



VANILLA PROCESSING

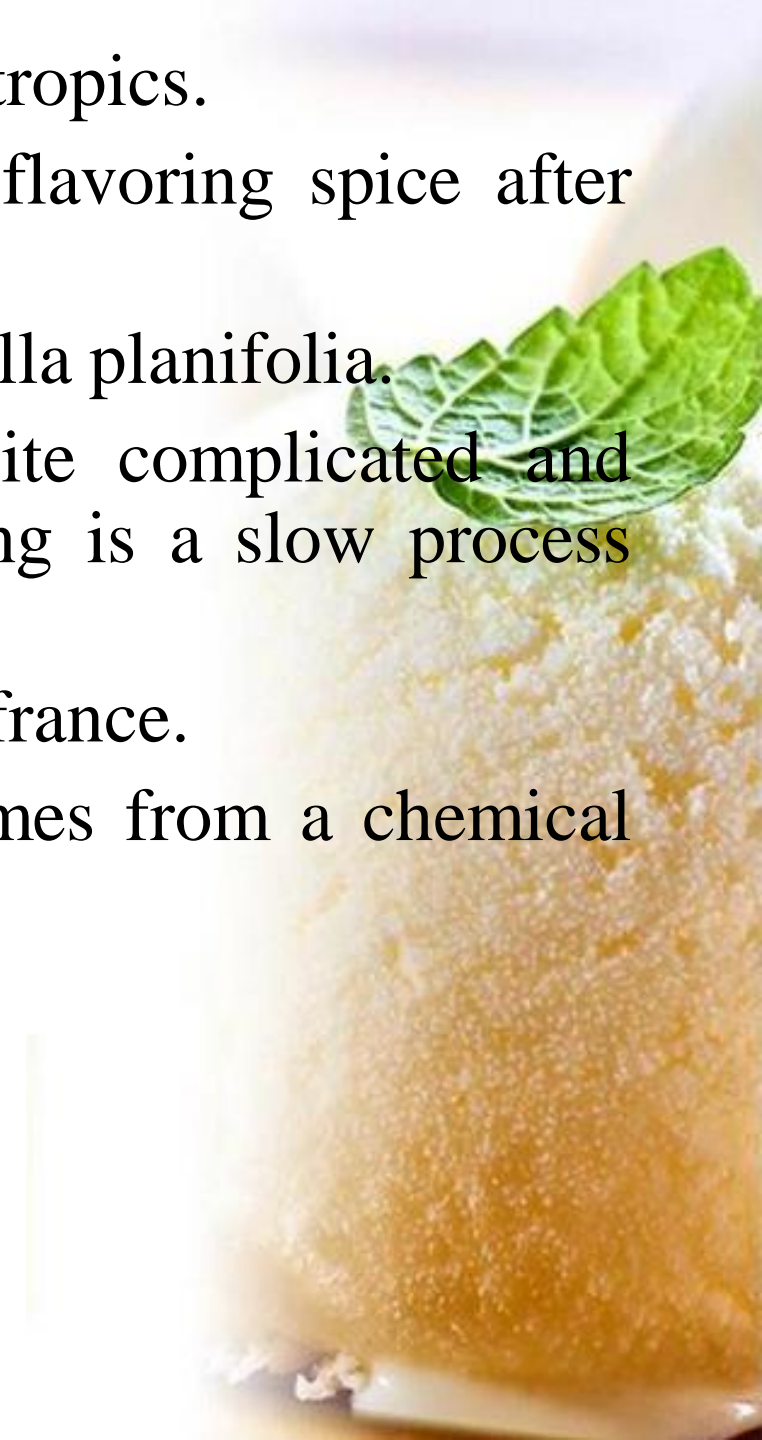
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Introduction

- ✓ Botanical Name - *Vanilla planifolia*
- ✓ Family name – Orchidaceae
- ✓ Origin - It is a native of Atlantic Coast from Mexico to Brazil.
- ✓ Vanilla, is belong orchid family is a climbing monocot possessing a stout, succulent stem, short petioled, oblong leaves about 20 cm long.
- ✓ The inflorescence is a raceme with 20 or more flowers. Flowers are 6 cm long, 2.5 cm wide, either yellowish green or white. Fruit popularly known as ‘beans’ or ‘pod’ is a capsule, nearly cylindrical and about 20 cm long.



- ✓ Vanilla is grown in warm humid tropics.
- ✓ It is the second most expensive flavoring spice after saffron.
- ✓ Vanilla beans are the fruits of *Vanilla planifolia*.
- ✓ Growing of vanilla beans is quite complicated and labour intensive and its processing is a slow process requiring skills.
- ✓ Vanilla flavour first introduced to France.
- ✓ The vanilla flavor and aroma comes from a chemical called vanillin.



Vanilla planifolia



Area and Production

- The producing countries are Madagascar, Mexico, Tahiti, Malagasy Republic, Comoro, Reunion, Indonesia, Seychelles and India.
- Natural growth is obtained at latitudes, 15° North & 20° South of the equator. The optimum temperature ranges from 21-32° C and rainfall 2000-2500 mm annually

Amount of vanilla produced

Country or continent	Production (tons)
Indonesia	3700
Madagascar	2800
China	1400
Mexico	637
Tonga	150
Uganda	70
Asia	5270
Africa	2970
America	645
Oceania	180
European Union	15
World	9080

