

Performance evaluation of LPG fired small cardamom drier in cardamom plantation

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■ **ABSTRACT** : Freshly harvested small cardamom capsules were dried in a LPG fired dryer in a cardamom estate, Idukki district of Kerala. The temperature of the drying air during the initial period of drying was 40°C and thereby raised to 50°C towards the end. The drying characteristics of cardamom in the developed dryer were studied. It took about 23 hours of drying to reach a moisture content of 8 per cent (w.b) from an initial moisture content of 86 per cent (w.b). The quality parameters of the dried cardamom were analysed based on BIS specification. The cost of drying one kilogram of cardamom was worked out to be Rs. 2.10.

■ **KEY WORDS** : Cardamom, Liquefied petroleum gas, Drier, Drying characteristics, Quality

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Small Cardamom, (*Elettaria cardamomum*) popularly known as queen of spices, enjoys a premium preference in the international market and is relished for its distinct enriching properties. According to the statistics of Spices Board, Kerala, the area under cardamom cultivation was 55221 ha and the production in the year 2003-2004 was 11530 tonnes. There is a decline in the export of cardamom being produced in the country due to severe competition offered by Guatemala to India in the global market (Singhal, 1999). Hence, to raise the export potential of quality cardamom and to meet the growth in domestic demand the base of cardamom production need to be strengthened by better processing and post harvest techniques that could be easily adopted even by small planters is essential.

Cardamom capsules should be subjected to drying within 24 to 36 hours of harvest to avoid deterioration. Drying is one of the important unit operations as it determines the colour of the end product, which is the attractive and most important quality character. The retention of green colour is very important in cardamom drying as green colored cardamom fetches premium price in the export market. Fully matured capsules, which are not ripe yet, retain good colour after drying. Apart from retention of green colour, the capsules should not have excessive shrinkage and splitting of the capsules. Conventionally, cardamom is dried by flue curing in a special chamber known as the kiln. These kilns have many disadvantages such as high capital investment on buildings and also shortage of firewood as fuel, due to deforestation.

Also the smoke coming out of these driers leads to environmental pollution.

Earlier field studies in the mechanical drying of cardamom was done with lesser capacity batch type mechanical dryers (George Varkey *et al.*, 1981) and in the case of tray dryers, the drying period was found to be considerably long. Moreover, these dryers were operated with electrical heaters where the consumption of electricity was found to be higher. The trays also occupy more space inside the dryer and the labour required for loading and unloading of trays is more. The trays need to be interchanged quite frequently to avoid overheating at the bottom.

Better colour, flavour and aroma could be best retained at higher airflow and low temperature. This could be easily met using a forced flow type of cardamom drier using liquefied petroleum gas (LPG) as fuel. This type of drier requires less space and could be easily transported by vehicle to small plantations. The dryer could be used even in small plantations having limited power supply, since the availability of electricity is limited in such plantations. The dryer could handle 400-kg/batch of fresh cardamom capsules and the retention of green colour were found to be maximum with better flavour and aroma.

■ METHODOLOGY

Description and operation of the LPG fired cardamom drier:

The drier has the following components: Drying chamber