

# PROCESSING OF TURMERIC

## Harvesting

Turmeric is harvested when the plants are between 7 and 10 months of age, when the stems and leaves start to dry out and die back. The whole plant is removed from the ground, taking care not to cut or bruise the rhizomes.



## Sweating

The leaves are removed from the plant and the roots carefully washed to remove soil. Any leaf scales and long roots are trimmed off. The side (lateral) branches (which are known as the fingers) of the rhizomes are removed from the main central bulb (known as the mother). The mothers and fingers are heaped separately, covered in leaves and left to sweat for one day. The 'mothers' are the preferred material for planting the following year.

## Curing

Before drying, the turmeric rhizomes have to be cured. This involves boiling the roots to soften them and remove the raw odour. After curing, the starch is gelatinised, which reduces the drying time required, and the colour is uniformly distributed throughout the rhizome.

The specifications for curing turmeric vary from different places. The Indian Institute of Spice Research and the Agricultural Research Centre recommend boiling in plain water for 45 minutes until froth appears at the surface and the typical turmeric aroma is released. Using this method, the colour will deteriorate if the rhizomes are boiled for too long. However, if not boiled for long enough, the rhizome will be brittle. The optimum stage is reached when the rhizomes are soft to touch or can be pierced by a blunt piece of wood.

Other researchers recommend boiling the rhizomes in an alkaline solution, made from 0.05% to 1.0% sodium carbonate or lime (calcium carbonate). The alkaline water is thought to improve the final colour of the dried turmeric. Because

the fingers and bulbs are of different size and thickness to each other, it is important that they are cured in different batches. The curing time is dependent on the age, variety and size and thickness of the rhizomes and varies from one to four or sometimes six hours. It is also affected by the size of the batch – smaller batches generally produce a higher quality dried turmeric as the curing process is easier to control and monitor. It is recommended to use perforated containers with a capacity of 50-75kg. The perforated containers are immersed in the boiling water for the required cooking time. This method allows the boiling water to be used for more than one batch of turmeric.

The best time for curing is two to three days after harvest. If it is delayed after this then the rhizomes may start to deteriorate.

***The benefits of curing turmeric include the following:***

- Reduction of drying time
- More even colour distribution throughout the rhizome
- A more attractive (not wrinkled) product that is easier to polish
- Sterilisation of the rhizomes before drying.

## **Drying**

The rhizomes are sliced before drying to reduce the drying time and improve the quality of the final product (it is easier to achieve



a lower final moisture content in small pieces of rhizome without spoiling the appearance of the product). The rhizomes are traditionally sliced by hand, but there are small machines available to carry out this process. shows a simple turmeric slicing machine designed in Bolivia. It is a simple structure that contains a

transmission system and two stainless steel circular blades. The machine is easy to build and maintain and can cut up to 120kg turmeric per hour.

The cooked fingers or bulbs are dried until they have a final moisture content of 5-10%. An experienced turmeric processor will know when the rhizome is dry enough as the fingers will snap cleanly with a metallic sound. Traditionally the rhizome pieces are laid on clean concrete floors and dried in the sun. This method can take anything from 10 to 15 days, depending on the climate and the size of the rhizome pieces. It is important that the rhizome pieces are not placed in direct sunlight as this will cause the colour to fade. Using a mechanical drier will result in a better colour and a higher quality product.

There are several different types of mechanical drier that are suitable for drying turmeric. These include the tray drier, cross flow air tunnels, solar driers and cabinet driers. The optimum drying temperature is 60°C – temperatures higher than this result in a darker coloured product. See the Practical Action Technical Brief on drying for further general information on driers.

## **Polishing**

After drying the rhizomes are polished to remove the rough surface. This can be done by hand or by shaking the rhizomes in a gunny bag filled with stones. Polishing drums are used in many places – these are very simple, power driven drums that have an abrasive metallic mesh lining. In some places the rhizomes are sprinkled with a solution of ground turmeric in water during the final polishing, to give the rhizomes a good colour.

## **Grading**

Quality specifications for turmeric are imposed by the importing country. They refer to the cleanliness of the product rather than on the eating quality. Bulk rhizomes are graded into fingers, bulbs



and splits. The Indian standards for turmeric follow the Agmark Specifications (Agricultural Directorate of Marketing) to ensure quality and purity of the products.

## **Grinding**

Grinding can be a method of adding value to a product. However, in general it is not advisable to grind spices as they become more vulnerable to spoilage. The flavour and aroma compounds are not stable and will quickly disappear from ground products. The storage life of ground spices is much less than for the whole spices. It is very difficult for the consumer to judge the quality of a ground spice. It is also very easy for unscrupulous processors to contaminate the ground spice by adding other material. Therefore, most consumers, from wholesalers to individual customers, prefer to buy whole spices.

Turmeric is one of the few spices that is usually purchased in a ground form. The whole rhizome pieces may be exported and then ground in the country of destination. Alternatively, the dried rhizomes may be ground at the place of origin. Grinding is a very simple process that involves cutting and crushing the rhizomes into small particles, then sifting it through a series of screens of different mesh size, to get a fine powder. There are a range of grinding mills available, both manual and powered, of different capacities and which work in different ways. The traditional way to grind would be between two stones.

The advantage of this method is that the turmeric does not get too hot during the grinding process. With some of the mechanical mills, such as a hammer mill, heat is generated during the grinding process, which can cause some of the volatile taste and aroma compounds to be lost. For higher quality ground turmeric, the grinding temperature should be kept as low as possible. After grinding the powder is sieved through different mesh screens until a uniform, fine powder is obtained.

## Storage

The bulk rhizomes are stored in a cool and dry environment, away from direct sunlight. The bright colour of ground turmeric will fade when it is left in the light for a long period of time. Therefore, the packets should be stored in a cardboard box, away from the sunlight. The storage room should be clean, dry, cool and free from pests. Mosquito netting should be fitted on the windows to prevent pests and insects from entering the room. Strong smelling foods, detergents and paints should not be stored in the same room.