Source- FAO-STAT, 2010



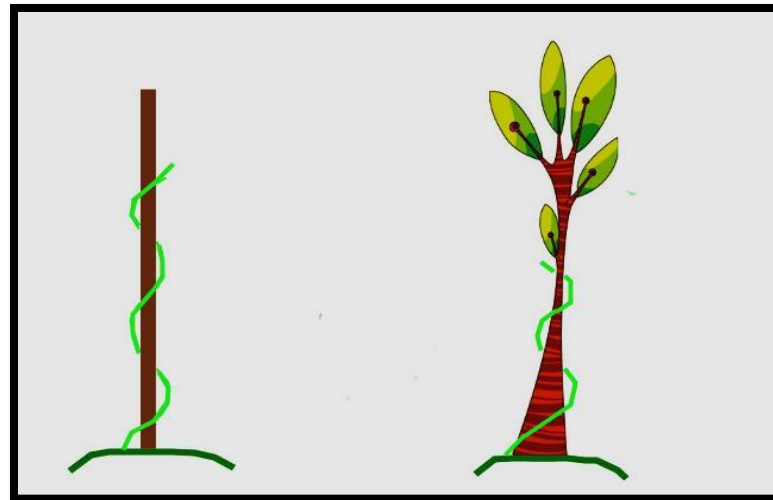
India Market

- Karnataka, Tamilnadu. and Kerla
- In KN Shimoga, Uttara Kannada, Dakshina Kannada, Udupi & Chikmagalur the places Government of India is declared as the Agri-Export Zone for vanilla.
- 2004 India exported 26 tonnes of cured vanilla beans values rupess 36.06(Crores).
- Kerla exported 7 tonnes that they earned Rs. 1175.61 lakhs during 2004-05.



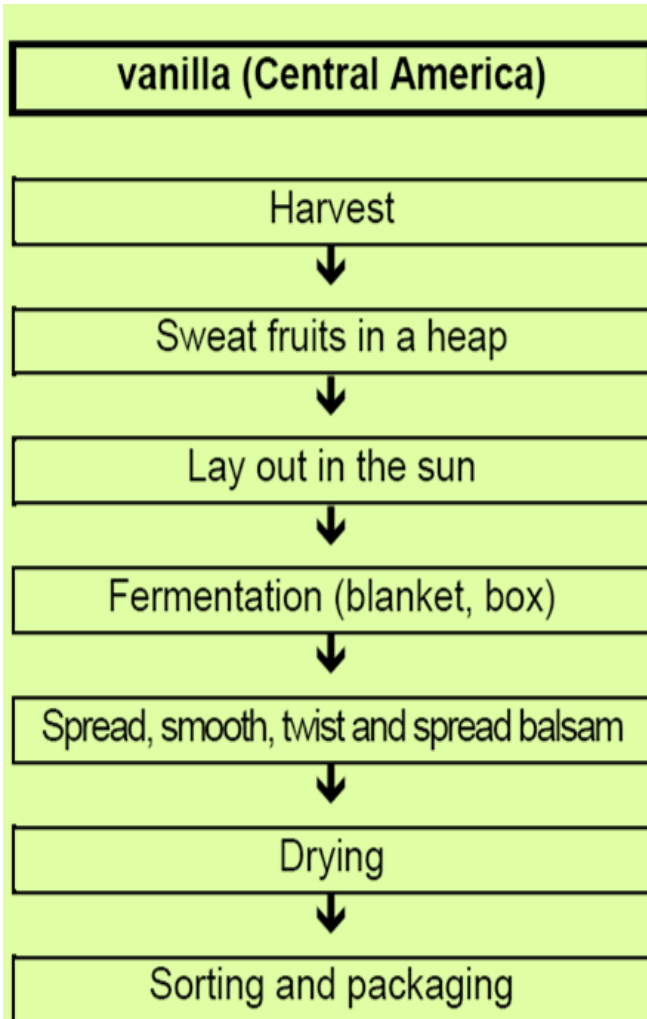
Cultivation

- The vanilla beans need to be supported with a stick
- There are 2 advantages to using trees : they protect the vanilla plant from too much sun, and also provide organic material which becomes natural fertilizer.

