Exploration of Phase Transformations in Coffee Beans Using DSC and TGA

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ABSTRACT

Coffee beans are the number one item of export for over ten countries across the globe and coffee is one of the most popular drinks worldwide, but the coffee bean endures a number of processing steps before it can be found on the breakfast table. The freshly picked bean is first fermented and then dried before considered a "green" bean. Once the initial drying is completed, the "green" bean can then be roasted before it can be used for consumption. The roasting stage changes the beans, both physically and chemically, which browns the beans and brings out the aromas and flavors making it a very important step to the process. Certain roasting temperatures will cause the starches in the bean to break down into simple sugars and at slighter higher temperatures, various oils start to develop, which ultimately enhance the flavors and aromas. This paper will show the use of DSC and TGA to explore the various transformations the coffee bean goes through from green to roasted at various temperatures as well as an examination of pre-roasted beans and their associated roast category, e.g., Light, Dark, French, Decaf.

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