

BOOK OF ABSTRACTS

11th International Symposium on **RECENT ADVANCES IN FOOD ANALYSIS**

**November 5-8, 2024
Prague, Czech Republic**

Jana Pulkrabová, Monika Tomaniová, Stefan van Leeuwen, Michele Suman,
Michel Nielen and Jana Hajšlová
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THE CHEMISTRY BEHIND CHANGES IN COFFEE FLAVOR DURING STORAGE IN COMPOSTABLE AND STANDARD CAPSULES

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Rationale: Coffee quality is influenced by a series of genetic precursors, environmental factors, and post-harvest processes [1-3]. In this scenario, the storage of roasted&ground coffee plays a role. Even if it is a dehydrated product, oxygen and moisture affect its stability and thus its shelf life [2,4-6]. The selection of packaging materials is crucial for maintaining quality, and polymer-aluminium multilayer composite packaging materials are generally used to meet these requirements. However, especially in the broad market of coffee capsules, this packaging has an impact on the environment [7]. Some companies are looking for ways to balance flavor quality and sustainability by replacing aluminium-polymer packaging with compostable alternatives. This paper focuses on investigating a flavoromics approach to explore the chemistry behind changes in coffee flavor during storage.

Methods: Different commercial blends (P and B, 100% Arabica and I 50/50% Arabica/Robusta) of coffee capsules in different packaging, namely standard (multilayer foil with aluminium barrier) (and eco-capsules, batches and were analysed. Samples were stored under stress conditions (65% RH and 45°C) and monitored over a period from T0 to T180 days for the standard caps and from T0 to T90 days for the eco caps. The chemical data of the investigated coffee samples were obtained by analyzing both volatile and non-volatile profiles (i.e. lipids and phenolic fractions including alkaloids) using HS-SPME-GC-MS, HPLC-UV/DAD, moisture, pH, acidity, peroxide value and p-anisidine were measured. Sensory tests were carried out by an expert panel.

Results: A series of volatile compounds were detected aged samples, including 3 VOCs exhibiting pungent, rancid and acidic notes and appearing in sensory unacceptable samples independently from blends, batches and packaging. The phenolic fraction is very stable over time regardless of packaging and mixture. The evolution of the free fatty acids (FFAs) was correlated with the peroxides, p-anisidine, acidity values, and VOCs. pH decreases and moisture increase is measured in particular with compostable capsules. The results show that the different blends behave differently over time in the standard packaging than in the eco-capsules. The latter have a shorter shelf life due to moisture adsorption, which triggers hydrolytic and oxidative reactions.

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