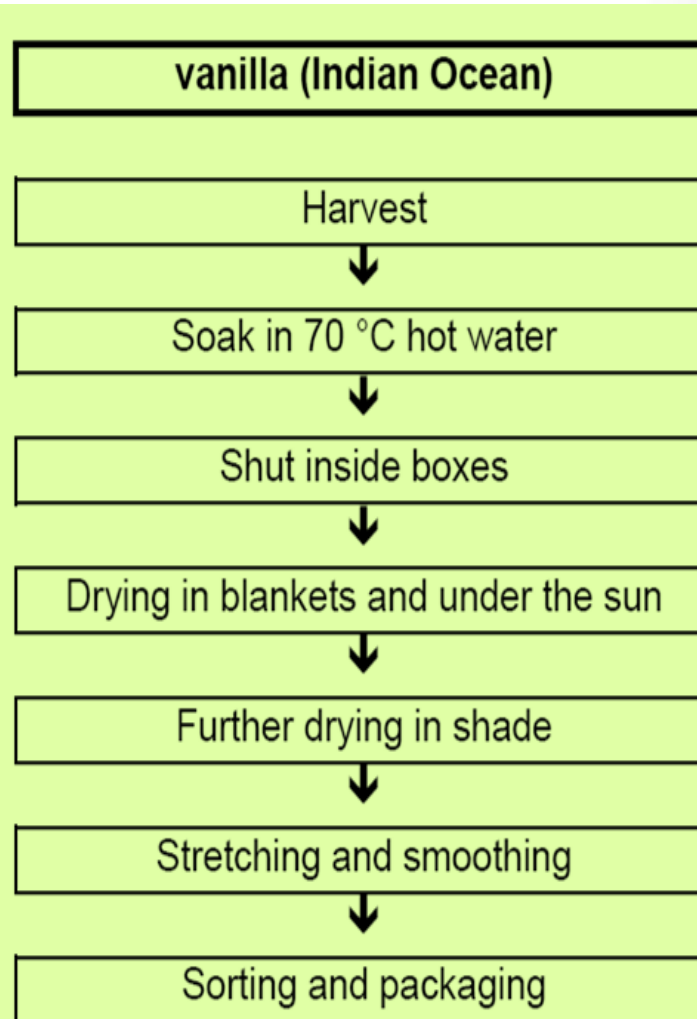


Flow Chart - Processing Vanilla Sticks

Mexico method



Bourbon method

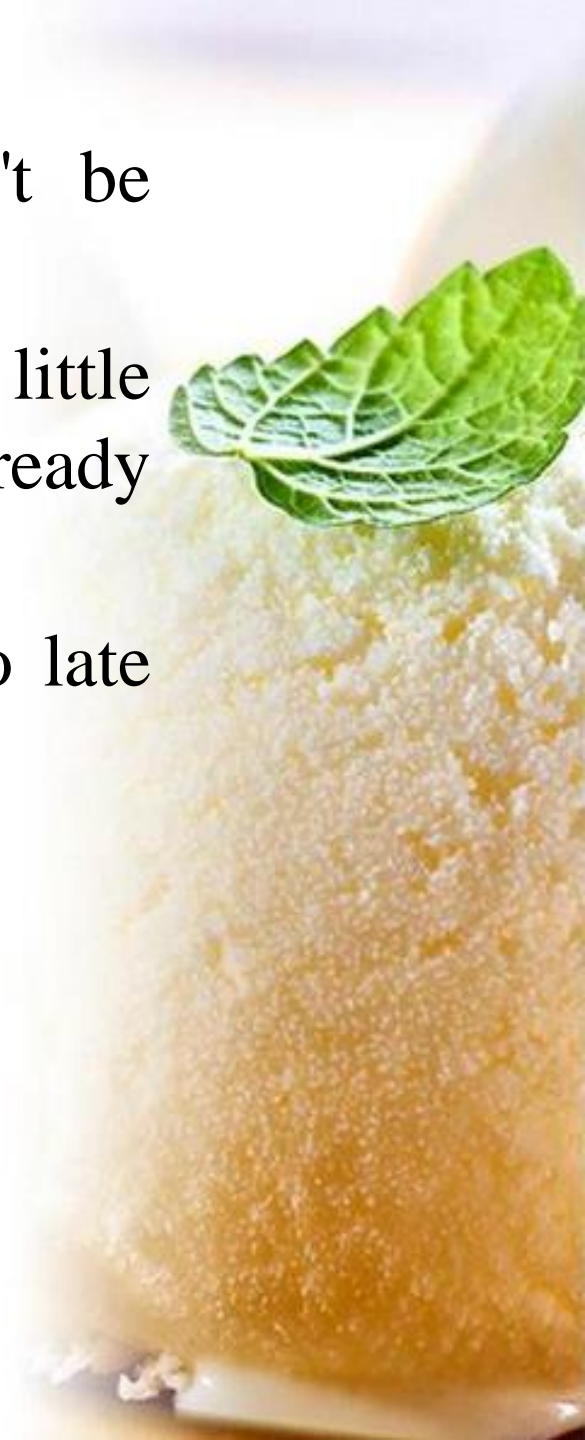
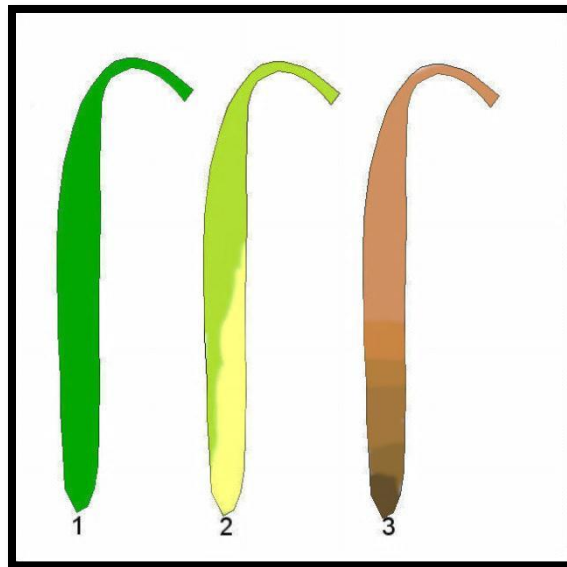


Harvesting

- ✦ The matured vanilla beans become pale yellow in colour and a trace of brown occurs on its tips.
- ✦ If harvested too early will not develop full aroma.
- ✦ Beans should not be harvested in bunches under any circumstances.
- ✦ Beans are harvested on the same day of yellowing of distal end or within the two days after the change in colour.

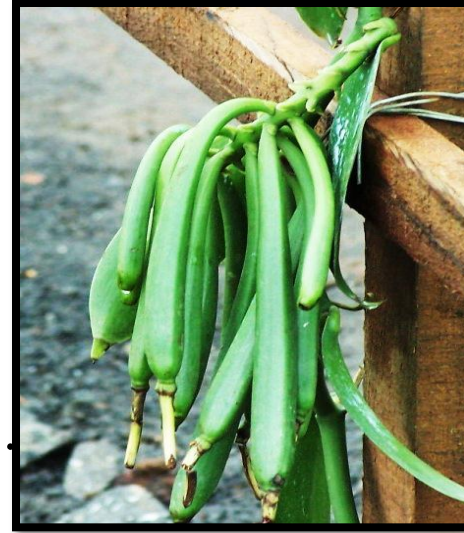


- Vanilla bean is still green and can't be harvested.
- Vanilla bean is light green with a very little bit to light yellow then Vanilla bean is ready to be harvested.
- Vanilla bean is brown with black too late the bean is over ripe.



