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THE SIGNIFICANCE OF OIL AND MOISTURE AS MATURITY PARAMETERS FOR AVOCADOS

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Abstract

In order to upgrade quality control, the moisture and oil content of different avocado cultivars were compared. The first fruit to be marketed had a moisture content of 78% while the last fruit to be submitted had a moisture content of 65%. The lowest oil levels (circa 12% on a wet mass basis and circa 50% on a dry mass basis) were recorded during May. The highest oil percentages recorded exceeded 20% of the wet mass and 60% of the dry mass. The inverse relationship between harvest time and moisture content was significant.

The relative status of each cultivar with regard to its oil and moisture content was calculated on a monthly basis and these 'constants' employed to evaluate the moisture to oil conversions currently in use. It was found that a potential for error exists with regard to these conversions and that the need for cultivar and geographically specific regulations is imperative.

In South Africa, transport temperature recommendations are based on fruit moisture concentration. The linear equation on which the oil:moisture regressions were based indicated that fruit with similar moisture concentrations may have oil concentrations which differ notably.

1. Introduction

In order to ensure that physiologically mature avocado fruit are harvested for export purposes, the South African Avocado Growers Association has set specific guidelines with regard to the stage at which the fruit is to be harvested. Similarly, the temperature regime under which the fruit is shipped is crucial to the quality of the fruit and guidelines have been set to ensure high quality fruit.

Currently, the above mentioned directives are based on measurements taken of the moisture content of the fruit. As an avocado becomes mature, the oil content increases and consequently the moisture content decreases. Either may therefore be used as indicators of maturity. The procedure for moisture concentration determinations are simpler and substantially cheaper than those for measuring oil content.

This paper deals with the relationship between oil and moisture readings. The aim is to gauge the extent to which variation between the two sets of data may influence aspects such as harvesting date and refrigeration temperature of the fruit.

2. Materials and methods

Sampling was done on all batches of fruit that were delivered between April and August 1994. A sample of 6 fruit were randomly drawn from each batch. The sample was recorded according to cultivar, delivery date, producer and count.

Moisture concentration analysis was done on all fruit from each of the 1165 samples that were taken using the method of Swarts (1976).

Oil concentration assays were performed on 578 samples using a Soxtec 1043 extraction unit (Tecator). The oil content was expressed in two ways, namely, a percentage based on the dry mass, as well as a percentage based on fresh fruit mass.

3. Results

Moisture content displayed a declining pattern as the season progressed. The first 'Fuerte' fruit to be marketed had a moisture content of around 78% while the last Ryan fruit to be produced, had a moisture content around 65% (Fig. 1).

The oil content of all cultivars rose steadily throughout the season. The lowest wet mass based oil levels of around 12% were recorded for Edranol and Pinkerton in May (Fig. 2) The lowest dry mass oil levels of around 50% were recorded for Pinkerton and Hass in May (Fig. 3). The highest oil percentages were recorded in August and were around 22% of the wet mass (Hass) and around 62% of the dry mass (Edranol).

The inverse relationship between oil and water content was significant in all cultivars (Fig. 4). 'Edranol' and 'Fuerte' had greater concentrations of both oil and moisture than 'Hass', 'Pinkerton' and 'Ryan'.

4.Discussion

The maximum moisture levels at which the avocados were accepted during the 1994 season were 77% in the case of 'Hass' and 80 % with regard to all the other cultivars. When making use of Swart’s (1976) constants, this converts to a minimum required oil level (fresh mass based) of between 9.8% and 10.9%, depending on the cultivar. However, the constants obtained in this study and those obtained by Holzapfel and Kuschke (1977) are lower than those calculated by Swarts (1976). When using the minimum monthly constants obtained in the current study, the above figures equate to an oil percentage between 6,1 % and 8,6%. Clearly, a potential error thus exists with regard to the conversions.

An aspect which may also be influenced by the moisture to oil conversions, is transport temperature. The latter is based on maturity moisture level of the fruit are also being investigated.

