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BOOK OF ABSTRACTS

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Production and transfer kinetics of three aroma compounds into the coffee beans during simulated wet processing and their fate after the transfer

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For the consumer, the flavor is arguably the most important aspect of coffee. Thereby, the coffee industry has dedicated efforts in improving and controlling the final beverage quality using roasting and brewing steps (de Carvalho Neto et al., 2018). Moreover, recent research studies have highlighted that the postharvest processing can have a direct impact on the quality and value of the final product, and they showed that wet processing offers a coffee with higher acidity and more aroma than dry and semi-dry processing (Pereira et al., 2017). Furthermore, Lee et al., (2017) assumed that there might exist a diffusion process of microbial metabolites into the coffee beans during the fermentation, enhancing the final coffee quality.

However, one question remains: are aroma molecules able to be produced by yeast and then to cross the different layers (mucilage and parchment) surrounding the coffee beans during coffee fermentation and what happens to them in the bean once they are transferred?

To answer this question, three labelled compounds with deuterium (butanal, 2-phenyethanol, isoamyl acetate) were used to study their transfer kinetics from a liquid medium into the coffee beans during simulated wet processing and to follow their fate in the beans. Ten grams of coffee samples were submerged in distilled water concentrated with marked compounds; they were maintained at 25°C and under agitation (120 rpm) for five time periods (0, 6, 12, 24 and 48 hours), then the transfer was stopped by washing the coffee beans with distilled water and the fate of the transferred volatiles in the coffee beans was studied during four time periods (3, 6, 9 and 15 hours) at 25 °C. For all trials, the labelled molecules were analyzed by SPME-GC-MS. Then the production kinetics of those three aroma compounds by three *Saccharomyces cerevisiae* strains were studied using a simulated coffee pulp media for 48 hours.

Results showed that the three labelled molecules were transferred into the coffee beans with different mass transfer rates, reaching at 12hrs, 0.2±0.03 ,11.2±0.66 and 1.3±0.04µg/g of coffee respectively for butanal, 2-phenyethanol and isoamyl acetate. After their transfer into the beans, the level of 2-phenylethanol remained stable for 15 hours, whereas butanal and isoamyl acetate underwent a first-order degradation reaction that could be linked to the metabolic germination reaction. The three yeast strains were able to produce those three volatiles during the fermentation of the simulated coffee pulp at different rate.

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