Primary Grading

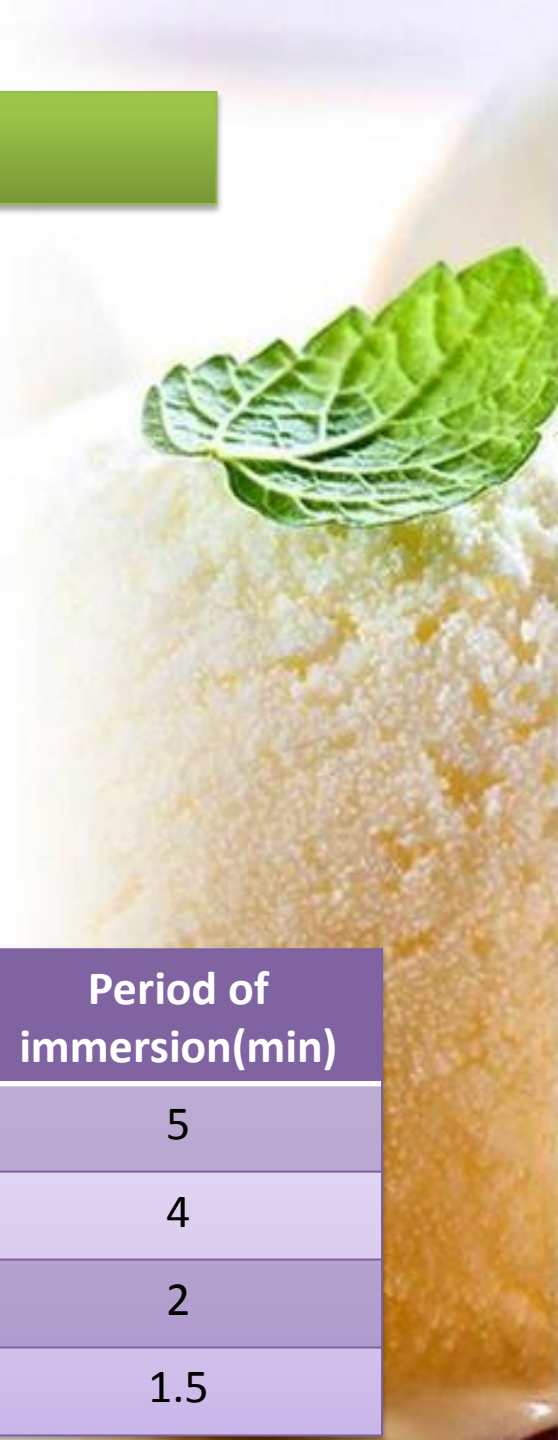
- ✓ Length and Condition of beans.
- ✓ After Curing, The Four Grades For whole beans
 - 1) Extra superior
 - 2) Good Superior
 - 3) Superior
 - 4) Good
- ✓ Finally Grading on the basic of
- ✓ Moisture content- Top grade 35-40 %
poorest – 10 %
- ✓ Length-16.5-25cm
- ✓ In the green bean important phenolic aroma compounds are present as glucosides.
- ✓ The curing process is meant to release the aglycons to set free the aroma compounds.



Curing

1. Killing or wilting

- Is the stops further vegetative development in the fresh bean and starts the enzymatic reactions responsible for the production of aroma and flavour
- Killing is indicated by the Development of a brown coloration in the bean.

A glass of beer with a green leaf garnish. The beer is a golden color with a white head of foam. The leaf is fresh and green, placed on top of the foam.

Grade of beans	Period of immersion(min)
I	5
II	4
III	2
IV	1.5

2. Sweating

- ✦ The raising the temperature of the killed beans to promote the desired enzymatic reactions and fairly rapid drying to prevent harmful fermentations.
- ✦ During this operation, the beans obtain a dark brown coloration and become elastic, and the development of an aroma becomes perceptible.

