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STORAGE OF GRAPES
UNDER MODIFIED ATMOSPHERES
(HIGH CO₂, LOW O₂)

A thesis submitted in part fulfilment of the examination
requirements for the award of

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FOOD TECHNOLOGY

Submitted by: Eleftheria Orfani

Supervised by: Dr. V. Dourtoglou

UNIVERSITY OF HUMBERSIDE
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ABSTRACT

This study investigates the behavior of PAL and PPO enzymes under stress conditions in grapes .

Those two enzymes were chosen because:

- PAL is a key enzyme in the biogenesis of aroma compounds
- PPO plays an important role in anthocyanin degradation, as well as in the formation of brown pigments.

PAL was found to be increase under high CO₂ / low O₂ concentration storage conditions; while PPO activity showed an increase after a period of time, under the same storage conditions.

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1. INTRODUCTION

Grapes as well as every other fruit and vegetable has a limited life cycle. This means that there is a period where large quantities of grapes are supplied to the market for various purposes, but there are also large quantities that go wasted due to the perishable nature of these goods. This phenomenon affects both the producers and the consumers. First of all the producers eventually supply the market with large quantities of fruit, so its price falls due to the steady demand that exists, and thus resulting in loss of profit. On the other hand due to the perishable nature of fruits and vegetables, large quantities go wasted without being able to reach the consumer; a thing which is very important particularly in the developing countries, where food shortage is usual.

In order to reduce the losses in this commodity and thus maximise profits and satisfy the consumers' demand, scientists and engineers have tried to find ways to extend the commercial life of the fruits and vegetables. In this effort several methods are employed, such as: drying, canning, chilling, and in recent years the use of controlled/modified atmosphere storage.

Controlled atmosphere storage refers to the storage of fruit in a gas tight environment, depleted in O_2 , enriched in CO_2 , and controlled to $\pm 1\%$ of predetermined levels.

Modified atmosphere storage refers to the storage of fruits and vegetables inside materials which have specific gas permeability properties; in an environment that is modified only once at the beginning of the storage period (Koski, 1988).

As it was mentioned earlier, fruits and vegetables have a limited life cycle. During this life cycle a number of biochemical and physiological changes take place, starting from the growth and proceeding to the ripeness and finally the senescence of the fruits and vegetables. By controlling or modifying the storage atmosphere of fruits and vegetables, people succeeded in affecting key enzymes, and thus retarding the ripening process.

In this project, we examine the modification of the storage environment (stress conditions), affected the activity of certain enzymes (PAL and polygalacturonase), as well as the production of aroma compounds, and the presence of pectins in grapes.