

# Study of Different Turmeric Curing Processes

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**Abstract**—The paper includes the information about the different cooking processes of turmeric rhizome cooking after harvesting. The impact of cooking method used for curing the turmeric on the quality of final product given in this paper. Effect are made to find the best economical, time saving and less labor cost turmeric cooking method for turmeric. Significance of different method for curcumin, oleoresin and essential oil contents studied in this paper.

**Index Terms**—Turmeric rhizome, curcumin, turmeric cooking

## I. INTRODUCTION (HEADING 1)

Turmeric is a prime cash crop in India. 80% of worlds turmeric production takes place in India. It's a traditional indian export item. In india the use of turmeric since very ancient days. In indian culinary as it lends color and aromatic flavor to various dishes it forms an important adjuvant. Turmeric used in daily diet, medicines, cosmetics and in pesticides on large scale. Now days due to the mechanization and a spice cash crop medicinally and industrially there is increase in turmeric sector in Maharashtra. From 700 ha area under turmeric Maharashtra produces about 200 MT of turmeric. Because of curcumin and aromatic flavor turmeric graded with its deep yellow color.

Turmeric primary processing is still done with traditional means leading to many losses and difficulties. After harvesting the turmeric rhizomes it requires different processing to get the final product given by,

- 1) Cleaning in water to remove stick soil from the rhizomes.
- 2) Curing.
- 3) Drying.
- 4) Polishing.
- 5) Grading.

After cleaning the rhizomes it is necessary to cure the rhizomes by boiling the rhizomes in water to make the final product soft. There are different methods of curing the turmeric rhizomes and every method have aim to cook the turmeric. The fingers made separated from mother rhizomes. Usually mother rhizomes are kept as seed material. Curing implicate boiling of fresh rhizome in water and drying in sunlight. There are present different method of turmeric curing.

## II. DIFFERENT METHODE OF TURMERIC COOKING:

After harvesting the rhizomes should kept in shadow and within 4 or 5 days the curing process should done on it. The turmeric should cook by the methods given below no other type of cooking is economical that these.

### Traditional method of turmeric boiling:

In this method of turmeric cooking rhizomes boil in pan which have 200 to 1000 kg capacity and made of 16 gauge mild still sheet. The bottom diameter of the pan has 4 to 5 feet and height 2.5 to 3 feet. Upper part of pan has bigger by half feet than the lower part therefore it make easy to take out rhizomes. In this method during cooking after feeling the turmeric in pan it should take care that there should be 2.5 to 3 feet water above rhizomes. After that by using maximum leaves of turmeric and gunny bag above the pan for take care caging steam. Do not use soil mire for coating this. Normally in 2.30 to 3 hr turmeric got cook. After cooking the turmeric one type of smell spread into the surrounding as well as cooked turmeric get crush by pressing the thumb and fingers. Also it can be seen by piercing the stick into the cooked rhizomes.

Drawbacks of the process that while taking out rhizomes from the pan it get breaks. Minimum half water to let go to take out cooked rhizomes as well as saturated layer of soil at the bottom of the pan not possible to take out without taking out all the water inside the pan. Therefore there is undercooking at the top of the heap and overcooking at the bottom of the pan, while taking out rhizomes from the pan loss of curcumin, oleoresin takes place due to injuries occurred by rubbing and bruising, requirement of labour is high. Handling losses inefficient fuel use and more time requirement increases cost of processing.



**Fig: Traditional method of turmeric curing**

**Improved method of turmeric cooking:**

The pan used in traditional method is also used in this improved method. In this method 3 to 4 empty barrel of oil filled with turmeric is added to water filled pan. These half cut barrels at the bottom on one side has holes spaced by 2 to 3 inch. In this method 55 to 60 kg turmeric rhizomes can be cook in one batch within 30 to 35 mins. Since there is need to remove water from the pan, hence water is not wasted. Every time after taking out cooked rhizome 3 to 4 bucket water need to draw into the drum up to the level.

In this method turmeric is cooked uniformly and do not get crush. The turmeric cooked by this method do not need to polish for the long time so that it has less decrement and high lustre result in high market value.



**Fig: Improved method of turmeric cooking.**

**Steam boiling of turmeric:**

The above method utilises more fuel, requires more labour and time therefore, farmer do not go to cultivate this crop on large scale though it gives more profit. Turmeric is cook in water in traditional method where as in this method it is cook on steam therefore, get high quality, save time and labour cost.

In this method cylindrical tank of 2000 to 3000 lit of capacity is fitted on chassis of tractor trolley. To help to generation of steam on large scale, at the bottom of this tank area is increase to give more heat by using pipes. The tank has provided with two valves. Water should be minimum up to the bottom valve and maximum up to the upper valve. Steam get accumulate in above 4 to 5 cm of space. By using pipe this accumulated steam releases in the drum. In this, on the basis of capital of farmer four drum, two drum or fixed two drum system can build.