Slow sun drying of vanilla beans

Length(cm)	Grade	Period(days)
> 22	I	12-14
13 - 22	II	7-10
10 -12	III & IV	5-7

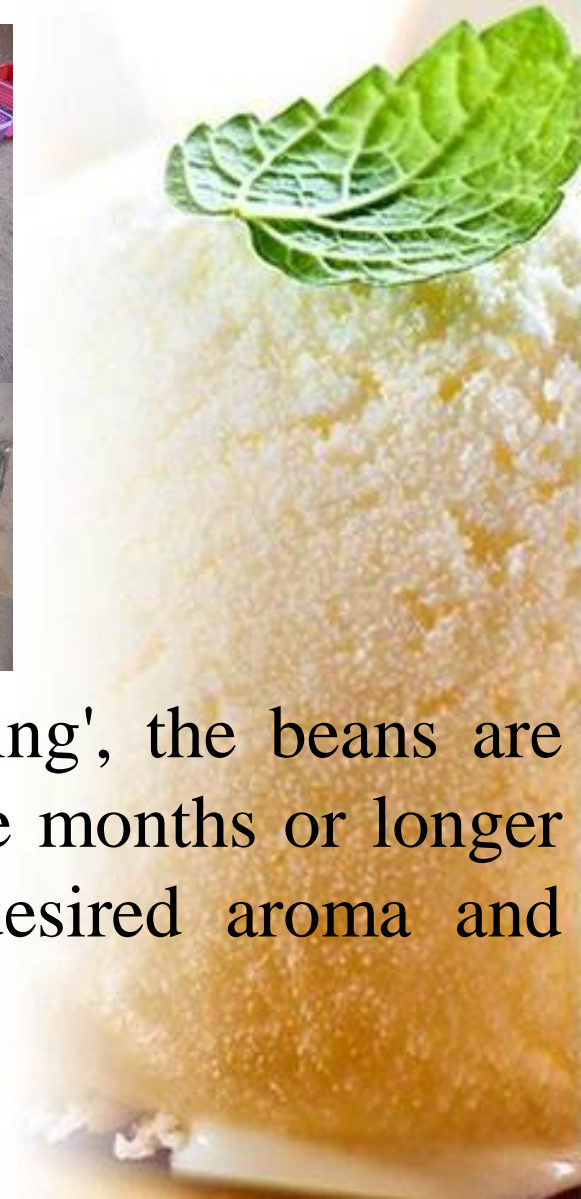


3. Slow drying at ambient temperature, usually in the shade, until the beans have reached about one-third of their original weight. **Slow drying of vanilla beans**

Grade	Period(days)
I	20-35
II	10-20
III	3-10
IV	2-8



4. In the final stage, known as 'conditioning', the beans are stored in closed boxes for a period of three months or longer to permit the full development of the desired aroma and flavour.



Two method

- 1) Mexican Method – (**Sun-wilting and Oven-wilting**)
- 2) Bourbon Method

Sun- wilting

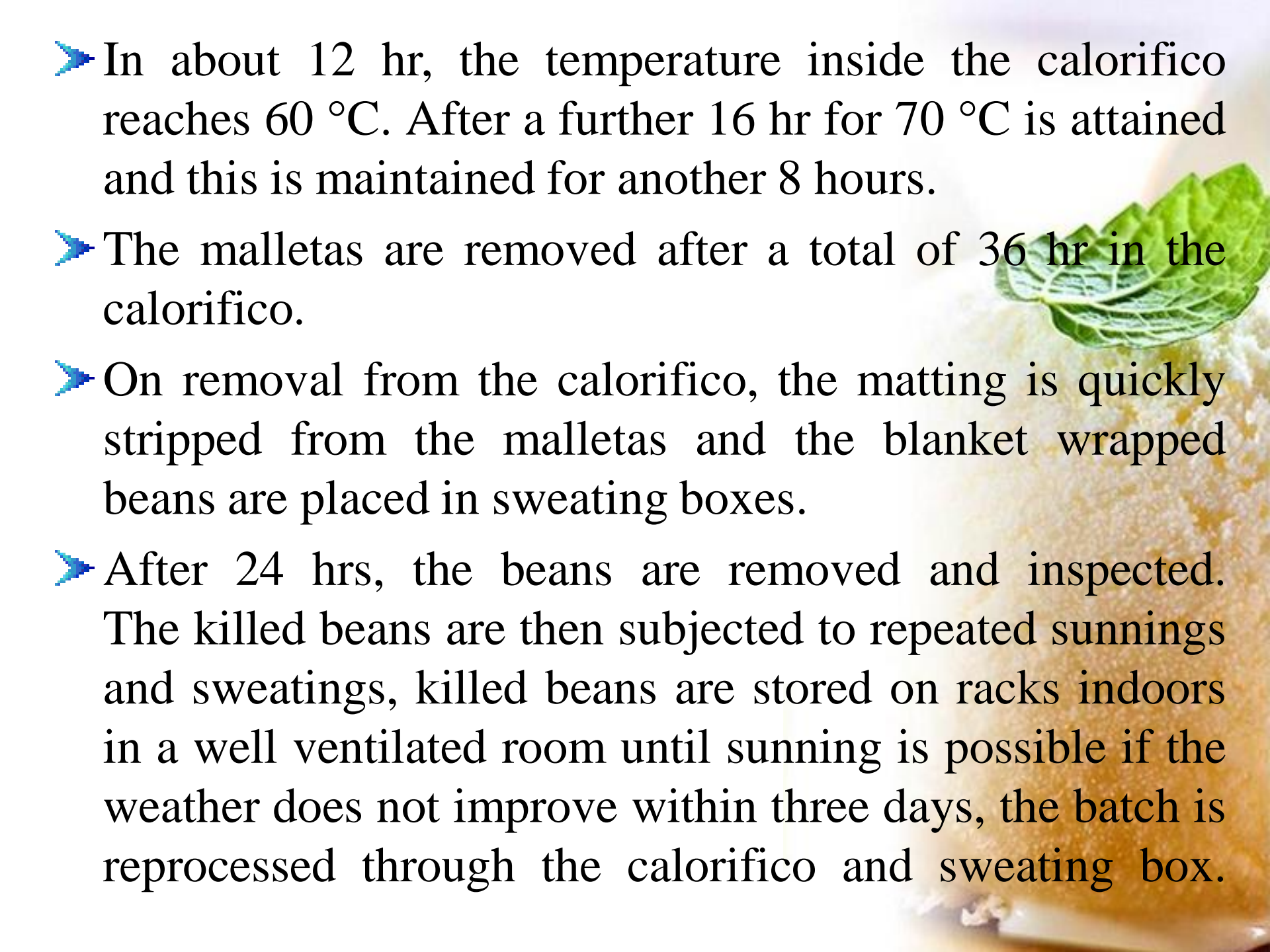
- On arrival at the curing house, the fresh beans set aside in a store – stored for long time start to shrivel.
- The beans are killed by exposing them to the sun for a period of about five hours on the day after sorting.
- The fresh beans are spread out on dark blankets resting on a cement patio or on wooden racks. In the afternoon, the beans become too hot to hold by hand and are then covered by the edges of the blanket.



