

COMPARATIVE ANALYSIS OF COFFEE DECOFFEINIZATION PROCESSES

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Caffeine is a natural stimulant found in the leaves, seeds and fruits of many plant species, including coffee beans, tea leaves and cocoa beans. The amount of caffeine in a serving of coffee depends on the type of coffee and how it is prepared. Robusta coffee tends to have a higher caffeine content than Arabica coffee, and the caffeine content can range from about 40 milligrams in an espresso shot to over 200 milligrams in a cup of filtered coffee or by french dam. It is also important to know that "decaffeinated" should not be without coffee. Decaffeinated coffee may still contain 2-4 milligrams of caffeine per serving.

This study shows the importance of antioxidants, polyphenols and minerals present in the coffee, as well as its usefulness in the food industry. The following methods have been suggested for the extraction of caffeine from green coffee beans with CO₂ in supercritical or near-critical conditions:

- Moistened green coffee beans are mixed with a stream of CO₂ in a pressure vessel. Caffeine diffuses from coffee beans into carbon dioxide which then passes into a washing oven where caffeine is absorbed into the water. After 10 hours of circulation, almost all the caffeine passes into the water, from where it is subsequently separated by various methods.

- using the same conditions for extraction as in the first method, only the process of recovering the caffeine from CO₂ is modified, passing the mixture over a layer of activated carbon on which the caffeine is absorbed.

- the third process uses a mixture of green coffee beans and activated carbon particles which is introduced into a vessel together with CO₂. In this vessel it achieves pressures of 220 bar and temperatures of 90 degrees Celsius. In about 5 hours caffeine diffuses from the grains into supercritical carbon dioxide and from there directly onto the activated carbon particles. After extraction, the coffee beans are separated from the coal particles by sieving.

Research has shown that modern methods used for decaffeination are safe and beneficial to the human body. The analyzes aimed to identify the optimal methods of decaffeination by analyzing two samples of decaffeinated coffee: Julius Meinl and B-1870 Caffè, the latter having the best results.