Animal Feed Testing

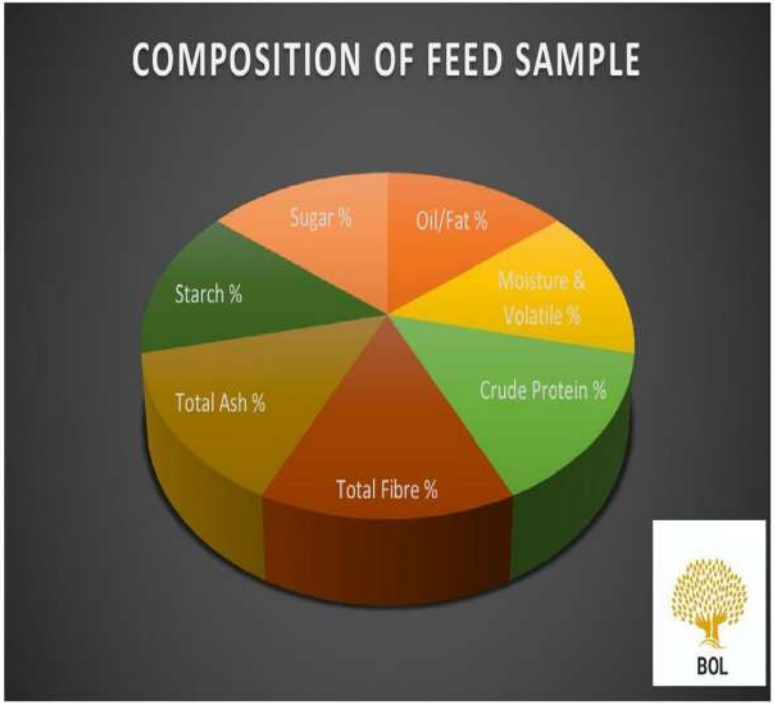
Analytical testing by Bombay Oil Laboratory

ANALYTICAL TESTING AS PER IS 2052:2009 & ISO STANDARDS

Animal feed testing is crucial for ensuring animal health, productivity, and safety of animal products like milk, meat, and eggs. It helps identify potential hazards like mycotoxins in feed, as well as nutrient deficiencies or excesses. This information enables feed manufacturers to make informed decisions about feed formulation, supplementation, and overall animal management, leading to improved animal health and well-being

Testing Parameters

1. Oil content
2. Moisture & Volatile matter
3. Crude Protein
4. Crude Fibre/NDF/ADF
5. Total Ash content
6. Sand/Silica –Acid insoluble Ash
7. Starch
8. Sugar
9. Aflatoxins –Total or B1
10. FFA–Free Fatty Acids



Oil Content–8 to 12 hrs

Oil content in feed samples is determined by solvent extraction technique . This process is most accurate but time consuming usually 8hrs to 12 hrs depending upon the type of commodities

The oil content in commodities like oilseeds, DDGS, DORB, DOC, etc is extracted by double extraction in two stages that takes about 12 hours

The oil content in commodities like RICEBRAN, oilseed cakes, etc is extracted by single solvent extraction process that usually takes about 8 hours

Moisture & Volatile matter –4hrs

Moisture in feed samples is determined analytically by 3 methods:

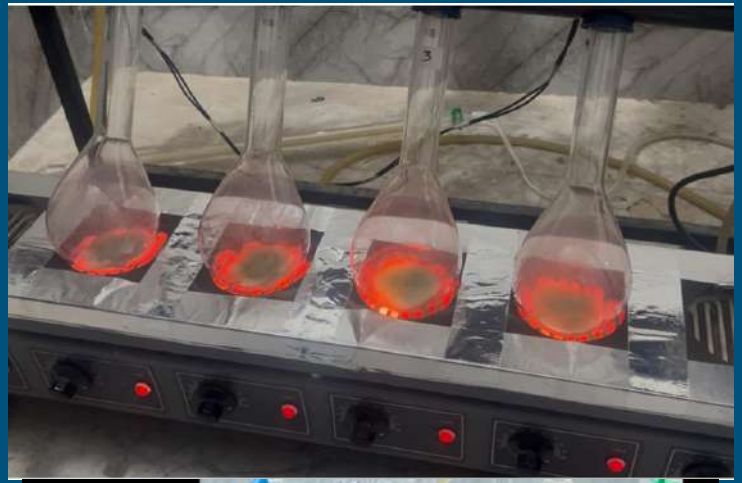
1.Oven Method: This method is most commonly used to determine moisture content plus any substance that is volatile at 105^0C

