

Study on Recent Trends of Cultivation, Harvesting and Post Harvesting Methods of *Zingiber officinale*, *Roscoe* (Zingiberaceae) in Kannad Area (Maharashtra)

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Abstract: *The paper deals with the recent trends of cultivation, harvesting and post harvesting methods of ginger used in Kannad area of district Aurangabad. Ginger is an important commercial crop grown for its aromatic rhizome which is used in both spices and medicines. After cultivation sometimes the ginger crop may affected with rhizome rot, wilting and stem borer diseases. The different control measures are used by farmers for controlling such a diseases. when the ginger plant is develops in between 6-12 months, it produces one meter leaves and stem. After maturity of crop the digging is done. Ginger is an underground modification of stem called as rhizome; it is a perennial herb plant. Rhizome is divided into distinct nodes and internode. It is ready for market by harvesting and washing to produce brown to white color ginger. Post harvesting methods is widely known for preparation of ginger powder, ginger candy; dried ginger is commonly called as 'Sunthi' in Kannad.*

Keywords: Ginger rhizome, cultivation, harvesting and post harvesting etc. of *Zingiber officinale*, *Roscoe* (Zingiberaceae)

1. Introduction

The ginger (*Zingiber officinale*) belongs to family Zingiberaceae. It is one of the perennial herbs, creeping along the soil plant is with long leaves, yellowish green flowers and thick tuberous rhizome (underground stem) Sharma et.al. (2010). when the plants are about 9 months old, the green leaves turn yellow in colour. The family Zingiberaceae is represented about 46 Genus which is distributed throughout the tropics and subtropical regions of India. The rhizome is oblique, round, annual and covered by smooth sheaths of scale leaves 2-3 feet in height, laterally rhizome are compressed with 7-15 cm long and 1-15 cm broad. About 1-3 cm long branches. Ginger is a cash crop, most of the tribal farmers living in this area follow the traditional and recent trends of ginger cultivation which is generally less expensive and utilizes local resources. Ginger contains highly organic material that facilitates growth, antistress environment friendly and antimicrobial properties. (Maqsood et.al. 2011) Nepal is the third biggest for making powder from ginger in the world. (FAO, 2012) The traditional practices of ginger cultivation in northeast India, about 3 Lakh tons of gingers are being produced annually (H. Raheman et.al. 2009). The cultivation of ginger is known originate in china which later on spread to the India. (W.A. Weiss, 1997 and H.Mc. Gee, 2004). Ginger is known for 'Sunthi' (Malhotra and Singh, 2003) Ginger is a medicinal plant and some antifungal properties (Nielsen and Rios, 2000) Ginger is used in effective control range of bacterial, viral and fungal diseases (Agrawal et.al., 2001) Some says that ginger is strong antioxidant substance (Haksar et.al., 2006 and Kim et.al., 2007) The powder of ginger rhizome is able to enhance non specific response (Haghighi and Rohan, 2013). Ginger may play biological role in antioxidative, cardiovascular etc. (Stoilova et.al. 2007, Nicoll and Henein, 2009).

2. Methodology

While preparation of land, minimum tillage operations may be adopted. Beds were prepared of 15 cm height, 1 meter width as per convenient, length may be prepared giving at least 50cm spacing between beds. Seed rhizomes of Ginger were used as planting material which is free from pest diseases. At the time of planting 25gm of neem powdered apply in each pits mixed with soil. Ginger rhizomes are planted in rows. In case of irrigated crop, ridges are made of 40-45 cm apart and planting is done while ridges should be 22-30 cm distances. Before planting seed rhizome should mixed with well rotten cattle manure or compost mixed with trichoderma. Sowing is done in the month of March- April or April-may in this region. Watered immediately after sowing, the shoots are emerging in 10-20 days.

3. Result and Discussion

3.1 Area and Production

Kannad is located in the Aurangabad district of Maharashtra. Many farmers of this area cultivated ginger production in their fields. The different community was major growers of ginger plant in this area. However as the crop becomes more commercially important every farmers are taking initiatives for planting ginger in their fields. In the periphery of Kannad tahesil many villages are proceed to brought under cultivation of ginger. Recent and innovative techniques are introduced and practiced in this area.

3.2 Cultivation, Climate and Soil

Ginger is mainly cultivated in humid climate and warm region. The climate of Kannad is suitable for cultivation of ginger. The ginger generally requires well drained soil like sandy or clay loam. In some places of Kannad region ginger

is cultivated in red and black soil. Soil is rich in humus are ideal for cultivation of ginger crop. A moderate watering require at the time of sowing till the rhizome sprout out. Dry weather with a temperature of 28⁰c to 35⁰c is required for about a month before harvesting is necessary.

3.4 Plantation

Planting is done in the month of March-April or April- May as per villages in Kannad area. Ginger is planted in rows as described in methodology. The distance between two rows is near about 22-30cm (Fig. 1a and Fig. 1b) preferably while planting seed rhizome treated with 10 gm of trichoderma and fungicides. Generally many farmers sowing ginger in the month of April-May some farmers sowing in middle of of April and in some regions it is done in the first week of May. It is observed that the seed rhizome sown in the month of May which gives more yields.



Figure 1(a): Ginger Plantation in rows.



