Large Cardamom Curing Through ICRI Improved Bhatti: A Breakthrough

T. N. Deka, B. A. Gudade*, P. Chhetri and A. K. Vijayan

Indian Cardamom Research Institute (ICRI), Regional Station, Spices Board,
Tadong, Gangtok- 737 102, Sikkim, India

*Email of corresponding author: bgudade@gmail.com

Large cardamom (Amomum subulatum Roxb.) is the major cash crop of Sikkim. The economic part of large cardamom is capsule. Harvesting of capsule starts September to November in Sikkim based on altitude. The harvested capsules are dried traditionally by the majority of farmers and sold in bulk in assembling markets. Although efforts were made in the past by several organizations to improve the system of curing, all of them remained unacceptable to the farming community, for one or the other reasons such as high establishment cost, risk on handling, poor quality of produce etc. In ICRI Improved bhatti cured capsule natural colour and unique flavour is retained which is lacking in local system. The system is very simple, dismantle, portable type and assembling materials are light in weight. The system is fabricated with materials available locally. Capsules cure in ICRI Improved bhatti is superior in quality, fetches higher price and accepted by the farming community. Thirty ICRI Improved bhatti was constructed in NAIP site at Dzongu, North Sikkim.

Introduction

Large cardamom (Amomum subulatum Roxb.) is the major cash crop of Sikkim. This crop is grown in other states of India also. Darjeeling district of West Bengal, Arunachal Pradesh, Nagaland and Uttarakhand grows the crop economically. Moreover, some pockets of Manipur, Meghalaya and Assam are also trying to grow the crop. In world Scenario, Nepal and Bhutan are the two competitors’ countries of India for the production of large cardamom. Recently, Royal Govt. of Myanmar has tried to popularise the cultivation of large cardamom in Lahe area and coming up well. The economic part of large cardamom is capsule. When seeds of capsule turn blackish than it is the indication for harvesting. Harvesting of capsule starts September to November in Sikkim based on altitude. Harvesting is one time venture for large cardamom. The harvested capsules are dried traditionally by the majority of farmers and sold in bulk in assembling markets.

Curing in Traditional bhatti

The curing or drying process of large cardamom capsule is primitive one. Curing in traditional bhatties imparts inferior quality produce (Fig.1&2). It is a direct heating process. Because of direct heating in traditional bhatties, capsules could not so far reach its consumers with its original colour, aroma and flavour. The traditional bhatti curing system takes away its colour and unique flavour, leaving it with smoky smell and charred unattractive colour. But farmers are using the system as it is acquainted with them. More over there was no other viable alternative of the system.
**Venture of ICRI Regional Station, Spices Board, Tadong, Gangtok**

Although efforts were made in the past by several organizations to improve the system of curing, all of them remained unacceptable to the farming community, for one or the other reasons such as high establishment cost, risk on handling, poor quality of produce etc. Hence, the Regional Station of ICRI at Gangtok improved the existing curing system by installing flue pipes. At present the improved *bhatti* is available in 200 kg and 400 kg capacity and the technology is popularised among farmers in Sikkim region by Spices Board, Development, Gangtok Region.

**ICRI Improved bhatti - 200 kg Capacity**

The lower *bhatti* is made by cutting the soil to 2.4 x 1.8 x 1.5 m from a conveniently located site/terrace and pitched with rubbles so that the inner dimension is 1.8 x 1.2 x 1.35m. An oil drum of 60 cm diameter or a furnace (90 x 45 x 45 cm) is placed at the centre to serve as the fire place. Flue pipes run from hearth all along the lower half of the bhatti and finally the pipe is connected to an exhaust hood of height 2.4 m high (Fig. 3). An iron net floor supported with G.I. Pipes / wooden bars is fitted above the fire place for spreading fresh capsules through which hot air moves upwards. Thirty cm high brick wall is provided all along the border. For conservation of energy an upper curing chamber is provided with 90 cm high wall made of bamboo mat and plastered with mud cow dung mix on the outer surface. Two opposite sides of the bamboo wall have the doors (60 x 90 cm) for opening and closing while handling. A roof made of G.I. sheet (22 gauges) with two ventilators is placed above bamboo walls.

![Fig. 3 Spread of flue pipe 200 kg capacity ICRI Improved Bhatti](image)

**Fig. 1 Traditional bhatti**

**Fig. 2 Capsules cured in traditional bhatti**
ICRI Improved bhatti - 400 kg Capacity
Like the improved Bhatti of 200 kg capacity, this system also consists of two parts viz., a lower bhatti and an upper curing chamber with a larger working area. The lower bhatti is made by cutting soil to 3.0 x 3.0 x 1.5 m from a conveniently located site/terrace and pitched with rubbles to inner dimension of 2.4 x 2.4 x 1.35 m. An oil drum of 60 cm diameter or a furnace (90 x 45 x 45 cm) is placed at the centre of the front wall and projected 52.5 cm inside into the lower bhatti. Instead of one set of flue pipe used in 200 kg capacity, here two parallel sets of flue pipes (15 cm diameter) made of GI sheet (22 gauge), each runs from the hearth all along the lower half of the bhatti in two rectangular paths (180 x 60 cm), keeping a distance of 30 cm from the wall and 30 cm down the strong iron net. Finally the flue pipes are connected to two opposite exhausts of 2.4 m high (Fig.4).

A strong iron net (high tempered) is spread over GI pipes (3.0 m x 1.25 cm diameter at 15 cm spacing) / wooden bar as support. A stone wall (30 cm high) is provided all along the border to contain capsules for curing. An upper curing chamber made of bamboo mats with two doors (60 x 90 cm) are fitted in adjacent/opposite walls of 90 cm high, and plastered with mud - cow dung mix on the outer surface. Upper chamber is covered with GI sheet as roof with two ventilators (30 x 15 cm). Two holes (6 cm diameter) at ground level are provided for inlet of cold air inside the lower bhatti/chamber.

Thirty ICRI Improved bhatti were constructed in NAIP site at Dzongu, North Sikkim for the quality improvement of large cardamom capsules.

Curing in ICRI Improved bhatti
Fire wood is burnt in the hearth to generate smoke laden hot air, to pass through the flue pipes and finally escapes through the outlet/exhaust. In the process, the air inside the lower bhatti gets heated up and passes upward through the cardamom capsules spread on the iron net. Vapour generated in the process escapes through the ventilators, if needed by opening of doors for a while. Two holes (6 cm
diameter) at ground level are provided for inlet of cold air inside the bhatti (Fig. 5). Superior quality capsule can be achieved through ICRI Improved *bhatti* (Fig.6).

![Fig 5 ICRI Improved bhatti](image1)

![Fig 6 ICRI Improved bhatti cured capsule](image2)

**Salient Features of ICRI Improved bhatti**
- Natural colour and unique flavour of cured cardamom is retained which is lacking in local system.
- The system is very simple, dismantle, portable type and assembling materials are light in weight.
- The system is fabricated with materials available locally.
- Any type of fire wood / Agricultural waste can be used as fuel.
- Easy to work and no hardship is faced by the workers as experienced while working in local *bhatti*.
- The additional cost over the local bhatti is affordable even by the local growers.

**Conclusion**
Large cardamom is basically sold in international market. Demand for quality capsule is very high in domestic and international market. In domestic market about Rs. 100/- to Rs. 150/- per kg of dry capsule got higher price compared to traditionally cured capsule. The system may be popularized among different farmers in other large cardamom growing areas also.