

Aroma retention in evaporated and freeze-dried strawberry pastes

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Abstract

Stability of volatile aroma compounds in different foods has been of increasing interest because of its relationship with the quality and acceptability of foods, but it is difficult to control. In this work aroma (fruity esters) of strawberry pastes were investigated by GC-MS. Loss of aroma compounds especially due to high temperature treatments is a well-known problem in food industry, since absence of aroma compounds causes considerable decrease in the quality. Strawberry pastes are very complex mixture. For the purpose of this research strawberry pastes were prepared by evaporation and freeze-drying, so that those two processes could be compared. Samples were also prepared with and without addition of artificial strawberry aroma. To improve aroma quality of evaporated and freeze-dried strawberry pastes, sucrose (3, 5 and 10%) was replaced by addition of the same concentration of trehalose. Results showed that freeze-drying was more effective than evaporation in aroma retention of strawberry pastes, but it had higher impact on samples without addition of artificial aroma. Increase wasn't proportional with trehalose concentration. The highest concentration of trehalose i.e. 10% didn't have the highest impact on aroma retention. Addition of 3 and 5% of trehalose had better effect on aroma retention in both evaporated and freeze-dried samples with and without addition of artificial aroma. Influence of trehalose addition on individual selected fruity esters was also investigated. The same trend is noticed as in overall amount of fruity esters.

Key words: aroma, trehalose, freeze-dried strawberry paste, evaporated strawberry paste

Introduction

Aroma plays an important role in consumer satisfaction and influences further consumption of foods. Stability of volatile aroma compounds in different foods has been of increasing interest because of its relationship with the quality and acceptability of foods, but it is difficult to control (Madene et al, 2006). A complex mixture of esters, aldehydes, alcohols and sulphur compounds mainly determines strawberry aroma, but esters are quantitatively and qualitatively the most important class of volatiles (Komes et al, 2003).

Strawberry pastes can be used as fillings for energy bars, chocolates and other products which contains fruit. Their quality is very important since it has influence on overall product quality and through that on acceptance of product by consumers.

Materials and Methods

Raw material. Raw material for strawberry pastes preparation was obtained from Fructal d.d. Ajdovčina, Slovenia. Samples of strawberry pastes were prepared by freeze-drying and evaporation at 80 °C until 76% of total solids were achieved. To improve aroma quality of evaporated and freeze-dried strawberry pastes, sucrose (3, 5 and 10%) was replaced by addition of the same concentration of trehalose.

GC-MS analyses. GC-MS analyses were carried out for evaluation of selected fruity eaters (ethyl-butanoate 2-methyl-ethyl-butanoate 3-methyl-ethyl-butanoate ethyl-pentanoate methyl-ethyl-pentanoate ethyl-heksanoate methyl-heksanoate heksil-acetate and methyl-butanoate). Extraction of volatiles was carried out with 85 µm Carboxen/PDMS (Supelco) needle at 50 °C for 30 min. It was used 6890N (Agilent, SAD) instrument equipped with MS 5971A (Hewlett Packard, SAD) detector. ZB-WAX; 60 m x 0,32 mm x 0,5 µm (Phenomenex)

column was used with initial temperature of 40 °C for 5 min, temperature gradient 4 °C/min and final temperature 230 °C for 5 min. Carrier gas was helium with flow 1 ml/min at 40 °C.

Results and Discussion

Results from fig. 1 and 2. showed that freeze-dried samples with and without addition of artificial aroma had higher amount of fruity esters than evaporated sample due to low process temperatures. Samples with trehalose addition had higher amount of fruity esters than samples prepared without addition of trehalose except freeze-dried sample with addition of 10% of trehalose and evaporated samples with 10% of trehalose without addition of artificial aroma. That could be explained with interactions in complex matrix of strawberry pastes. As it can be seen from fig. 1. and 2. amount of fruity esters didn't increased proportionally with higher amount of trehalose addition. Freeze-dried samples without addition of artificial aroma and evaporated samples with addition of artificial aroma had highest retention of fruity esters when 5% of trehalose was added. While evaporated samples without addition of artificial aroma and freeze-dried samples with addition of artificial aroma had highest retention of fruity esters when 3% of trehalose was added. Influence of trehalose addition on individual selected fruity esters was also investigated. The same trend is noticed as in overall amount of fruity esters. Addition of 3 and 5% of trehalose had the higher influence than addition of 10% of trehalose (results are not shown).

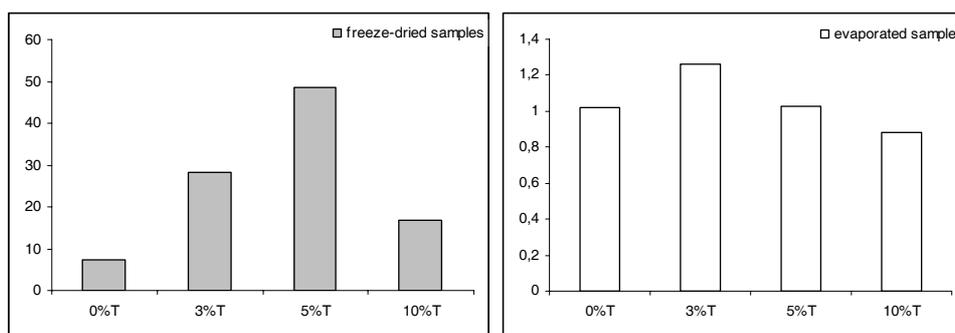


Fig. 1. Aroma retention of freeze-dried and evaporated strawberry pastes without addition of artificial aroma (T – trehalose).

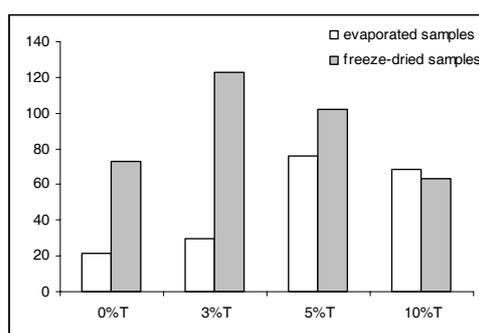


Fig. 2. Aroma retention of freeze-dried and evaporated strawberry pastes with addition of artificial aroma (T – trehalose).

References

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