

Effect of product free volume ratios on the respiration rate of tuberose (*Polianthes tuberosa*) flowers

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SUMMARY : The experiment was carried out to study the effect of product free volume ratios on the respiration rate of tuberose (*polianthes tuberosa*) flowers under different storage condition. Tuberose flowers were selected for the study, based on their growing export demand. Known quantities (25g, 50g and 100g) of flowers were kept in the closed system under air tight condition in the PET container containing ambient air as the initial atmosphere. Then respiration rate of the flowers was measured with respect to different time and temperature conditions. (ambient conditions 25-27°C and refrigerated 6-8°C conditions). From respiration studies it was concluded that, as the product free volume ratio decreases the rate of O₂ consumption was accelerated. Also the respiration rate of the tuberose flowers stored under ambient condition was 0.21 to 0.28 m³/kg-h for O₂ and 0.19 to 0.30 m³/kg-h for CO₂ and under refrigerated condition were 0.013 to 0.022 m³/kg-h for O₂ and 0.010 to 0.014 m³/kg-h for CO₂. Respiration rate of the flowers under ambient condition was greater than the flowers stored under refrigeration condition due to the slow metabolic activities.

Key Words : Respiration rated, Post harvest handling of tuberose, Selflife of tuberose

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Tuberose (*Polianthes tuberosa* L.) is a bulbous ornamental flower. In India it is cultivated for its fragrant (Naidu and Reid, 1989). It consists of 'Single', 'Semi double' and 'Double' type of flowers which are popular both in domestic and export markets.

Respiration can be defined as the metabolic process that provides energy for plant biochemical processes. It involves oxidative breakdown of organic reserves to simpler molecules, including CO₂ and water, with the release of energy. The significance of respiration in extending the shelf-life of fresh fruits, vegetables and flowers that there exists an inverse

relationship between respiration rate and the shelf life of the commodity. Respiration rate of the produce gives an advanced insight into the respiratory kinetics of the storage system and also helps to predict the respiratory quotient. This helps to select appropriate packaging materials when designing modified atmosphere (MA) packaging system (Ravindra and Goswami, 2008). Thus, the accurate rate of respiration kinetics is an important step in the successful design and operation of storage techniques for horticultural produce.

Hence, the focus of the present study was to determine the respiration rate of flowers and also study the effect of product free volume ratios on the respiration rate of tuberose flowers under different storage conditions

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EXPERIMENTAL METHODS

The experiment was conducted at Department of Food and Agricultural Process Engineering, coimbatore during 2010-2011.

Fresh flowers of tuberose (*Polianthes tuberosa*) species