Figure 1(b): Mature Ginger plant in rows

Irrigation

Irrigation is given to the ginger crop in variable intervals of 3-10 days and when it requires. Some farmers having use of drip irrigation, drenching is done through this system.

Harvesting and Curing of Ginger

Depending upon maturity the harvesting is done from 6 months onwards but basically in Kannad are it is done after 8-10 months. When complete maturities of ginger, leaves are

become turns yellow and pseudo stems began to dry (Fig.2). The rhizome of ginger were lifted either the help of digging fork or with spade. They are late cleaned off roots and adhering soil particles. The rhizome of ginger thoroughly washed in water. The washing of rhizome is done 2-3 time to remove soil and dirty particles and sun dried for a day (Fig.3a) For preparation of dry ginger, the harvesting is done between 245 to 260 days The dried ginger later converted into ‘Sunth’(Fig 3b) when the leaves are turn yellowing and dry up. The average yield per hectare are varies from 15-25 tones.



Figure 2: The yellowing of leaves and pseudo stem of Ginger in field and harvesting in field.



Figure 3(a): Mature Ginger after washing.



Figure 3 (b): Ginger after drying as 'Sunth'

3.5 Preservation of Seed

After harvesting some of the rhizomes are preserved as seed material and it should be preserved carefully by the farmers. For good germination big and healthy seed rhizomes are selected immediately after harvesting ginger, which is free from diseases. For this purpose healthy and disease free area are marked and notify by farmers when the crop is 7-8 months old and still green in colour. Some of the farmers preserve disease free seed rhizomes in pits of convenient size made in the shade to protect from sun and rain. Walls of the pits may be coated with cow dung paste. The seed rhizomes are stored in these pits wrapped with well dried sand or saw dust, care should be taken that sufficient gap is to be left at the top of pits for adequate aeration. These seed rhizomes are need to be inspection once in twenty to twenty five day for to removal of disease affected rhizomes.

3.6 Diseases Affects on Ginger

The crop of ginger affected by many diseases (Fig.4 a, 4b) such as shoot borer, leaf roller, rhizome scale, soft rot or rhizome rot and bacterial wilt etc. The shoot borer caused by *Congothes punctiferalis* it leads to yellowing and drying of the infected shoot and it is controlled through spraying 0.1 % malathion. The leaf roller disease caused by *Udaspes folus* it leads to rolls the whole leaf of crop plants. It is controlled by spraying 0.1 % carbaryl solution. The rhizome scale disease caused by *Aspidiotus hartii* it infects rhizome feeds on the plant sap causing withering to plant. It is controlled through dipping the seed rhizome in 0.1% quinalphos twice or prior to sowing. The soft rot or rhizome rot disease is caused by *Pythium phamidermatum*. The symptoms of this disease are collar region exhibits rotting and spreads to rhizome and root. The leaves, root become exhibits yellowing. The bacterial wilt disease is caused by *Pseudomonas solanacearum*. The symptoms of this disease is rhizome shows milky oozing on its gentle pressing to avoid this, the seed rhizome is treated with 200 ppm of streptomycycline.



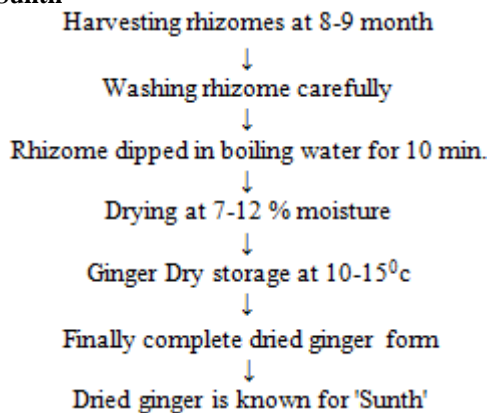
Figure 4 (a), 4 (b): The ginger plant infected by diseases like rhizome rot, bacterial and wilting

3.7 Post - Harvest Production Operations:

Washing, killing and drying: The freshly harvested rhizome was washed under force of water to remove debris, soil adhering to rhizome. pressure washing is preferred and it is more efficient and tends to reduce the microbial load (Pruthi J.S., 1992) In traditional methods the rhizome are killed by a 10 min. immersion in boiling water and proceed

to drying of rhizome. (Sutarno et.al., 1999 and Weiss, E.A., 2002) After peeling and washing the rhizome are first soaked in water for 2-3 hours and then steeped in lime (calcium oxide) of 1.5 to 2.0% solution for 6 hours. It is then drained and sun dried (Pruthi, J.S., 1992)

Flow Chart for Production of Dry Ginger For Making Sunth



4. Conclusion

As the ginger is cash crop of many farmers in kannad region are proceed to cultivation and harvesting of ginger crop. According to survey report more than 50% farmers of kannad are struggling with rhizome rot, wilting and borer diseases are the major factor in ginger cultivation. Every year 20-30% yield is loss was reported due to suffering of crop due to such a diseases. Marketing is one of the important obstacles for sold ginger. As the farmers facing problems of occurring diseases on crop till they do not stop the cultivation and harvesting of ginger crop because, in comparison to other crops it is better option for earning source. It is seen that to overcome these problems of diseases, farmers of this region planted *Tagetes erecta* (Marigold plants) along the sides of ginger crop in their fields. It is because of *Tagetes erecta* plant forms nitrogen fixing bacteria in the root nodules.

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