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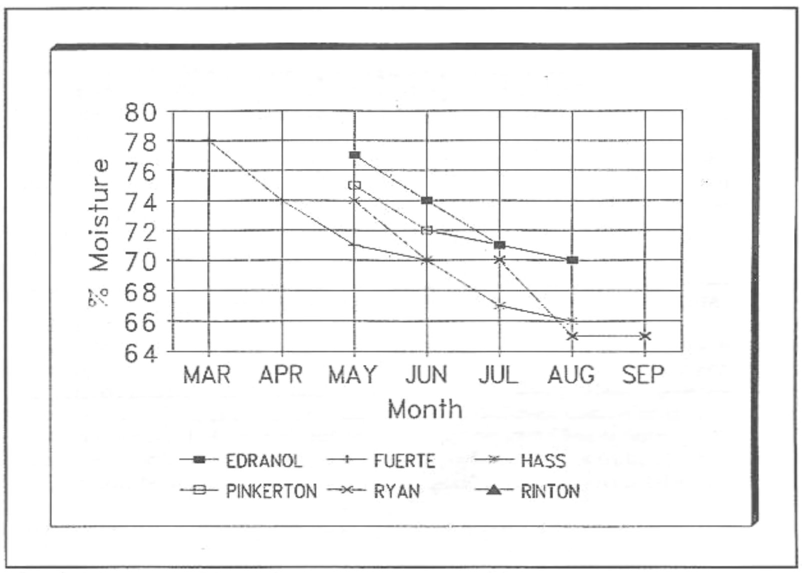

Fig. 1 Mean monthly moisture content per cultivar

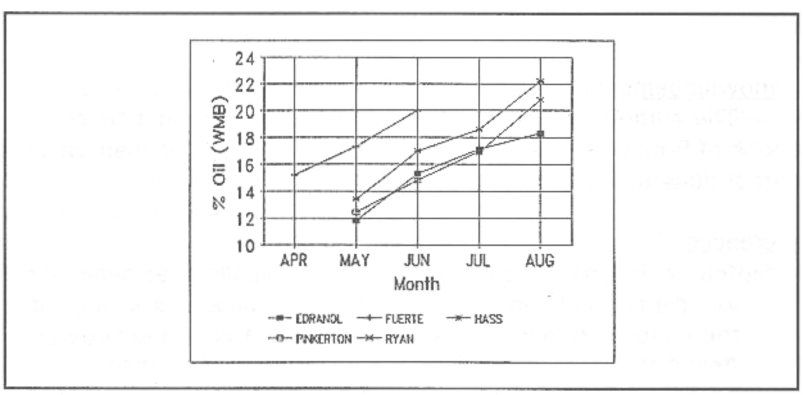

Fig. 2 Mean monthly oil content (wet mass basis) per cultivar

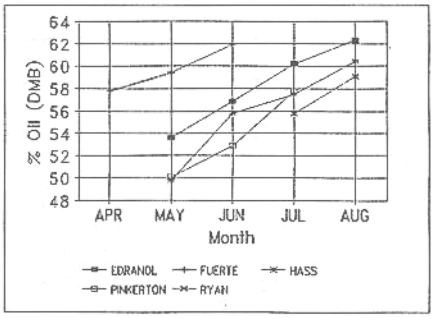

Fig. 3 Mean monthly oil content (dry mass basis) per cultivar

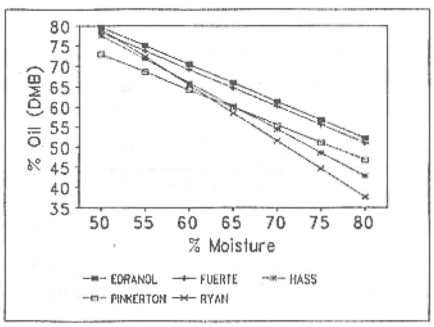

Fig. 4 Linear regression between oil content (dry mass basis) and moisture content