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## NIR SPECTROSCOPY AND COLOR MEASUREMENTS CAN BE USED TO Determine different characteristics of fermented cocoa beans

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**C**olombia produces fine and flavor cocoa, so there is a need to Gidentify the compounds that generated these characteristics. However, the chemical analysis in the laboratory it is expensive and time-consuming. The control and quality guarantee of the cocoa requires the rapid analysis of cocoa beans. In this study, NIRS it is used because it is a fast, simple, nondestructive analytical tool that does not involve the use of chemicals or the elaborate preparation of samples and to allows the identification of these compounds. This study shows the differences between the initial and the final spectra of fermentation, which are related to characteristic frequencies of fat, polysaccharides, proteins and aromatic compounds with bands that appear in 2338, 2314, 2078, 2056 and 1930 nm respectively. Additional to this, the degree of fermentation of cocoa bean is an important characteristic that defines your quality. Then the measurements of color are a good alternative for this determination. In this work, we obtained the red, green and blue values of bean surface measurements obtained from a digital camera. The brown color indicated a complete fermentation, a partial fermentation show brown and violet color. In this case, cocoa beans are brown with a small contribution of violet. These analytical techniques are useful to manufacturers and producers for onsite quality control and quantification of the fermentation degree of cocoa beans. The results of the present work demonstrate that these techniques can be adopted in-situ procedure to identify different characteristics of cocoa.

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