PROPERTIES OF PEARS HARVESTED AT DIFFERENT RIPENING STAGES

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Abstract: Pears of the variety S. Bartolomeu have been used over the years in Portugal to produce a traditional dried pear known as "pera passa". The processing comprehends a solar drying performed at open air, with obvious disadvantages, either concerning the drying efficiency or the sanitary quality of the final product, taking into account that the products are exposed to multiple contamination agents. For these reasons, attempts have been made to study alternative production methodologies, including the use of solar stoves, among others. In the present work pears of the variety S. Bartolomeu which were harvested at three different moments, and therefore correspond to three different ripening stages, were dried in a solar stove and the evolution of some properties was monitored along the drying process. From the results obtained was possible to conclude that the pears harvested in the two first dates show quite similar trends through drying, while the pears harvested at the last date reveal a clear distinct behavior, allowing to infer that the ripening stage at harvest plays an important role in the subsequent drying operation.

1. INTRODUCTION

"Pera Passa de Viseu" denominates a traditional food product produced from pears of the variety S. Bartolomeu using a traditional solar drying method, which is based on an open-air exposure [1]. Despite being quite a cheap drying method, making use of the sun as energy source, it has some very important disadvantages, like for example: (1) the process is slow and very much dependent on weather conditions, and (2) the quality of the product is not satisfactory taking into account factors such as pollution from dust or from animal contamination or other types of infestation and microbial and mould contamination in humid environments [2]. Therefore, using a solar stove allows to conciliate the cheapness of the method with the improvement in quality by protecting the fruits against external dangers.
The present work aimed to study the effect of ripening stage on the properties of pears of the variety S. Bartolomeu along drying, and for that three harvest dates were considered: 27th July (Essay 1), 10th August (Essay 2) and 20th August (Essay 3). Figure 1 shows that pears harvested in the first dates, corresponding to essays 1 and 2, present quite a similar behavior through drying, while the pears harvested at the last date (essay 3), which were much more ripe, present clear distinct and contradictory trends. Therefore, it is legitimate to think that the ripening stage at harvest plays an important role in the subsequent drying operation.

2. EXPERIMENTAL

Pears of the variety S. Bartolomeu were purchased to a farmer in Oliveira do Hospital, being harvested on three different dates: 27/07/2007, 10/08/2007, 20/08/2007. The drying experiments made with these pears were respectively essays 1, 2 and 3. The pears were dried uncut, after peeling, inside a solar stove, over nylon nets. Three samples were removed from the stove everyday at 10:00 h, 14:00h and 18:00 h, to analyze their moisture content, acidity, total soluble solids and hardness.
Moisture content of the pulp was quantified with a Halogen Moisture Analyzer (Mettler Toledo HG53). Total Soluble Solids and acidity was estimated according to previous established methodologies [3]. Hardness was measured following the methodology described at Ferreira *et al* [4].

3. RESULTS AND DISCUSSION

Figure 1 represents the evolution of moisture (wet basis) in the pears along drying for the first essay, shown as an example. The experimental points do not follow a very firm pattern, showing some periods where the decrease in moisture was very slight (8-24 h, 32-48 h, 56-72 h) alternating with other periods where the decrease was quite significant (24-28 h, 48-52 h). However, the points can be globally described either by a linear function or an exponential decay function, being this last slightly better, showing a little higher correlation coefficient of 0.9686.

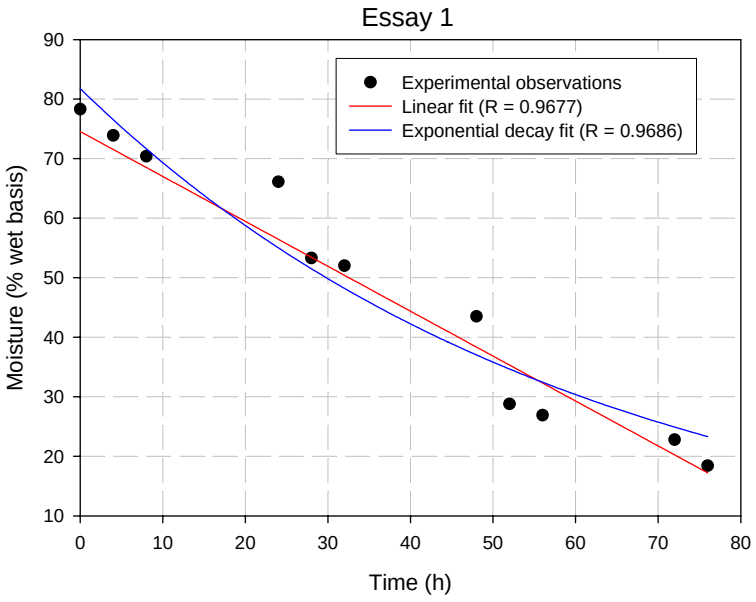

Figure 1 – Variation of moisture along drying, for essay 1.

Figure 2 shows the variation of acidity and total soluble solids (TSS) along drying, that is to say as the moisture content diminishes. From both graphs in Figure 2 is evident that essays 1 and 2 show a similar trend but essay 3 is clearly different. In fact for acidity, which is quite an important organoleptic property for this kind of product, the pears harvested earlier show a decrease in acidity along drying, being at first more acid but achieving a low acidity value towards the end of the process, whereas the pears that were too ripe at first and showed less

acidity at the beginning of drying, showed a higher acidity when dried, because this property did not change during drying. As to the total soluble solids, once more the difference between essays 1 and 2 and essay 3 is visible.

