**Starter culture development for cocoa bean fermentation using indigenous yeast strains.**

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**Highlights**

* The volatile compounds produced by the yeast strains were identified and quantified using SPME-GC-MS.
* Selection of yeast strains with potential to develop starter cultures for cocoa bean fermentation.

**1. Introduction**

Fermentation is one of the most important steps in the post-harvest process of cocoa, because many of the organoleptic perceptions that will directly impact the quality of the final product are developed in this stage by the action of microorganisms [1]. Among the main microorganisms involved in this process are the yeasts, lactic and acetic bacteria. The yeasts are the microorganism that plays the most important role in the production of volatile organic compounds [2]. The most common metabolites produced are esters which are related to fruit notes, alcohols with floral aromas and aldehydes and ketones with walnuts or almonds [3].

For those reasons is imperative to have more control over the fermentation; and one of the recently proposed alternatives is the use of starter cultures. These starter cultures are made from yeasts isolated from typical cocoa fermentations that have had the effect of producing cocoa paste with fine or flavor characteristics. The use of this approach would not only reduce the fermentation time [4], but also the variability between production lots; ensuring the uniformity of the product in markets that increasingly require more traceability [5]. The main objective of this work is to select yeast isolates that represent potential sources for producing volatile compounds related to desirable perceptions in cocoa beans.

**2. Methods**

1. The isolation of yeast from fermentation box was done as following: Sampling cocoa beans during fermentation process until cocoa bean was well fermented; once it was done the sample was diluted serially in order to get single colonies for isolation in Sabouraud media.
2. The growth of yeast and volatile compound production was following by UFC and SPME – GC – MS, respectively. Briefly, the isolated yeast was inoculated in a Sabouraud media and then the growth of yeast was development until reach a 106 UFC. After that, the media was placed into a hermetically sealed vial where was developed the solid phase microextraction using the procedure described by Palencia [5]. Then, the identification and quantification of volatile compounds produced by the yeasts was carried out by GC-MS and GC-FID respectively using the HP5 column 30m x 0.25µm x 0.25µm [5].

Finally, the concentration profile obtained was analyzed in order to determine which yeasts have the best potential to produce aroma compounds. Yeast with highest yields in volatile compounds were selected for starter culture development.

**3. Results and discussion**

Four yeast were selected for the future starter culture development according to aroma profiles produced by each of them identifying and quantifying by using GC. Some volatile compounds produced by selected yeast can be mentioned as follow: alcohols, esters, aldehydes which are related with sensorial perception of floral, fruit, nutty; respectively.

Interestingly, the yeast 111 was be able to produce high concentration of isoamyl ester; this finding would be used for developing cocoa fermentations in order to produce cocoa mass with fruit characteristics, which aren’t typically produced in Colombia.

**4. Conclusions**

In this work there were isolated 90 native yeasts and it was selected 4 of them with potential to use in cocoa fermentations. Remarkably, it was found a yeast with potential to produce high concentration of esters which open the possibility to a development fermentation process to produce Colombian cacao with new sensorial profiles.

**References**

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