Post-harvest Quality of Table Grapes Marketed in the Municipality of Areia in the State of Paraíba

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Authors’ contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

The semi-arid region of Paraíba is known for the expansion of cultivated areas and agricultural produce, and the high yields and the quality of grapes. The objective of this work was to evaluate the quality table grapes for classification purposes according to the physical and physicochemical characteristics marketed in a local fair in the city of Areia - PB. The work was developed at the Laboratory of Technology of Agricultural Products (LPTA), Federal University of Paraíba (UFPB), Center of Agricultural Sciences (CCA), Campus II, Areia-PB. Table grapes were purchased at the free fair in the municipality of Areia. Two clusters were selected and analyzed according to the Standardization Primer and Classification of the Brazilian Program for Modernization of
1. INTRODUCTION

Table grapes comprise varieties of the species *Vitis vinifera* L. of European origin, which are sensitive to fungal diseases and highly demanding in cultural dealings. Most exported grape varieties are *Vitis vinifera* but could include hybrid species. Brazilian grape exports have a history of growth over the years. Increased production is characterized by the supply in times of low availability from importing countries of the Northern Hemisphere [1]. Its production dispenses with technical practices of cultural management, which reduces the costs and demands less investment [2]. These markets value healthy, intact fruits with size, colour and shape consistent with consumer demands [3]. The fruits that do not meet these requirements are destined to the domestic market.

In spite of the diversity and availability of fruit products in the domestic market, their commercialization is limited, mainly due to the high perishability and because they are, in general, handled under environmental conditions that accelerate the loss of quality. In addition to the quantitative losses recorded in post-harvest, the qualitative losses of the products could compromise their profitability [4]. Viticulture in the semi-arid region, particularly in this region, stands out in the national scenario, not only for the expansion of cultivated areas and production volume but also for the high yields achieved and the quality of the grapes produced.

According to the Standardization Primer and Classification of the Brazilian Program for Modernization of Horticulture [5], the fruits must represent characteristics appreciated for consumption "in natura". The bunches should be attractive, with a pleasant taste and must be resistant to transport and handling with post-harvest preservation. The ideal shape of the cluster is conical, especially for the external market, with an average size of 15 to 20 cm and weighing more than 300 grams, and should be dense but not compact bunches. The berries should be large and uniform, with a diameter equal or greater than 18 mm for seedless grapes and 24 mm for those with seeds and have good adhesion to the pedicel. Also, berries should be clean without insect staining, disease, mechanical or defensive damage. The pulp must be firm, with a sturdy film and gland.

The absence of seeds is a desired characteristic for "in natura" consumption. The colour of the berries may be green, yellowish-green or amber, red or black, which is an important aspect in marketing. The berries must have an intense, bright and even colour. Although this is a varietal characteristic, it is also affected by climate and cultural practices. The taste of the pulp is determined by the type and concentration of the volatile compounds present and can be grouped into four types: neutral, special, musk and muscatel. The grapes may still be sweet or acidic, according to the relationship between sugars and acids and may be more or less astringent, depending on the tannin contents. The objective of this work was to evaluate the quality of grapes for classification purposes according to the physical and physicochemical characteristics of table grapes marketed in a local fair in the city of Areia - PB.

2. MATERIALS AND METHODS

The work was developed in a practice at the Laboratory of Technology of Agricultural Products (LPTA), Federal University of Paraíba (UFPB), Center of Agricultural Sciences (CCA), Campus II, Areia-PB. The material was purchased at the free fair of the municipality and identified as table grapes. Two clusters were selected and analyzed according to the standardization primer and Classification of the Brazilian Program for Modernization of Horticulture, identifying the group, subgroup, class, subclass, category and the presence of defects (severe or mild).

The bunches were weighed separately using an analytical balance and measured longitudinally and transversally with the aid of a calliper. The same measurements were carried out for 10 berries of each cluster. The skin and seeds were removed and the pulp was weighed. The pulp

**Keywords:** Post-harvest; quality; grape; viticulture.
was macerated with a pestle and mortar. After maceration, 10 g was weighed into three separate containers, adding 50 mL of distilled water to each. The pH was measured. To read the acidity, 2 drops of phenolphthalein was added to the macerated pulp and titrated with Sodium Hydroxide. For soluble solids, 3 drops of the macerated material were used using a portable analogue refractometer.

Table 1. Evaluation of the physical characteristics of table grapes

<table>
<thead>
<tr>
<th>Bunch</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (g)</td>
<td>338.89</td>
<td>189.76</td>
</tr>
<tr>
<td>Length (mm)</td>
<td>142.7</td>
<td>69.4</td>
</tr>
<tr>
<td>Width (mm)</td>
<td>122.2</td>
<td>50.5</td>
</tr>
</tbody>
</table>

Table 2. Evaluation of physicochemical characteristics of table grapes

| Titratable Acidity (mg / 100 g) | 0.613661 |
| Soluble Solids (°Brix) | 11.9     |
| pH                  | 3.4      |
| SST / ATT           | 1.98     |

3. RESULTS AND DISCUSSION

According to the standardization primer, the grapes were classified in the group: grapes with seeds; subgroup: Skin with white colouration; class: bunch/cluster 1 represents the weight of 338.89 g, class 200, bunch 2 represent the weight of 189.76 g, clas 50; subclass: 26. The bunches showed slight defects, with superficial damages.

Weight, longitudinal and transverse measures (height and diameter) of the bunches are listed in Table 1. The weight of the bunch was higher than the means of five cycles of the 'Beauty Seedless' grape, where according to [6], the highest weight of the cycles was 283 g, with a mean of 203.53 g. For cluster/bunch two, the same author found in 'Canner' cultivar, average values of 189.76 g, class 50; subclass: 26. The bunches showed slight defects, with superficial damages.

Acidity, soluble solids and pH were performed on the mean and expressed in Table 2.

Similar values for titratable acidity [7] were found in Benitaka cultivar. Soluble solids (SS) values obtained were lower than those found by [8] (17.69), and a smaller difference according to [6]. In the 'Canner' variety, it reached 14.05 °Brix. The SS determines the sweetness of the fruit during maturation and is related to its flavour Santana et al. [8] found a pH values of 3.69, similar to that obtained, and low SST / ATT ratio when the commercial minimum standard for table grapes was 20, when compared to the cultivar Festival.

These characteristics, combined with the management from the field to the commercialization, allow high potential [9,10,11]. However, the best quality of the final product depends on the equilibrium of a set of parameters. The relationship between sugars and organic acids determines this balance.

4. CONCLUSIONS

According to the evaluations carried out, from the standardization primer, the berries were slight damage but not changing drastically in their post-harvest quality.

The samples were classified according to commercial standards and suitable for “in natura” consumption.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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