



Facultad de Ciencia y Tecnología

Escuela de Ingeniería en Alimentos

**Effect of co-fermentation of probiotic microorganisms and
fruit pulps in the cocoa beans of the CCN-51 variety.**

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DEDICATION

I dedicate this thesis to two of the most important people in my life, my parents. Their constant love, support, and sacrifice has helped me fulfill my life goals and to get to where I am today.

I would also like to dedicate my thesis to all the people who have supported me continuously and participated in this chapter of my life.

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**EFFECTO DE LA CO-FERMENTACIÓN DE MICROORGANISMOS PROBIÓTICOS Y
PULPA DE FRUTAS EN GRANOS DE CACAO DE LA VARIEDAD CCN-51.**

RESUMEN

A pesar de sus múltiples beneficios, el cacao (*Theobroma cacao L.*) CCN-51 posee características que limitan su aprovechamiento en la industria chocolatera. En esta investigación, se realizó un estudio de los cambios fisicoquímicos, microbiológicos y calidad del grano de cacao durante una fermentación controlada de seis días usando un cultivo iniciador de microorganismos probióticos y pulpas de frutas. Los resultados mostraron diferencias significativas ($p < 0.05$) entre los distintos parámetros de los diferentes tiempos de fermentación. Los granos de cacao beneficiados fueron considerados "Cacao Superior Selecto". Se obtuvieron granos de cacao de buena calidad, sin embargo, el tiempo de fermentación puede influir en sus características.

Palabras claves: *Theobroma cacao L.*, fisicoquímicos, microbiológicos, calidad, fermentación controlada, cacao beneficiado.



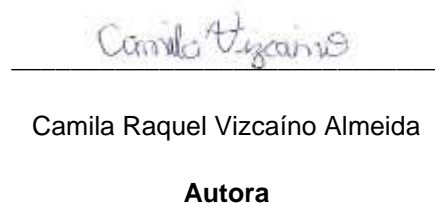
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**EFFECT OF CO-FERMENTATION OF PROBIOTIC MICROORGANISMS AND FRUIT
PULPS IN THE COCOA BEANS OF THE CCN-51 VARIETY**

ABSTRACT

Despite its multiple benefits, the cocoa (*Theobroma cacao L.*) CCN-51 has characteristics that limit its use in the chocolate industry. In this investigation, a study was carried out of physicochemical, microbiological, and quality changes of the cocoa bean during a controlled fermentation of six days, using a starter culture of probiotic microorganisms and fruit pulps. The results showed significant differences ($p < 0.05$) between the various parameters of the different fermentation times. The beneficiated cocoa beans were considered “Superior Select Cocoa”. Good quality cocoa beans were obtained, however, the fermentation time can influence their characteristics.

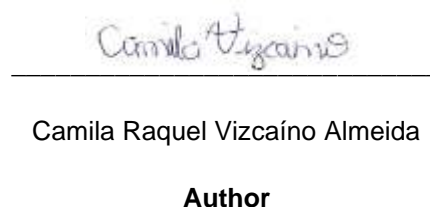
Keywords: *Theobroma cacao L.*, physicochemical, microbiological, quality, controlled fermentation, beneficiated cocoa.



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