

Amylase activity in coffee fruit fermentation with or without the addition of microbial growth stimulants

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Coffee is one of the most profitable agricultural crops in Latin America and produces one of the most consumed beverages in the world. Specialty coffees can be produced by fermentation processes that improve the sensory quality of the drink. Fermentations can alter the chemical composition of coffee fruits due to the production of enzymes that contribute to the degradation of compounds that detract from the sensory attributes of the beverage. The enzyme amylase oxidizes plant polymers with the release of glucose which contributes to microbial growth and coffee flavor. The aim of this study was to identify and analyze the concentration of the amylase enzyme during spontaneous and induced fermentations with or without maceration of coffee fruits with microbial growth stimulants. The experiment was carried out at the Coffee Analysis and Research Laboratory - LAPC of the Federal Institute of Espírito Santo - IFES, Venda Nova dos Imigrantes and at the Mycorrhizal Associations Laboratory - Universidade Federal de Viçosa - UFV. The fermentations were carried out in bioreactors (500 L) with cherry coffee. The starter cultures of *Saccharomyces cerevisiae* were used in the fermentation process at 107 CFU/mL and at a ratio of 1% (w/v). The fruits macerated in solutions of (5% w/v) glucose, fructose, cellulase and water and incubated for up to 120 h. The test to determine the activity of the amylase enzyme was carried out by adding 800 µL of water, 100 µL of the crude enzyme extract (BSE) and 100 µL of 1% (w/v) starch. This reaction was incubated for 15 minutes at 37 °C in a water bath. Enzyme activity was determined using the 3,5-dinitrosalicylic acid method at 540 nm and one unit of this activity was defined as the amount of enzyme that releases 1 µmol of reducing sugar per min. Amylase activity was influenced by the time and types of fermentation and maceration. Activity was higher in induced fermentation than in spontaneous fermentation. There was difference between fermentations regardless of fermentation time. The accumulated enzyme activity was higher in the fructose treatments and varied by up to 470 (U/mL) over 120 h. These results show that there may be a preference for certain microorganisms to hydrolyze starch. In addition, the equations fitted to the fermentation times at 5% showed that amylase activity was higher at intermediate times. Therefore, induced fermentations have great potential to increase amylase activity and contribute to improving coffee beverage quality.

Key words: Fermentation, coffee, enzymes, amylase.

Atividade de amilase na fermentação de frutos de café com ou sem adição de estimulantes do crescimento microbiano

A fermentação é um processo de extrema importância para melhorar a qualidade da bebida do café. A enzima amilase oxida polímeros vegetais que contribuem para o crescimento microbiano e melhora dos atributos sensoriais do café. O objetivo deste estudo foi identificar e analisar a concentração da enzima amilase durante a fermentação espontânea e induzida com ou sem maceração dos frutos de café com estimulantes do crescimento microbiano. Os resultados mostraram que as fermentações induzidas, podem ter um grande potencial para aumentar a atividade da amilase e contribuir para a melhoria da qualidade final da bebida.

Palavras-chave: Fermentação, café, enzimas, amilase.

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