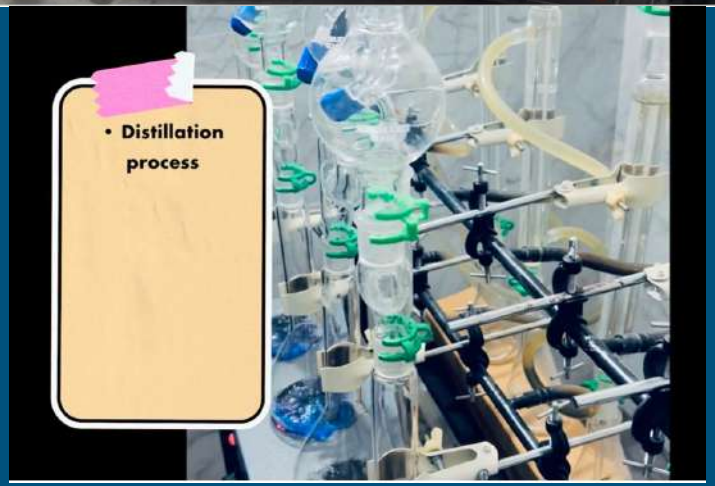
2.Distillation method: This method is used to determine only moisture content present in sample

3.Karl Fischer Method: This method is also used to determine only moisture content more precisely

Crude Protein–8hr

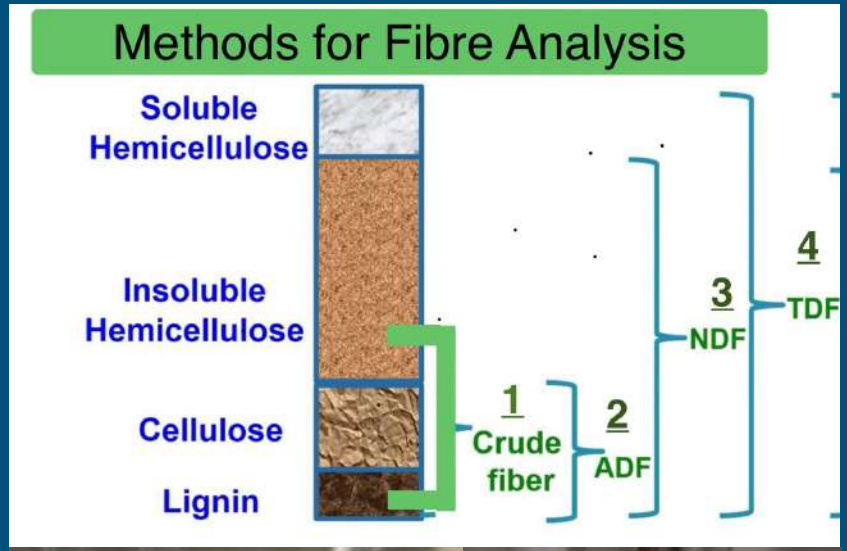
Crude protein in feed samples is determined by manual Kjeldahl’s method that involves 6 steps: a)Sample preparation . b) Digestion. c) Dilution. d) Distillation. e) Titration. f) Calculation

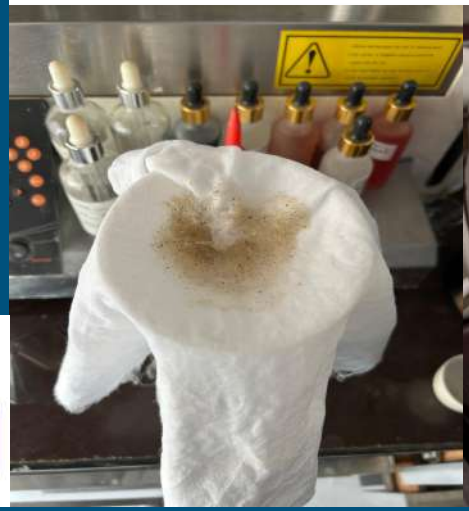




Crude Fibre/NDF/ADF–6hrs

THere are mostly 3 types of tests to determine Fibre content in feed samples like Crude Fibre, NDF & ADF. Among all these tests, Crude Fibre test is more reliable and consistent which is conducted by acid base digestion. NDF test & ADF test is performed chemically by using NDF solution and ADF solution respectively in our lab.





