

## FACTORS AFFECTING THE QUALITY OF COTTONSEED OIL

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**Abstract:** *This article provides information on the composition of cottonseed oil and its storage conditions. The primary uses of cottonseed oil are food related; it is used as salad oil, for frying, in margarine manufacture, and for manufacturing shortenings used in cakes and biscuits.*

**Key words:** *cottonseed oil, fatty acids, gossypol, storage conditions, cold pressing*

Cottonseed oil is extracted from the seeds of cotton plants of various species, mainly *Gossypium hirsutum* and *Gossypium herbaceum*. They are grown primarily to produce for cotton fiber and animal feed. Processing includes the use of hydraulic pressing, screw pressing, and solvent extraction.

It is classified as a polyunsaturated oil, with 70% unsaturated fatty acids (18% monounsaturated and 52% polyunsaturated). It contains palmitic acid 20–25%, stearic acid 2–7%, oleic acid 18–30%, and linoleic acid 40–55%. It also contains a toxic yellow polyphenolic compound known as gossypol. This naturally occurring colored compound is found in tiny glands in the seed, leaf, stem, tap root bark, and root of the cotton plant.

The adaptive function of the compound facilitates natural insect resistance. In producing finished oil, the three key steps of refining, bleaching, and deodorizing act to eliminate the gossypol.

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Gossypol, the toxic component that must be removed from the oil used for edible purposes, is a polyphenolic aldehyde. It comprises 0.1–0.2% of crude cottonseed oil, but is a strong antioxidant [1].

### Factors affecting oil quality

Cottonseed oil quality can be influenced by several major factors, namely processing method, storage conditions, and external-internal environmental factors. These factors determine the oil's oxidative stability, shelf life, and nutritional attributes. The processing methods, such as extraction and refining methods, affect the cottonseed oil's various properties, including the oil yield, bioactive component holding, and many more.

The cold pressing of the oil is an energy-efficient and environment-friendly method that holds several bioactive compounds, likely to include tocopherols and phytosterols, by eliminating thermal, chemical, and refining processes [2].

The extraction using solvents (hexane or petroleum ether) increases the yield of oil but leaves behind the footprint of the solvent [3]. Refining can be responsible for the loss of essential bioactive compounds if done excessively; rather, it improves oil taste, stability, and clarity [4].

As cold-pressed and refined cottonseed oil has a high amount of antioxidant retention, it is a preferable choice for consumers who are more considerate about their health. Storage condition is another factor responsible for cottonseed oil's quality and shelf life. In case of inappropriate conditions, i.e., exposure to oxygen, high temperature, exposure to ultraviolet radiation, and high could lead to an acceleration of oxidation and hydrolysis, resulting in loss of nutritional value and rancidity [5].

A warmer climate influences the quality of the oil by promoting an increase in oleic acid content and improving oxidative stability. Cottonseed oil quality is influenced by processing methods, storage conditions, and environmental factors, affecting its stability, nutritional value, and shelf life.

Cold pressing retains bioactive compounds like tocopherols and phytosterols, offering a natural and eco-friendly alternative. Solvent extraction improves yield but may leave solvent residues, raising safety concerns. Refining enhances clarity and stability, but if excessive, it depletes essential nutrients.

Storage conditions also play a crucial role; exposure to oxygen, high temperatures, and UV radiation accelerates oxidation, leading to rancidity. Proper storage in dark, airtight containers at controlled temperatures is essential for maintaining oil quality.

To meet consumer demand for healthier oils, optimizing processing techniques while minimizing nutrient loss is crucial. Research into advanced extraction methods, natural antioxidants, and innovative packaging solutions can further enhance cottonseed oil quality, ensuring sustainability and improved consumer health benefits.

#### REFERENCES:

1. Liuping Fan , N.A. Michael Eskin “15 - The use of antioxidants in the preservation of edible oils” Woodhead Publishing Series in Food Science, Technology and Nutrition, 2015, Pages 373-388 <https://doi.org/10.1016/B978-1-78242-089-7.00015-4>
2. S. Wandhekar, V. Pawar, S. Shinde, P. Gangakhedkar, Extraction of oil from oilseeds by cold pressing: a review. *Indian Food Ind. Mag.* 4, 63–69 (2023)
3. P.R. Bhutada, A.J. Jadhav, D.V. Pinjari, P.R. Nemade, R.D. Jain, Solvent assisted extraction of oil from *Moringa oleifera* Lam. seeds. *Industrial Crops and Products* 82, 74–80 (2016)
4. R. Sabbahi, K. Azzaoui, L. Rhazi, A. Ayerdi-Gotor, T. Aussenac, F. Depeint, B. Hammouti, Factors affecting the quality of canola grains and their implications for grain-based foods. *Foods* 12(11), 2219 (2023)

5. G. Talbot, The stability and shelf life of fats and oils. in The stability and shelf life of food, (Woodhead Publishing, 2016), pp. 461–503