 3 ml of alcohol in the test tube. Mix up the contents thoroughly by shaking the test tube. Add 10 drops of Hydrochloric acid in it. A pink colouration indicates presence of Metanil yellow in Besan.</p> 
Kesari Flour	<p>Add 50 ml of dilute Hydrochloric Acid to 10 gm of sample and keep on simmering water for about 15 minutes. Development of pink colour indicates the presence of Kesari flour.</p> 

Adulteration in pulses and its products including besan can be checked at home by using simple test methods listed in Detect Adulteration with Rapid Test (DART) booklet prepared by FSSAI. This booklet is a compilation of common quick tests for detection of food adulterants at household level by citizens themselves. It can be downloaded free from the FSSAI website (<http://www.fssai.gov.in/home/capacity-building/FSSAI-Books.html>)

## V. Provisions under Food Safety and Standards Act, 2006

Standards of pulses are notified in the Sub Regulation 2.4.6.22 of Food Safety and Standards (Food Products Standards and Food Additives), Regulations, 2011. These standards apply to whole, shelled (de-husked) and split variants of 12 types of pulses, namely; Lentil (Masur), Black gram (Urd), Green gram (Moong), Bengal gram (Chana or Chick pea) or Kabuli chana or Chhole or (green chick pea) hara chana, Red gram (Arhar), Horse gram (Kulthi), Field bean (Black, Brown, White), Peas dry (Matra), Soybean, Rajmah or Double beans or Broad beans or Black beans, Lobia or black eyed beans or black eyed white lobia, Moth bean (matki). Limit of moisture, extraneous matter, defects, uric acid, etc. are important parameters in the standards.

Standard for Besan is prescribed under Sub Regulation 2.4.4 of Food Safety and Standards (Food Products Standards and Food Additives), Regulations, 2011. The Sub Regulation “2.2.1: Restriction on use of certain ingredient relating to Kesari dal” of Food Safety and Standards (Prohibition and Restriction on Sales), Regulations, 2011 prohibits sale of Kesari dal (*Lathyrus sativus*) and its products.

*These regulations are available on FSSAI website ([www.fssai.gov.in](http://www.fssai.gov.in)).*

## VI. How to report the sale of adulterated Pulses and Besan

- Consumers should inform the Food Safety Department about any illegal sale of adulterated foodstuff in their areas. Anyone can report the problem relating to safety of food to the concerned State Food Safety Commissioners. Contact details of Food Safety Commissioners are available on FSSAI website [www.fssai.gov.in](http://www.fssai.gov.in).
- Consumers can also share their concerns through Food Safety Connect Portal (<https://foodlicensing.fssai.gov.in/cmsweb/>) or may register their complaint on FSSAI App available at Google Play store.
- Consumers can also visit on (<http://foodsmart.fssai.gov.in/home.html>) to become aware of other food safety/labelling provisions.

## References

### Related FSSAI Regulations and Standards

- *Food Safety & Standards (Food products Standards and Food Additives), Regulations, 2011.*
- *Food Safety and Standards (Prohibition and Restrictions on Sale) Regulations, 2011.*
- *Quick test for some adulterant in Food: instruction manual part II (Methods for detection of adulterants).*

### Other sources

- *A project work on Detection of Adulteration in some common foodstuff* (<https://www.researchgate.net/publication/272492507>)
- *Methods for Detection of common adulterants in food* <http://vikaspedia.in/health/health-campaigns/beware-of-adulteration/methods-for-detection-of-common-adulterants-in-food>
- *Guide to consumer (Colour Adulteration), Consumer Rights Education & Awareness Trust (CREAT)* [http://www.creatindia.org/pdf/guide\\_colour\\_adultration.pdf](http://www.creatindia.org/pdf/guide_colour_adultration.pdf)
- [https://jemds.com/latest-articles.php?at\\_id=7652](https://jemds.com/latest-articles.php?at_id=7652)
- *All India Ex-servicemen Joint Action Front (Sanjha Morcha).* <http://www.sanjhamorcha.com/?p=4580>