Total Ash–3 hrs
Acid Insoluble Ash–6 hrs

Ash content is determined by burning the feed sample at about 600^0C in a muffle furnace. It mainly represents the mineral level like calcium,magnesium,zinc,etc in feed.

Acid Insoluble Ash(AIA) is determined by treating the total ash with dilute HCL and the remaining residue is AIA that represents the sand & silica in feed . AIA test is used to measure the impurities or contamination level in feed .

FFA–Free Fatty Acids

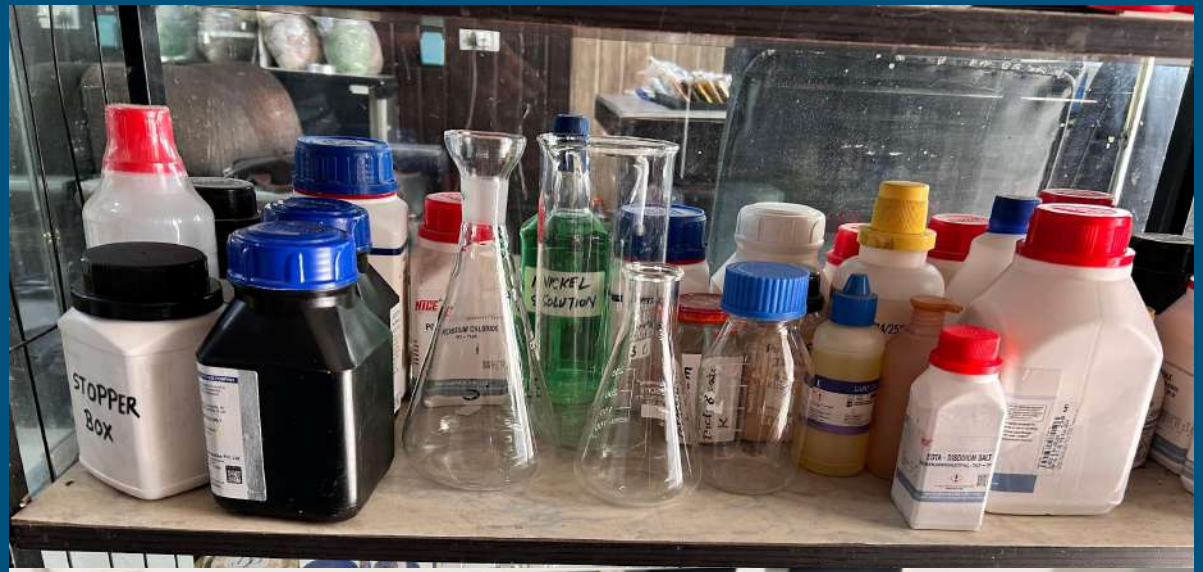
This FFA test is performed on the oil extracted from the feed samples followed by base Titration. This test is the quality test that measures the rancidity of the oil in feed.

High level of FFA in feed indicates the spoilage or degradation of feed.

Starch & Sugar content

Starch and sugar are both carbohydrates and an important source of energy.

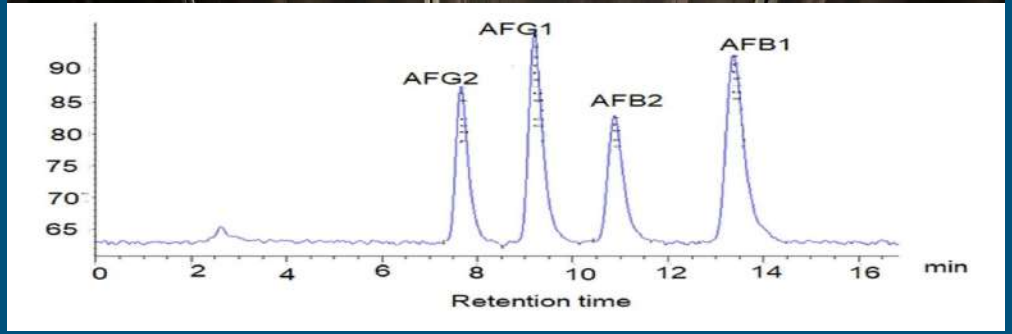
He quantification of starch and sugar in feed sample is done chemically in lab .