1.2) Oven-wilting

- In this procedure, use is made of a specially constructed brick or cement room, known as a calorifico, which serves as an autoclave.
- The room measures approximately 4 x 4 x 4 metres and incorporates a wood-fired heater, which is stoked from the outside. It is fitted with a small access door and has wooden racks fitted along the walls.
- The beans are killed then rolled up in a blanket, which is finally covered with matting to form a malleta.
- The malletas are moistened with water and are placed on the shelves in the calorifico.
- Water is poured onto the solid floor to maintain a high humidity, the door is closed and the heating fire is lit.



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- In about 12 hr, the temperature inside the calorifico reaches 60 °C. After a further 16 hr for 70 °C is attained and this is maintained for another 8 hours.
 - The malletas are removed after a total of 36 hr in the calorifico.
 - On removal from the calorifico, the matting is quickly stripped from the malletas and the blanket wrapped beans are placed in sweating boxes.
 - After 24 hrs, the beans are removed and inspected. The killed beans are then subjected to repeated sunnings and sweatings, killed beans are stored on racks indoors in a well ventilated room until sunning is possible if the weather does not improve within three days, the batch is reprocessed through the calorifico and sweating box.

Oven-wilting

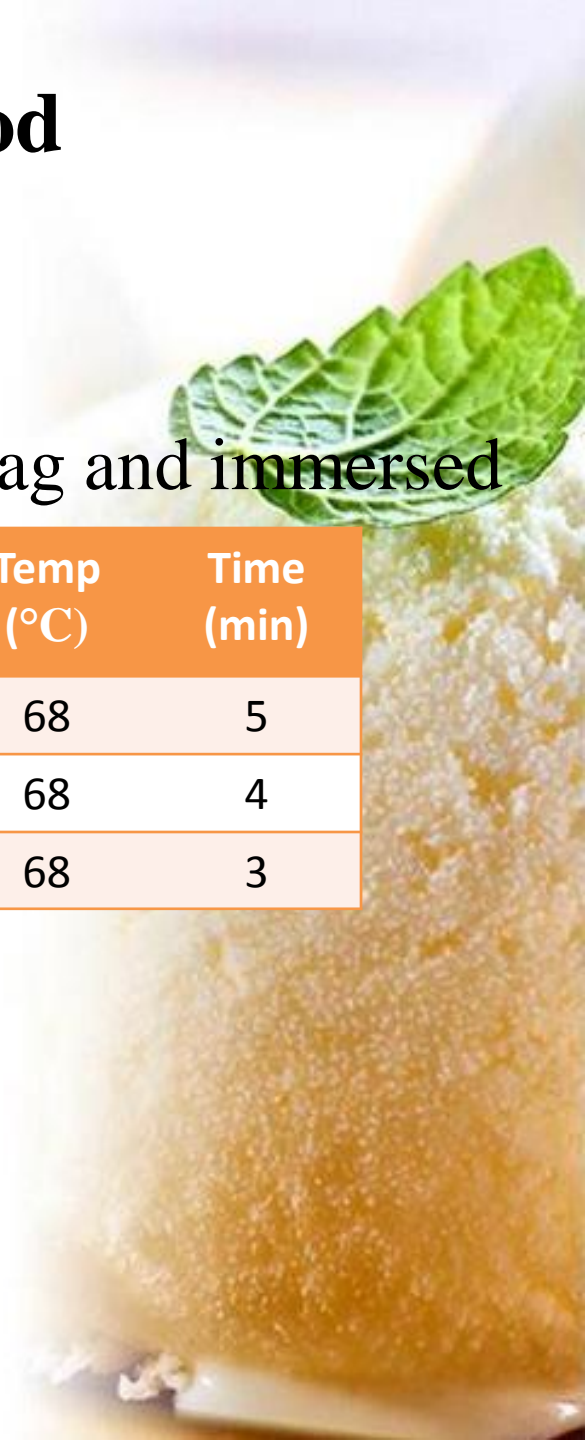


Bourbon curing method

1. Blanching or Killing

- Stopped the biological activity of beans
- Beans are put bamboo basket or gunny bag and immersed in hot water for blanching.
- Water rapidly drained.
- Beans are Wrapped in woolen cloth and stored wooden box.

Length(c m)	Temp (°C)	Time (min)
> 22	68	5
13 - 22	68	4
10 -12	68	3



2. Sweating

- Most critical phase in processing
- Spread under sun to reach temp 55°C
- Wrapped in woolen cloth and kept in sun for ½ to 3 hr.
- Stunning and Sweating has continue for 8-10 days,
- End of sweating period the beans attain chocolate brown colour and loose about 40-50 % moisture.

3. Slow drying

- Removal of excess moisture and bring it down to 50-67%
- This process takes 10-15 days

4. Conditioning

- After slow drying beans are bundled according to size
- Wrapped in butter paper and sored in air tight container at room temperature



Types of Vanilla

- **Bourbon beans**-long and slender with a very rich taste and smell. Bourbon beans have thick oily skin containing an abundance of tiny seeds and have a strong vanilla aroma.
- **Mexican beans**- mellow, smooth and a spicy, woody fragrance.
- **Tahitian beans**- Shorter, plumper and contain a higher oil and water content than Bourbon beans. The skin is thinner and they contain fewer seeds. The aroma is fruity & floral. It is often described as smelling like licorice, cherry, prunes or wine.



