



**Biotica  
Research  
Today**

**Vol 2:8** <sup>832</sup>  
**2020** <sup>834</sup>

# Common Adulteration in Oil and Ghee and Their Rapid Detection Techniques

**Trupti Dash\* and Kailash Chandra Samal**

Dept. of Agricultural Biotechnology, College of Agriculture,  
Odisha University of Agriculture and Technology, Bhubaneswar,  
Odisha (751 003), India

 **Open Access**

**Corresponding Author**

Trupti Dash

e-mail: [truptidashctc@gmail.com](mailto:truptidashctc@gmail.com)

 **Keywords**

Adulteration, Detection, Ghee, Oil

## Article History

Received in 26<sup>th</sup> August 2020

Received in revised form 27<sup>th</sup> August 2020

Accepted in final form 28<sup>th</sup> August 2020

E-mail: [bioticapublications@gmail.com](mailto:bioticapublications@gmail.com)

## How to cite this article?

Dash and Samal, 2020. Common Adulteration in Oil and Ghee and Their Rapid Detection Techniques. Biotica Research Today 2(8): 832-834.

## Abstract

Ghee is obtained from the milk and edible oils such as coconut, sesame, peanut, mustard oil are extracted from the seeds of the plants. Taking the advantage of food shortage and lack of monitoring on food safety and quality, few food vendors adopt illegal method of food adulteration. They add similar equally likely food and non-food cheaper substances to the food to increase its volume and appearance for getting higher profit in an illegal manner. This practice of adulteration causes serious threat to human health. The safety of food is vital to all consumers and they must have confidence that the food they buy and eat should be free from adulterants. Easy method of detection of adulterants in foodstuff and its estimation is one of the key concerns in recent years. The aim of this study was the detection of the adulteration in ghee and oil by rapid detection technique.

## Introduction

Food is any substance that is directly or indirectly consumed by organisms which provide nutritional support. Food is usually of plant or animal origin and contains essential nutrients, such as carbohydrates, fats, proteins, vitamins or minerals. However the growing population and increased food demand leads to shortage of quality food items to meet the demand, which indirectly leads to creation of different illegal method of adding of similar equally likely food and non-food cheaper substances to the food to increase the volume for profit making. This is called adulteration. The selfish food traders compromise the health of the consumer by adulteration of food for their financial gains.

## Adulteration in Edible Oil

Edible oils are used as cooking or frying medium in food products. But some adulterants are added routinely by some traders. Generally mustard oil is adulterated with argemone oil and butter yellow has been reported. Coconut oil is adulterated with palm oil, argemone and cotton seed oil. Sesame oil is generally adulterated with peanut oil, olive oil, perilla oil, walnut oil, avocado oil, canola oil, and others. As peanut oil (groundnut oil) is more expensive than other oil, it is adulterated with other cheap seed oils, such as soybean oil, palm oil, cotton seed oil, corn oil, rapeseed oil, and others.

## Adulteration in Ghee

Ghee also known as clarified butter is most commonly used and regular ingredient in Indian kitchen, and also considered to be a symbol of wealth and prosperity of a family. According to Ayurveda ghee is an important ingredient used for Ayurvedic medicines as it promotes good health and helps in growth. Due to its high demand in Indian

market adulteration is very common in ghee (Gupta *et al.*, 2013). Generally boiled potato is used to increase the volume and also other non-edible mineral oils are used. Along with it animal fat materials like tallow is used which is a serious concern especially due to cultural and religious background in India which includes vegetarianism and motherly attitude towards cow.

## Food Safety

The safety of food is vital to all consumer and food businesses. Consumer must have confidence that the food they buy and eat will be what they expect, food will not harm them and they should be protected from fraud. The customer's interest should not be underestimated. So, on this regard the parliament has passed the Food Safety and Standard Act, 2006 (<https://fssai.gov.in/dart>). The Food Safety and Standard Act, 2006 is act to consolidate the laws relating to food and to establish the food safety and standard authority of India for laying down science based standard for articles of food and to regulate their manufacture, storage distribution, sale and import, to ensure availability of safe and wholesome food for human consumption and for matters connected therewith. This includes prevention of food adulteration act 1954; Fruit products order, 1955; Meat food product order, 1973; Vegetable oil products (control) order, 1947 act (Meduri, 2005 and <https://fssai.gov.in/dart>).