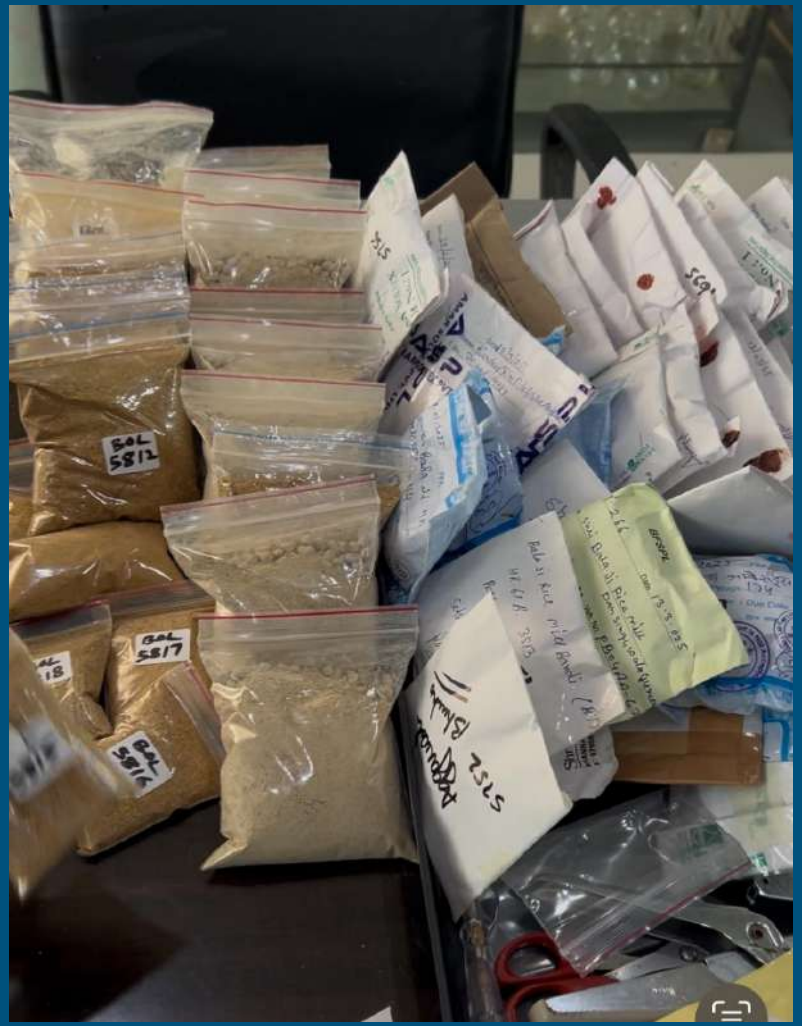


Aflatoxins

Aflatoxins are type of mycotoxins that are found mainly in feed made of maize. To test aflatoxins in feed samples we mainly use ELISA spectroscopy to have more accurate results.

The other method used to test aflatoxins is HPLC–High performance liquid chromatography





BOMBAY OIL LABORATORY

Bathinda(Pb)-9988833224

MOLASSES : Testing Parameters & Related Method

Introduction: Molasses is a by-product of sugar refining and making process from sugarcane or sugar beets which is rich in vitamins and minerals. Types of molasses depends upon the number of times the cane or beet juice is boiled. The first boiling results in light colour sweetened molasses (type A), second boiling results in dark colour less sweater molasses(type B) and third boiling results in blackstrap molasses (type C). It is primarily used as Feedstock for ethanol production and as an ingredient in animal feed.

TESTING PARAMETERS & RELATED METHOD

1. Sugar content expressed as Brix by hydrometer or refractometer
2. Moisture content by hot air oven method
3. PH value by PH meter
4. Total Ash by muffle furnace digestion
5. Crude Protein by Kjeldahl method
6. Fructose & Glucose(Non-Reducing Sugars) &
7. Sucrose (Reducing Sugar) by Lane Eynon method
8. Insoluble Impurities by Filtration or centrifuge
9. Specific Gravity by Pyknometer Method
10. Minerals(Calcium/Potassium/Sodium/Magnesium)
11. Glycemic Index
12. Colour
13. Starch

Feed Analytical Lab Installation

As per IS Standard 2052:2009 that covers the following tests

1. Oil Content — Soxhlet Chemical Extraction
2. Moisture Content — Distillation
3. Volatile Matter — Hot Air Oven
4. Crude Protein — Kjeldahl's Method
5. Total Ash — Muffle Furnace
6. Sand/Silica or Acid Insoluble Ash
7. Crude Fibre /ADF/NDF
8. FFA(Free Fatty Acids)