It is require 60 to 90 min at start to boil the water in two drum system. Once water gets boiled, release the generated steam into the drum by pipes and nozzle with required pressure. 300 to 350 kg rhizomes can fill into a drum. Since cool temprature of the rhizomes and higher temprature of the steam at the start, steam converted into water and comes out through the window provided at the bottom of the drum. After, completion of cooking instead of this water steam comes out through the drum bottom window as rhizomes do no absorb the steam. Filled second drum during this process. After releasing the steam in second drum then and then only turmeric in first drum make to fall in small trolley and then this turmeric to cast for drying. Use eucalyptus, acacia or other wood as fuel. One tonne wood can cook 55 to 60 drum. 15 to 20 mins requires for cook one drum. By using H.T.P. pump water can filled from bottom valve if level of water gets down therefor, it is not necessary to shut off the whole system. As the steam is cooking on the steam the curcumin gets accumulated in the rhizomes as a result causes good colour and market value.



**Fig: Steam cooking turmeric system.**

**Advantages of steam cooking method:**

1. In one batch 300 kg and in 8 hrs 90 quintal turmeric rhizomes can be cook.
2. Only 30 kg wood requires for cooking 300 kg of rhizomes in one batch.
3. 90 quintal turmeric can be cooked by only 3 labours.
4. No need of skilled labours.
5. According to farmers need unit size can be increase.
6. In traditional method to dry the rhizomes require 15 to 20 days but rhizomes cooked by this method require 8 to 10 days as rhizome cook only on steam so it absorbs less water.
7. save time and fuel as cooking is continuous.

**DRYING:**

Cooked fingers are dried in the sun for 8 to 10 days. During drying for the first 4 days it should not be with more than 2 inch layer on the floor. The rhizomes should be heaped or covered with material which provides aeration, during night time. Spread the fingers on bamboo mats or on drying floor. During drying turmeric according to need move it by hand. Remove soil, dirt, stick while moving hand time to time. Care for to get wet again by rain any condition. Should not be mix perfectly dried and imperfectly dried rhizomes as they decrease the quality. Remove out imperfectly dried fingers as they require more time to dry perfectly.

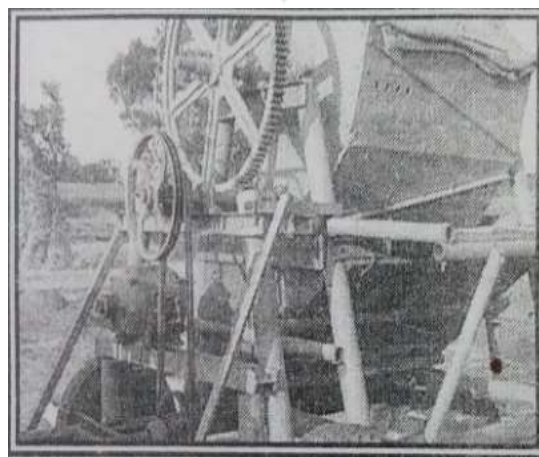


**Fig: Drying of turmeric rhizomes.**

**POLISHING:**

During cooking the turmeric soil in the drum gets stick to the rhizomes and also the upper skin of rhizomes has different thickness according to variety. This skin after cooking appears blackish and gets crush during cooking. So that rhizomes without polishing do not look attractive and don't get good market value. Therefore it is necessary to polish the turmeric.

Use mild still oil barrel to polish the turmeric. Put this barrel on stand. Barrel should have 6 \* 9 inch face to feel the turmeric rhizomes. On this barrel at 10 to 15 cm distance punch the holes which are 1 to 1.5 cm broad by chisel. The inside portion of drum at which holes are punched gets rough. Two people can rotate the drum after putting on the stand by proving the handle system to the drum. In such by darting 5 to 7 spiky stones turmeric gets polish soon. In this method two labour polish 25 to 30 kg turmeric in 1 hr. 2 to 10 quintal capacity and powered by electric motor or tractor turmeric polishing machine is available in market which works on this principle.



**Fig: Electric powered turmeric polisher.**

**GRADING:**

Is necessary to grade the rhizomes in four types after polishing,

- 1) Fat and long rhizomes (long more than 3 cm).
- 2) Medium fat rhizomes (2 to 3 cm long).
- 3) Small rhizomes (2 to 3 cm long).
- 4) Soil less small granule.

After grading turmeric in this way pack it in bags. As the sale of turmeric in market is by open auctioning so the quality, fatness of rhizomes, length of rhizomes, lustre, and attractiveness is important so the grading of rhizome is very important.

**CONCLUSION:**

From the study it is found that the curcumin, oleoresin, and essential oil content was maximum in rhizomes during steam cooking as it gets preserved into it. The lower amount of curcumin, oleoresin and essential oil content in traditional method may be due the fact that during the boiling process some amount of curcumin, oleoresin and essential oil contents might have leached along with the boiled water. Also very high pressure at the cooking vessel in steam cooking method causes decrease in curcumin, oleoresin and essential oil contents. Higher levels raise of steam temperature might have influenced the evaporation of the curcumin, oleoresin and essential oil contents. Steam cooking method requires less time than traditional cooking method and have good quality product too. Efficiency of cooking plant is approximately doubled than traditional cooking system. Storage of turmeric rhizomes causes reduction in volatile oil content. Moisture content is more in traditionally cooked turmeric than in steam cooked. Handling of steam cooked turmeric is easier than traditionally cooked. In steam cooking trolley is used to handle the steam cooked rhizomes where as in traditional method trampling takes place. Labour require for steam cooking process is half of traditional cooking process. Less fuel require for steam cooking.

By considering benefits of reducing the losses of fuel, labour, time, quality, and difficulties in turmeric processing, steam cooking method is beneficial to the turmeric growers and turmeric industries.

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