

Is transfer of precursors and aroma compounds produced by yeast during cocoa bean fermentation influenced by the tissue bean structure?

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ABSTRACT

Chocolate is obtained thanks to a large number of unit operations, including cocoa beans fermentation, their drying, roasting and processing into cocoa liquor. Fermentation is the first operation in chocolate processing. Without yeasts, lactic acid and acetic acid bacteria fermentative activity, a large part of aroma compounds would not be found in chocolate. In literature, there is a general consensus that fermentation is an important factor which influences chocolate flavor quality. These observations have led researcher to identify solutions to optimize the fermentation step, especially to control chocolate flavor. As for most of the fermented food or beverages, a solution aims to use starters in order to manage the biochemical transformation of cocoa beans. One focus has been done on starters ability to produce specific aroma compounds that could then be found in chocolate, and thus induce specific flavor qualities. However, there is still a lake of information regards to the transfer of precursor and aroma compounds produced by yeasts and their diffusion into the cocoa seed. Thus, this work was done to first prove whether precursors and aroma compounds, that could be produced by yeast during cocoa bean fermentation, were diffused from the pulp to the seed. For this purpose, labelled molecules, which constituted aroma precursors and key aroma compounds in chocolate, were chosen to follow their transfer into cocoa beans during simulated fermentation. Molecules transfer was studied in 4 media following a progressive experimental approach to evaluate the tissue layers impact. First medium contained cocoa seeds, without the pulp and tegument, a second medium contained cocoa seeds with the tegument, the third contained the whole cocoa beans constituted of the pulp, tegument and seed, and the fourth contained the whole cocoa beans and yeast. Cocoa beans samples were submerged in distilled water concentrated in labelled molecules; and maintained at 35°C for 6 days. Then, the labelled volatiles were analyzed by SPME-GCMS, and the labelled aroma precursors were analyzed by GC-MS after extraction and derivation. Analyses are underway: initial indications are that all studied compounds (i.e. volatiles and precursors) could diffuse from media to the cocoa seed and that the transfer speed is dependant of the nature compounds, with differences depending on media analysed.

Keywords: Cacao fermentation, Labelled aroma compounds, Transfers