Our package for lab setup for feed millers includes

1. Complete glassware & Equipments
2. All Chemicals & Reagents required
3. All instruments & Apparatus
4. Transportation & Delivery
5. Complete setup & Installation
6. Training for 1 week at our site
7. Training for 1 day at the time of installation

Things required but not provided by us

1. Separate ventilated room of at least 10*12 fitted with electricity & continuous water supply.
2. There should be a cemented slab on three side of the walls.
3. There should be a ceramic washing sink near the water source and system for water drainage

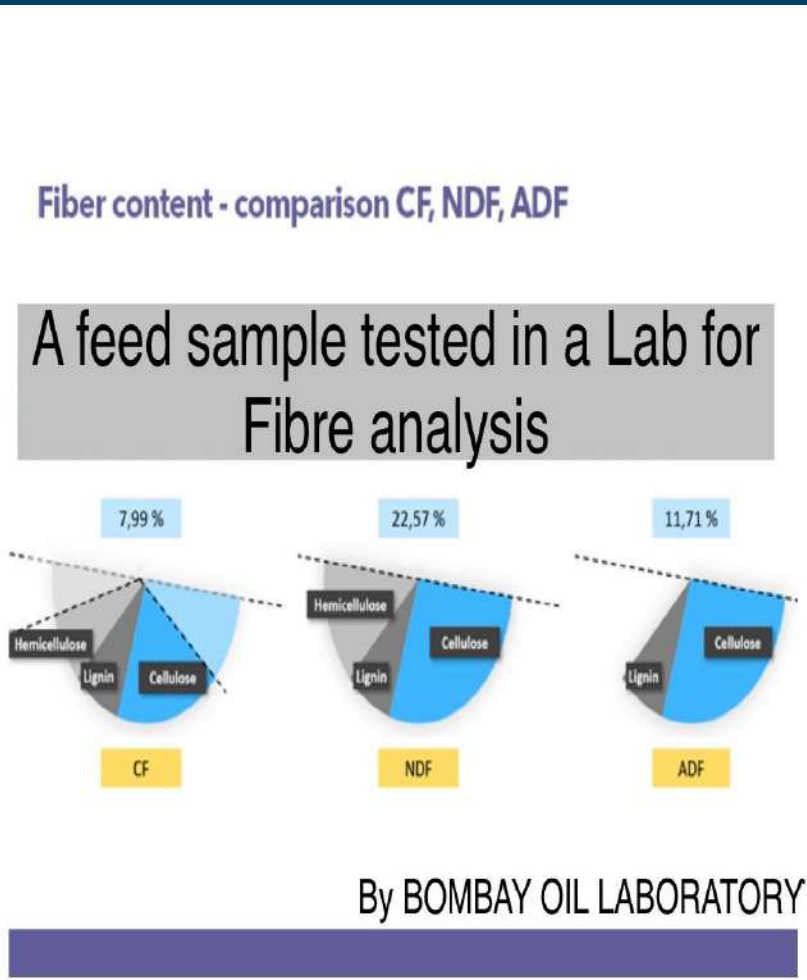
Any one interested please feel free to contact us
BOMBAY OIL LABORATORY —9988833224,7986461910
Booth no 16&17, Old tehsil PUDA complex, opp municipal corporation,railway mall godown road, Bathinda(Pb)-151001

BOL

Crude Fibre (CF) – a chemical method used to describe the indigestible portion of plant material. However, some of these substances can be partially digested by microorganisms in the rumen of cattle. The higher the fibre, the lower the energy content of the feed. It is not a very useful value. The practice of analyzing for it in feeds for ruminants is declining, but it is still commonly used for monogastrics (for example, pigs).

Neutral Detergent Fiber (NDF) – The NDF value is the total cell wall which is comprised of the ADF fraction plus hemicellulose. NDF values are important because they reflect the amount of forage the animal can consume. As NDF percent increases, the dry matter intake generally decreases.

Acid Detergent Fiber (ADF) – The ADF value refers to the cell wall portions of the forage that are made up of cellulose and lignin. These values are important because they relate to the ability of an animal to digest the forage. As ADF increases the ability to digest or the digestibility of the forage decreases.