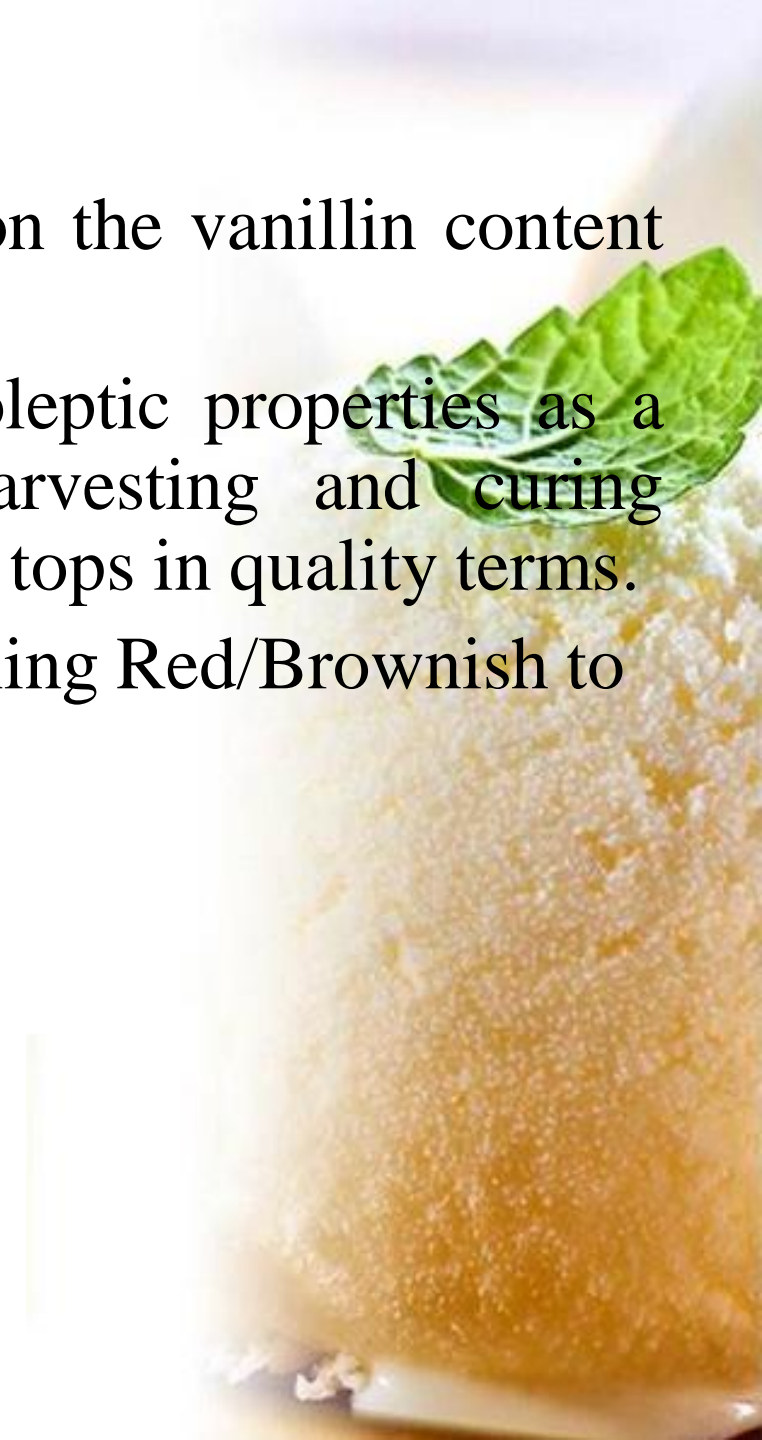
Chemical Composition

Component	Percentage (%)
Moisture	25.85-30.9
Nitrogen free extract	30.25-32.90
Fiber	15.27-19.6
Carbohydrate	7.1-9.1
Calcium	19.7
Fatty oil	4.46-6.78
Protein	2.56-4.87
Vanillin	1.48-2.90
Sodium	6.7
Phosphorus	9.5



