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EFFECTS OF MINIMALLY PROCESSING AND TEMPERATURE ON RESPIRATION RATE OF CARROT (VAR. NANTES).

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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 fiber, has accelerated an increased effort to improve the quality of those products through the marketing system.

A new category of products, called Minimally 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. The knowledge of the nutritional impact of minimal processing operations on these products will be an advantage for the producers that will possess information that will create new markets.

The aim of this work was to evaluate the influence of minimally processing operations as well as temperature on the respiration rate of carrots (var. Nantes). Minimally processing operations caused a remarkable impact on the respiration rate of carrots stored at 4°C and 20°C. Low storage temperature was a good inhibitor of the respiration rate, contributing to the improvement of shelf life.

EFFECT OF TISSUE WOUNDING ON CALORIMETRIC MEASUREMENTS OF VEGETABLE METABOLISM.

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When plant tissue is wounded, a number of protective processes start. We have made a study by isothermal calorimetry of the response of some vegetable tissue to wounding. Samples with different surface to volume ratios were prepared from carrots, potatoes and swedes (rutabaga) and the overall metabolic heat was measured in closed glass ampoules in a TAM Air isothermal calorimeter. The evaluation was made by assuming that a certain heat production rate per volume tissue was associated with the normal metabolism, and that another heat production rate per surface area was associated with the wound response.

The results showed that the wound response part was high; in some cases the major part of the heat came from the wound response and not from the ordinary metabolism. This is an important factor to take into account when making calorimetry on wounded tissue. It also shows that isothermal calorimetry can be used for the study of wound response in vegetable tissue. Measurements such as the ones shown here can be used to optimize experiments with respect to this problem.

EFFECTS OF STABILIZING TREATMENTS AND PACKAGING ON MINIMALLY PROCESSED FENNELS.

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Minimally processed vegetables are ready to eat products, with shelf-life of 5-6 days. The physical damage or wounding caused by preparation increases respiration and ethylene production within minutes, and associated increases occur in rates of microbial growth and enzymatic browning, with consequent changes in colour (such as russet spotting and brow stain), flavour, texture, and nutritional quality loss.

Among minimally processed vegetables, fennel is not a widespread product due to speed with whom enzymatic browning occurs (within 48 h). In order to extend shelf-life of fresh-cut fennels, effects of treatments with stabilizing solutions and different packaging conditions were studied. Washed and cut samples were treated with several stabilizing solutions (ascorbic acid, citric acid, ethanol, SO₂) straight before packaging; this was carried out both in modified atmosphere (75% N₂, 20% CO₂, 5% O₂) using an impermeable PET film and in ordinary atmosphere using a semipermeable film (MRX, Cryovac). During the storage at 4°C polyphenoloxidase activity, colour changes (measured as L*a*b* values) and level of main microbial groups were monitored.

Good results were obtained with SO₂ and ethanol pretreatments followed by modified atmosphere packaging and ordinary atmosphere packaging with semipermeable film, with shelf-life extension up to 8 days. Moreover it was observed that the studied cultivars are different both in terms of polyphenoloxidase activity and indigenous microflora.

EFFECT OF OZONATED WATER, MODIFIED ATMOSPHERE PACKAGING AND DIFFERENT STORAGE TEMPERATURE ON SHELF LIFE OF CUT LETTUCE (*Lactuca sativa acephala*) AND ARUGOLA (*Diplotaxis* spp.).

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Several experiment were carried out in order to assess the effect of different post-harvest treatments on quality and shelf life and in reducing microbiological spoilage during storage of cut lettuce and arugola. Applied treatments were as follows:

-Disinfection with ozone (about 1.5 ppm) added to the washing water and storage at 5°C;

-Packaging in plastic bags with Modified Atmosphere with different O₂/CO₂ (2/5; 2/10; 5/5; 5/10; 5/14; 12/10; 15/5; 15/10) and N protoxide/O₂ (80/20; 85/15; 90/10) ratios and storage at 2 or 5°C.

Lettuce and arugola leaves were stored for 3, 5 and 15 days and O₂ and CO₂ concentrations, ethylene evolution, ethanol ed acetaldehyde production were monitored. At the end of each storage period, colour was measured and the overall visual quality (leaves and cut surface browning, wilting and rotting) was estimated adopting a visual score system. A sensory panel of trained panelists evaluated appearance, texture, turgidity, crispness, juiciness, odours of the produce after each storage period.

Ozonated water did not affect physiological and quality parameters during storage but, as a trend, reduced the oxidation of the cut surfaces. N protoxide coupled with temperature of 5°C resulted to be the best treatment to prolong shelf-life and maintain quality and visual characteristics for 15 days. High CO₂ rates, mainly when applied with the lowest O₂ concentrations, negatively affected quality parameters of both produce. Similarly to ozonated water, atmospheres containing low CO₂ concentrations (5%) appeared to reduce cut surface oxidation.