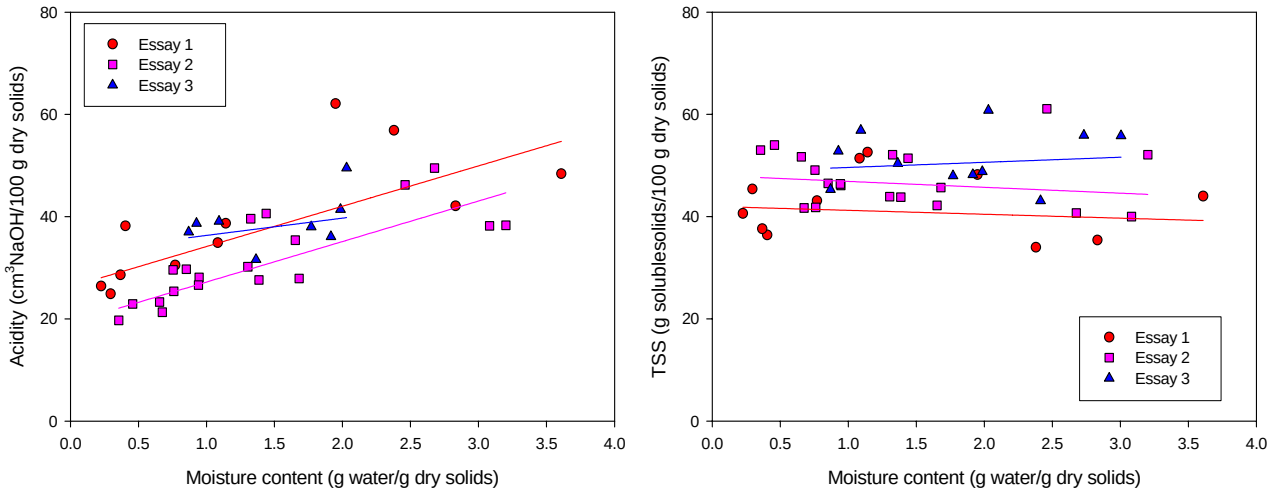

Figure 2 – Variation of acidity and TSS (total soluble solids) with moisture content.

Figure 3 shows how the relations TSS/Acidity and Hardness/TSS change with moisture content. In the first essay the hardness was not measured and therefore it was not possible to calculate the relation Hardness/TSS for this essay. From the graphs in Figure 3 one can see once more that essay 3 undoubtedly presents a different behaviour than the other essays.

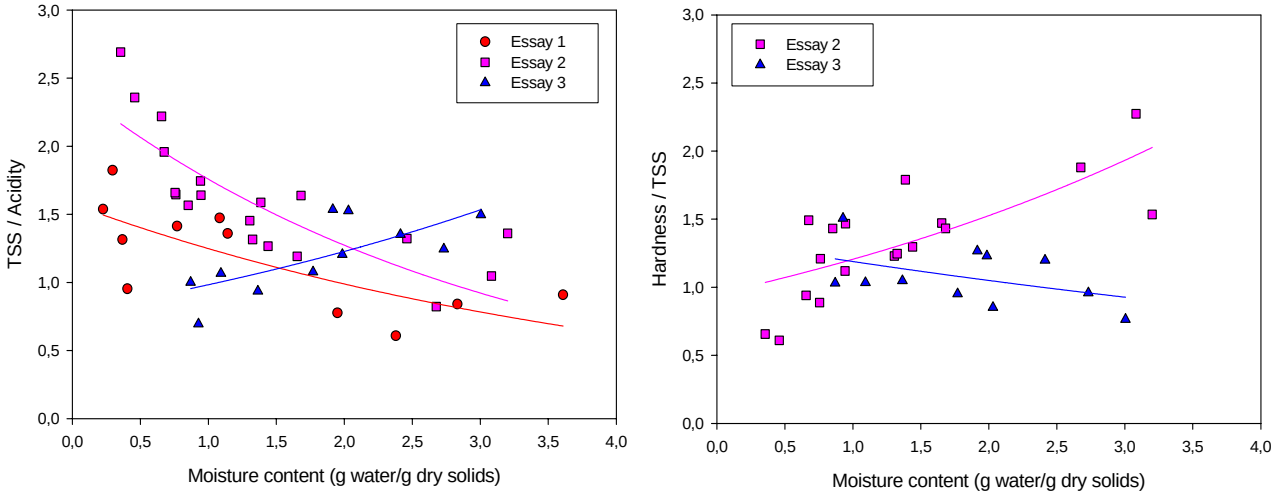

Figure 3 – Variation of the relationsTSS/Acidity and Hardness/TSS with moisture content.

4. CONCLUSIONS

From the results was possible to conclude the pears harvested in the first dates, corresponding to essays 1 and 2, present quite a similar behavior through drying, while the pears harvested at the last date (essay 3), which were much more ripe, present clear distinct and even contradictory trends.
Therefore, it is legitimate to think that the ripening stage at harvest plays an important role in the subsequent drying operation.

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