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Drying characteristics of *Byadagi* chilli (*Capsicum annuum* Linn.) using solar tunnel dryer

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ABSTRACT : Freshly harvested *Byadagi* chilli (*Capsicum annuum* Linn.) fruits were treated with dipsol, potassium nitrate and citric acid and dried in solar tunnel dryer (STD) and open yard sun drying (OYSD). A comparative study was conducted to evaluate two drying methods with respect to temperature and time combinations. It took 39 h to bring down the moisture content of chillies from 339.14% d.b. to 10.00% d.b. in STD as against 57 h under OYSD. The per cent time saved for drying chilli by using improved method of drying (STD) was found to be 31.57% in comparison with open yard sun drying. Drying took place in the falling rate period and the Newton model was found to be the best fit to describe the drying behavior of *Byadagi* chilli.

KEY WORDS : *Byadagi* chilli, Drying model, Moisture content

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Chilli (*Capsicum annuum* Linn.) is an important spice and vegetable crop used all over the world in one form or the other. It is also called as red pepper of capsicum and constitutes an important commercial crop used as condiment, culinary supplement or as a vegetable. Chilli is cultivated mainly in tropical and subtropical countries namely, Mexico, Africa, India, Japan, Turkey and USA. In India, among the spices consumed (per capita consumption), dried chilli contributes a major share (Pruthi, 1998).

Chilli, which contains high moisture content (300-400% d.b.) after harvest, is highly perishable and hence, its processing and storage are of considerable importance to the farmers as well as to the processors and consumers. Normally chilli with a moisture content of 11per cent d.b. is acceptable in the export market but Indian chilli sometimes contains up to 16 per cent d.b. moisture (Singhal, 1999). It is essential to reduce the moisture content and provide aeration to chilli after harvesting to avoid development of microflora and subsequent loss of quality or total spoilage (Singh and Alam, 1982).

Traditionally, the chilli is dried under sun in major production areas of the world but the major problem encountered in sun drying is that the chilli remains at intermediate moisture levels for longer periods resulting browning of the product besides the product being amenable to dirt, dust and microbial infection (Shrivastava *et al.,* 1990). Solar dryers have been reported to have higher drying efficiency (Tiris *et al.,* 1995). Chilli with higher colour value and less pungency are preferred in Europe and the West. Chilli is commercially important for two qualities, *i.e.*, its red colour due to the pigment capsanthin and its biting pungency due to capsaicin. Among these alkaloids, capsaicin and dihydrocapsaicin are the major alkaloids that contribute up to 80% of the total capsaicinoids (Bosland and Votava, 2000). The price that chilli powder fetches in the market is determined by its pungency and colour (Bandyopadhyay and Raghuram, 2007). Therefore, chilli needs to be dried quickly without impairing colour and pungency.

METHODOLOGY

The present study on drying of *Byadagi* chilli (*Capsicum annuum* Linn.) was carried out in the solar tunnel dryer (Fig. A) of one tonne capacity installed at the Department of Agricultural Processing and Food Engineering, College of Agricultural Engineering, Raichur, The dryer has tunnel shape made of semi cylindrical metallic (galvanized pipe) structure covered with UV-stabilized transparent thermic polyethylene sheet of 200 micron. Freshly harvested ripened chillies (cv. *Byadagi* kaddi) were procured from the field of a progressive farmer of Matamari village of Raichur district and brought to the laboratory within 5 h of harvesting. The chillies were washed in tap water to remove the soil and dirt adhered to the fruits. The chillies were pre-treated in selected emulsions and