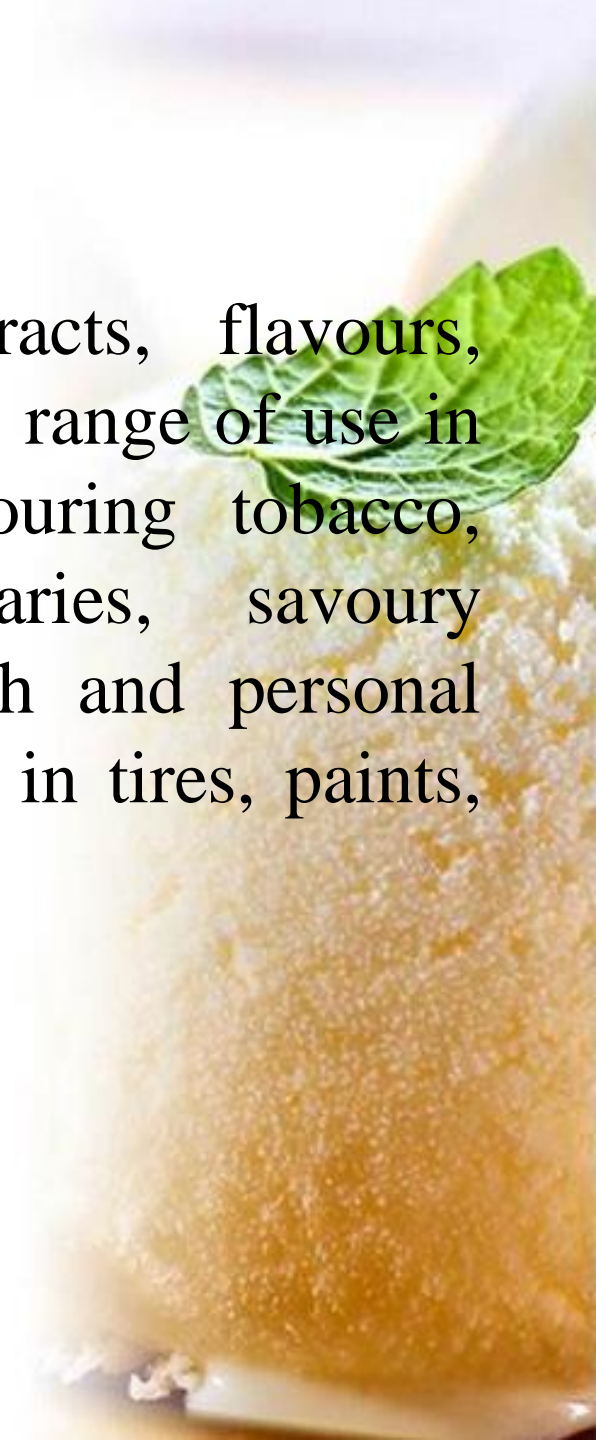
Quality

- Quality of vanilla beans depends on the vanillin content (minimum 1.8-2.0% normally).
- They differ in flavour and organoleptic properties as a result of growing conditions, harvesting and curing process. The Bourbon vanilla ranks tops in quality terms.
- **Colour** - Dark Brown to Black shining Red/Brownish to dark Brawn.
- **Quality** -Whole, Split
- **Aspect** -Oily, Sapple
- **Length** – 10-12 cms :low grade
13 - 22 cms: Standard
Above 22 cms : Top grade
- **Vanillin Content** -1.8% to 2.4%
- **Moisture Content** - 16% to 28%



Uses

- Beans are used for producing extracts, flavours, oleoresins and powders and have a wide range of use in dairy products, ice creams, for flavouring tobacco, liquors, beverages and confectionaries, savoury applications, medicinal purposes, health and personal care products and as an odour maskant in tires, paints, industrial chemicals etc.



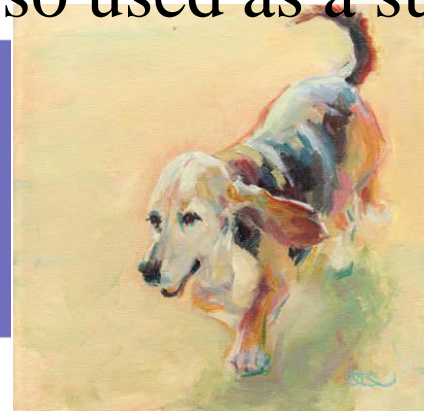
Uses

- **Food flavoring compounds**
- 30% of food-grade vanillin consumed in the world is through flavoring compounds.
- Flavoring compounding requires expertise to develop well-balanced and complex flavors such as fruit flavors. In the industrial production of dry cookies, cakes and pastries, the vanillin content ranges between 20 and 50 g per 100 kg of dough.
- Vanillin also is added during the chocolate manufacturing process in powder form in average amount of 20 g per 100 kg of the finished product.



Animal feed

- Vanillin is used as a palatability enhancer to make animal feed more appetizing by flavor masking minerals with off taste.
- Approximately 5 g of vanillin/100 kg of feed is added when preparing feed for lambs and pigs in order to increase feed intake and stimulate the growth of the animals.
- Vanillin is added during the manufacturing process either by mixing into the dry ingredients or in its liquid form. Increasingly vanillin is also used as a substitute for aniseed.



Perfumes and cosmetics

- In aldehydic perfumes, vanillin provides the powdery impressions given by the background smell usually up to 2% in the perfume concentrate.
- Vanillin enhances the fruity for instance a peach is not fully peach without vanillin.
- vanillin is combined with some floral such as heliotrope and orchid that actually contain strong vanilla impressions, amounts of 2 to 5%



Pharmaceutical products

- ❑ The single largest use of vanillin is as a starting material for the manufacture of an antihypertensive drug having the chemical name of Methyldopa or 3, 4- dihydroxyphenyl-2-methylalanine.
- ❑ L-Dopa and Trimethoprim are two other drugs that can be made from vanillin. L-Dopa is used for the treatment of Parkinson's disease.
- ❑ Trimethoprim is an anti-infective agent used mainly for urinary tract infections.

Agrochemical products

- ✦ Hydrazones of vanillin bees shown to have an herbicidal action similar to that of 2, 4-D and the zinc salts of dithiovanillic acid.
- ✦ Made by the reaction of vanillin and ammonium polysulfide in alcoholic hydrochloric acid, dithiovanillic acid is a vulcanization inhibitor.
- ✦ A new potential use for vanillin is as a ripening agent to increase the yield of sucrose in sugarcane by the treatment of the cane crop a few weeks before harvest



Industrial applications

- ✓ The **anti-ultraviolet protection properties** of vanillin have been patented and for the plastics and cosmetics industries.
- ✓ Other uses of vanillin include the **prevention of foaming in lubricating oils** as a brightener in zinc coating baths, as an activator for electroplating of zinc, as an aid to the oxidation of linseed oil, as an attractant in insecticides, in the preparation of syntans for tanning, as solubilizing agent for riboflavin, and as a catalyst to polymerize methyl methacrylate.



References

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Thank You ...

for your kind attention

