Effects of minimal processing and temperature on respiration rate of carrot (var. Nantes)

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INTRODUCTION

Consumer's increased interest in fruits and vegetables as 'healthy' foods with zero cholesterol, low to no fat and sodium, and high levels of vitamins, minerals and fibre, has accelerated an increased effort to improve the quality of those products through the marketing system. A new category of products, called **Minimal Processed (MP)** vegetables has arisen.
They are intended to be presented to the consumer conveniently peeled, cored or sliced in prepared packages, with fresh-like quality and ready to be eaten, comprise a fresh convenient product, but they are highly perishable.
New methods of solving degradation problems of MP products must be developed.
The respiration rate of vegetable products is an important indicator of metabolic activity allowing predicting the shelf life. Mechanical stress is responsible for marked increases on respiration rate of carrots (Seljasen et al.,2001).

The aim of this work was to evaluate the influence of minimal processing operations as well as temperature on the respiration rate of carrots (var. Nantes).

MATERIAL AND METHODS

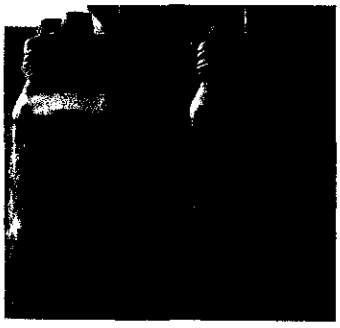
Carrots grown in Portugal were washed and placed in 500 ml glass jars and then closed hermetically. Samples were kept at 4 and 20°C. To measure the respiration rate gas sampling from the head space was obtained by injecting a sample from the head space in a gas analyser. Respiration rate was calculated in mg CO_2 / Kg of carrots / hour.
In order to analyse the influence of minimal processing operations experiments were repeated with whole carrot, peeled and sliced at two different temperatures.

Experiments were repeated three times and respiration rate for each storage condition was calculated as the average.

CONCLUSIONS

Minimal processing operations caused an impact on the respiration rate of carrots stored at 4°C and 20°C. At 20°C this effect was related to the extent of cutting surface.
Low storage temperature was a good inhibitor of the respiration rate, contributing to the improvement of shelf life. This effect was more visible for whole carrot.
Unexpectedly the respiration rate of grated carrot at 4°C was lower than the other samples.

RESULTS



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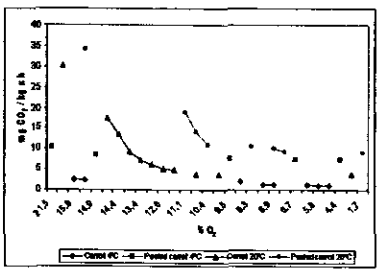

Fig. 1 - Influence of storage temperature on the respiration rate of carrots (var. *Nantes*)

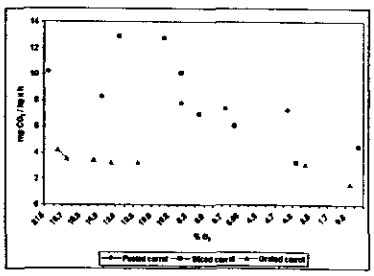

Fig. 2 - Influence of minimal processing operations on the respiration rate of carrots (var. *Nantes*) at 4°C

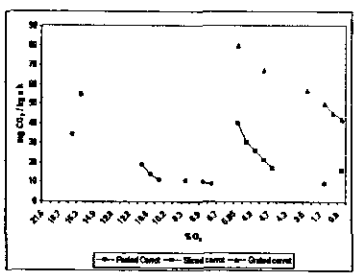

Fig. 3 - Influence of minimal processing operations on the respiration rate of carrots (var. *Nantes*) at 20°C