## Methods for Detection of Adulteration in Oils and Ghee

### **(a) Vegetable oil (containing mixture of different oils): Freezing Method**

In freezing method the oil is placed in a transparent bowl and placed in refrigerator and allowed to freeze. After 75-80 minutes it should be checked whether coagulated or not. If coagulated than it is of good quality and if not, and having liquid oil remaining then it contains other oil having different freezing point.

### **(b) Vegetable oil (admixed with tri ortho-cresyl-phosphate)**

The vegetable oil (2 ml) was taken in a container and a piece of yellow butter should be added, if it changes the colour to red then the vegetable oil is adulterated one. If no colour change then it is ascertained that the test vegetable oil is pure one.

### **(c) Coconut oil (with other oil mixture)**

Coconut oil (2 ml) was taken in a bowl and that bowl was kept inside the refrigerator at 5-10 °C for 60-90 minutes. If completely solidify than pure, then the coconut oil is pure one. If not, and having liquid oil remaining then it contains other oil having different freezing point.

### **(d) Sesame oil and groundnut oil**

**Odour Identification:** A drop of oil was taken in the hand for friction, if the oil is along with pure flavour, it is sesame oil, if it is along with bean smell, the oil may be mixed with soybean oil, if the oil is along with spicy flavour then mixed with rapeseed oil.

**Shake Method:** Sesame oil is taken a bottle and shaken gently. If the bubble is transparent and disappears quickly, usually it indicates that it is pure otherwise it is adulterated one.

**Freezing method:** Sesame oil in a bottle is kept in a refrigerated till it solidifies. After solidification the bottle is taken out. If frozen sesame oil will melt quickly when placed outside then it indicates the sesame is pure one. On the other hand poor quality sesame oil dissolves slowly and significant hard lumps will be visible during slow melting.

### **(e) Ghee**

**Heat method:** About five gram of ghee was taken on a plate and it was heated. If it melts quickly and the colour changes to dark brown then it indicates the ghee is pure. On the other hand if the ghee melts slowly and remains yellow then it is ascertained that the test ghee sample is an adulterated with other vegetable or natural oils.

**Iodine test:** In most cases boiled potato is added in ghee to increase its volume. For this a simple iodine test is conducted. In this method iodine containing ointment available at home is used for testing the purity of ghee. First iodine or iodine containing ointment is mixed with some ghee sample. if the iodine changes its colour to dark blue than it contains boiled potato as starch of the potato reacts with iodine and turns into dark blue colour. If no blue colour appears, then it indicates the ghee is a pure one.

**Sugar test:** In many cases other low cost vegetable oil is added in ghee to increase its volume and to fetch more profit. To test the presence of vegetable oil in ghee, about five gram of ghee is taken in bottle and little quantity of sugar is added to it. By closing the cap the bottle is shaken and then placed it for 5 minutes. If ghee is adulterated with vegetable oil then red colour precipitation is formed in the bottle. No precipitation indicates the ghee is pure.

## Conclusion

Adulteration is an illegal practice. Adulterated food is highly toxic and leads to several health issues, including certain nutrition deficiency diseases, kidney disorders, and failure of an individual's organ systems, including heart, kidney, and liver. Similarly, argemone oil mixed with edible oils can lead to epidemic dropsy, glaucoma and loss of eyesight. Therefore there is an urgent need for authentication and prevention of adulteration for the sake of consumers. However, apart from legal prosecution consumer awareness is also required. Responsive consumer can use these easy

methods of detection of admixture and can filed complain against the shopkeeper.

## References

Gupta, V.K., Shukla, S., Singh, R.V., Gupta, P., 2013. Assessment of milk food safety status: common milk adulterants in rural and urban areas of Indian Malwa plateau and their public health significance. *Vet. Practitioner*, 14(2), 536-539.

<https://fssai.gov.in/dart/> : Common quick tests for detection of some food adulterants at household. The Food Safety and Standards Authority of India (FSSAI), Govt. of India.  
Meduri, A., 2005. An Exhaustive Commentary on-The Prevention of Food Adulteration Act & Rules (Central and States with State Amendments)-A (PDF) *Adulteration in food - A threat to consumers in India. a*