

## Effects of Drying and Extraction Techniques on the Profile of Volatile Compounds in Banana Pseudostem

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**Abstract :** Banana is one of the most important crops produced in large quantities in tropical and sub-tropical countries. Of the total plant material grown, approximately 40% is considered waste and left in the field to decay. This practice allows fungal diseases such as Sigatoka Leaf Spot to develop, limiting plant growth and spreading spores in the air that can cause respiratory problems in the surrounding population. The pseudostem is considered a waste residue of production (60 to 80 tonnes/ha/year), although it is a good source of dietary fiber and volatile organic compounds (VOC's). Strategies to process banana pseudostem into palatable, nutritious and marketable food materials could provide significant social and economic benefits. Extraction of VOC's with desirable odor from dried and fresh pseudostem could improve the smell of products from the confectionary and bakery industries. Incorporation of banana pseudostem flour into bakery products could provide cost savings and improve nutritional value. The aim of this study was to determine the effects of drying methods and different banana species on the profile of volatile aroma compounds in dried banana pseudostem. The banana species analyzed were *Musa acuminata* and *Musa balbisiana*. Fresh banana pseudostem samples were processed by either freeze-drying (FD) or heat pump drying (HPD). The extraction of VOC's was performed at ambient temperature using vacuum distillation and the resulting, mostly aqueous, distillates were analyzed using headspace solid phase microextraction (SPME) gas chromatography - mass spectrometry (GC-MS). Optimal SPME adsorption conditions were 50 °C for 60 min using a Supelco 65 µm PDMS/DVB Stableflex fiber1. Compounds were identified by comparison of their electron impact mass spectra with those from the Wiley 9 / NIST 2011 combined mass spectral library. The results showed that the two species have notably different VOC profiles. Both species contained VOC's that have been established in literature to have pleasant appetizing aromas. These included l-Menthone, D-Limonene, trans-linlool oxide, 1-Nonanol, CIS 6 Nonen-1ol, 2,6 Nonadien-1-ol, Benzenemethanol, 4-methyl, 1-Butanol, 3-methyl, hexanal, 1-Propanol, 2-methyl- acid 2-Methyl-2-butanol. Results show banana pseudostem VOC's are better preserved by FD than by HPD. This study is still in progress and should lead to the optimization of processing techniques that would promote the utilization of banana pseudostem in the food industry.

**Keywords :** heat pump drying, freeze drying, SPME, vacuum distillation, VOC analysis

**Conference Title :** ICGFS 2017 : International Conference on Global Food Security

**Conference Location :** Miami, United States

**Conference Dates :** March 09-10, 2017