Nitesh Gupta
Bombay Oil Laboratory
28 March 2025

FFA in Rice Bran

FFA stands for Free Fatty Acids that means the Fatty Acids which are free & not bound to the Oil in the form of triglycerides of glycerol. Rice Bran oil is mainly composed of fatty acids namely oleic acid, palmitic acid, linoleic acid and linolenic acid in the form of triglycerides and when the breakdown of this triglycerides occurs, FFA increases. In simple words we can say that FFA is that part which is no more a part of Oil.

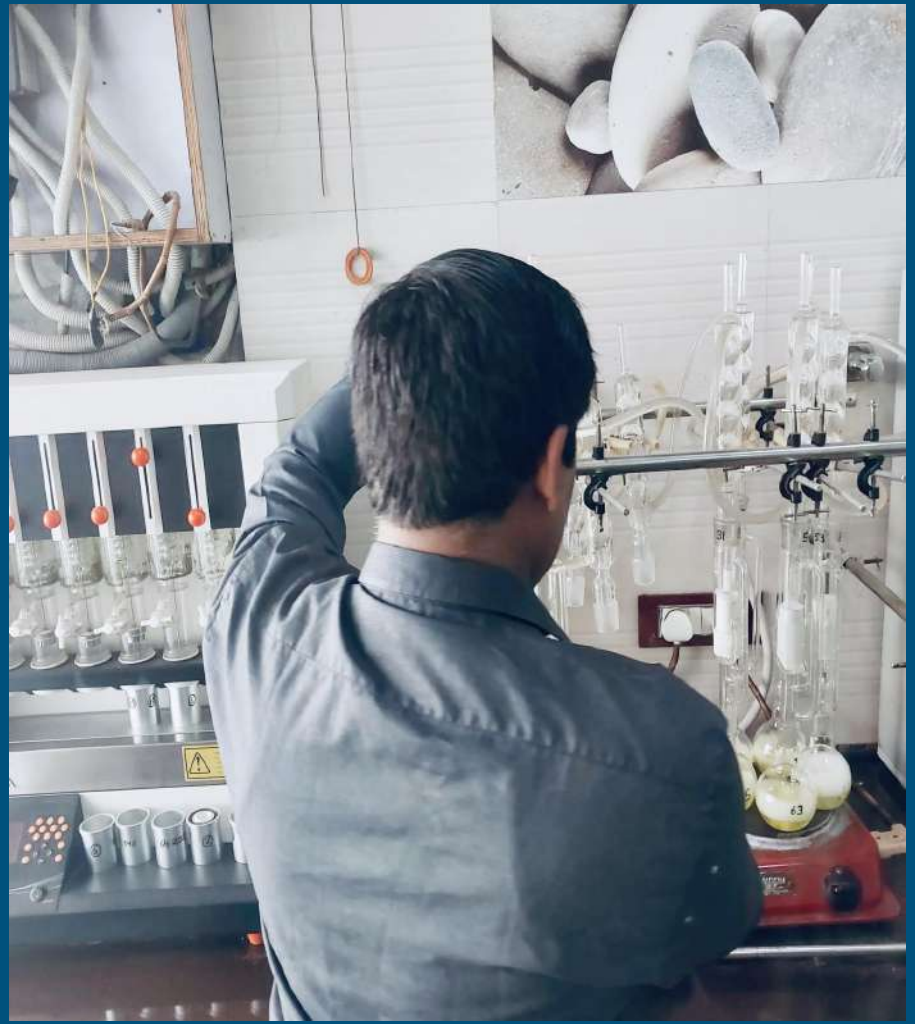
During the milling process when the bran is hulled from the rice, the rice bran undergoes rapid enzymatic hydrolysis by the lipases activity on the bran lipids released from the cell that causes decomposition of oil/lipids into free fatty acids and increase in FFA level in rice bran.

Due to biochemical instability of rice bran produced soon after polishing, the FFA increases rapidly due to breakdown of fatty acids from the oil present in the rice bran.

The other factors that contribute to increase in FFA are storage & processing conditions, Moisture content, temperature, humidity and light.

But as the oil is extracted from the rice bran, the rate of increase in FFA will become very slow in extracted RB Oil as compared to FFA in Rice Bran with oil.

The rice bran with higher FFA values that undergoes thermal treatment(like extruding ,steaming, microwaving) of high temperature for short duration found to have reduced lipase activity and lower FFA values as in the case of Sella.




Oilseeds Extraction unit