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Changes in the sensory and volatile characteristics of green coffee quality during storage in modified atmospheres

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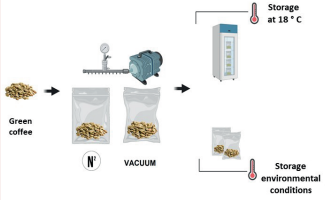
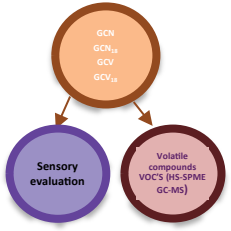
INTRODUCTION

For a high-quality green coffee bean (GCB), it is necessary to preserve the best conditions during harvest, postharvest and processing. During storage, the GCB suffer a series of important chemical, physical and biological modifications, that affect the quality and acceptability of roasted coffee and beverage[1]. These changes are complex and their occurrence depends on environmental variables such as temperature, humidity, oxygen availability, exposed surface area and packaging. Therefore, technological innovations that maintain and increase the quality attributes of the GCB are necessary[2,3]. In this work it was evaluated the sensory changes and volatile compounds during the storage of GCB in modified atmospheres in packing vacuum and N_2 for one year.

MATERIAL/METHODS





GCN: Green coffee stored with nitrogen gas under environmental conditions
GCN18: Green coffee stored with nitrogen gas at 18 ° C
GCV: Green coffee stored under vacuum in environmental conditions
GCV18: Green Coffe stored in vacuum at 18 ° C

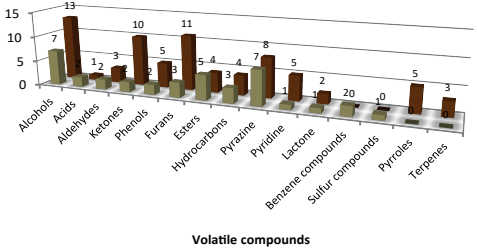


Figure 1. Total number of Voc's found in green and roasted coffee storage.

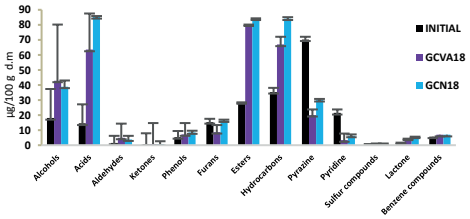


Figure 2. Initial and final concetration of chemical families in green coffee stored in modified atmospheres.

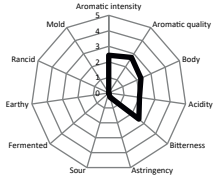


Figure 3. Sensory evaluation in coffee cup without storing.

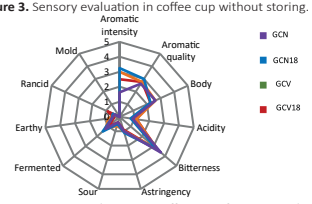


Figure 4. Sensory evaluation in coffee cup after 12 months in storage.

RESULTS/DISCUSSION

A total of 38 volatile compounds were identified in GCB divided into 13 chemical families. For roasted coffee, 74 compounds divided into 13 chemical families were identified (Figure 1). The final concentration of volatile compounds in roasted coffee **GCVA 18 (14158.83 µg / 100 g d.m.)** was higher than **CVN18 (13190.29 µg / 100 g d.m).** The observed changes are, in general, slower and less pronounced at the refrigeration temperature and with the application of modified atmospheres.

At the end of the storage, no new VOCs were produced in green coffee (Figure 2). Some VOCs previously identified as quality indicators, such as dimethylsulfite and 1-octen 3-ol, are associated with undesirable notes in green coffee, and therefore need to be monitored during storage. Makri et al., (2011) evaluated the effect of atmospheric conditions in oxygen conditions, RH higher than 75% and temperatures higher than 30°C on the fraction of volatile compounds after 180 days of storage, compounds such as dimethylsulfite and 1 octen 3-ol these compounds have been studied extensively and have been linked to undesirable aromatic notes in green coffee beans.

In the sensory evaluation (Figure 3), the tasters drank the coffee infusion as a reference before being stored, which obtained a round cup rating, creating a balance between the attributes. Subsequently the evaluation at 12 months storage showed that no unpleasant descriptors such as fermented, mouldy or earthy were developed in all treatments and the quality of the positive attributes was maintained over time. Broissin-Vargas et al., (2018), determined after 6 months of storage, descriptors such as river, earthy, decrease the aromatic quality and body in green coffee stored in jute bags.
Borém et al., (2019) studied the storage of coffee in different packaging conditions where they observed that the coffee stored in jute bags differed mainly due to the higher values of acidity of fats and lower scores in the sensory analysis. The high-barrier packages with inert gases were more efficient in the storage of coffee beans since they presented the lowest deterioration indicators, represented by the low values of fatty acidity, free fatty acids and higher scores in the sensory evaluation.

CONCLUSION/PERSPECTIVES

In this work, the use of modified atmospheres can improve the storage time of green coffee and its effect on the quality parameters at controlled and uncontrolled temperatures. For the profile of volatile compounds, the storage in a vacuum atmosphere was more advantageous than in nitrogen. For the sensory evaluation the use of nitrogen and vacuum can preserve the quality in the cup even at temperatures higher than 25 ° C, which is advantageous in comparison with the storage of jute bags. For these reasons, the application of this technology to maintain the sensory parameters of green coffee has promising results.

REFERENCE

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