The effect of the type of bean, processing and geographical location on the biodiesel produced from waste coffee grounds

Rhodri W. Jenkins,[a] Natasha Stageman,[b] Christopher Fortune[b] & Christopher J. Chuck[a]*

Supporting Information

Alternative Brewing Processes

All brewing methods were carried out according to manufacturers instruction. For further information about the specific brewing instruction see below.

AeroPress To an Aerobie-brand AeroPress, approximately 25 grams of ground coffee was added. Approximately 250 ml of freshly boiled water was added to the Aeropress and the coffee slightly agitated. After 1 minute brewing time, the rubber plunger was pushed down, forcing the aqueous fraction through the paper microfilter. The spent coffee grounds was removed, dried for a minimum of 24 hours in an oven and weighed before solvent extraction. This was repeated three times, for a total of four. For more information on this type of coffee maker please visit (http://www.aeropress.com/)

Filter Using a commercially available filter coffee maker (The Russel-Hobbs Heritage coffee maker), approximately 50 grams was added to the filter inside the filter basket. The reservoir was filled with 500 ml of water. When the machine had reached temperature, the water was turned on and allowed to drip through the ground coffee until the reservoir was empty. The spent coffee grounds were removed dried for a minimum of 24 hours in an oven and weighed before solvent extraction. This was repeated one time, for a total of two.

Espresso Using a commercially available espresso machine (The DeLonghi-brand Caffe Traviso), approximately 20 grams of ground was added filter basket inside the portafilter and compacted slightly. Once the portafilter was locked into place and the espresso machine had reached the required temperature, the water was turned on allowed to flow through the coffee. The water was turned off when the flow became clear (approximately 200 ml), under the assumption that most water-soluble compounds in the coffee had been removed. The spent coffee grounds were removed dried for a minimum of 24 hours in an oven and weighed before solvent extraction. This was repeated four times, for a total of five.

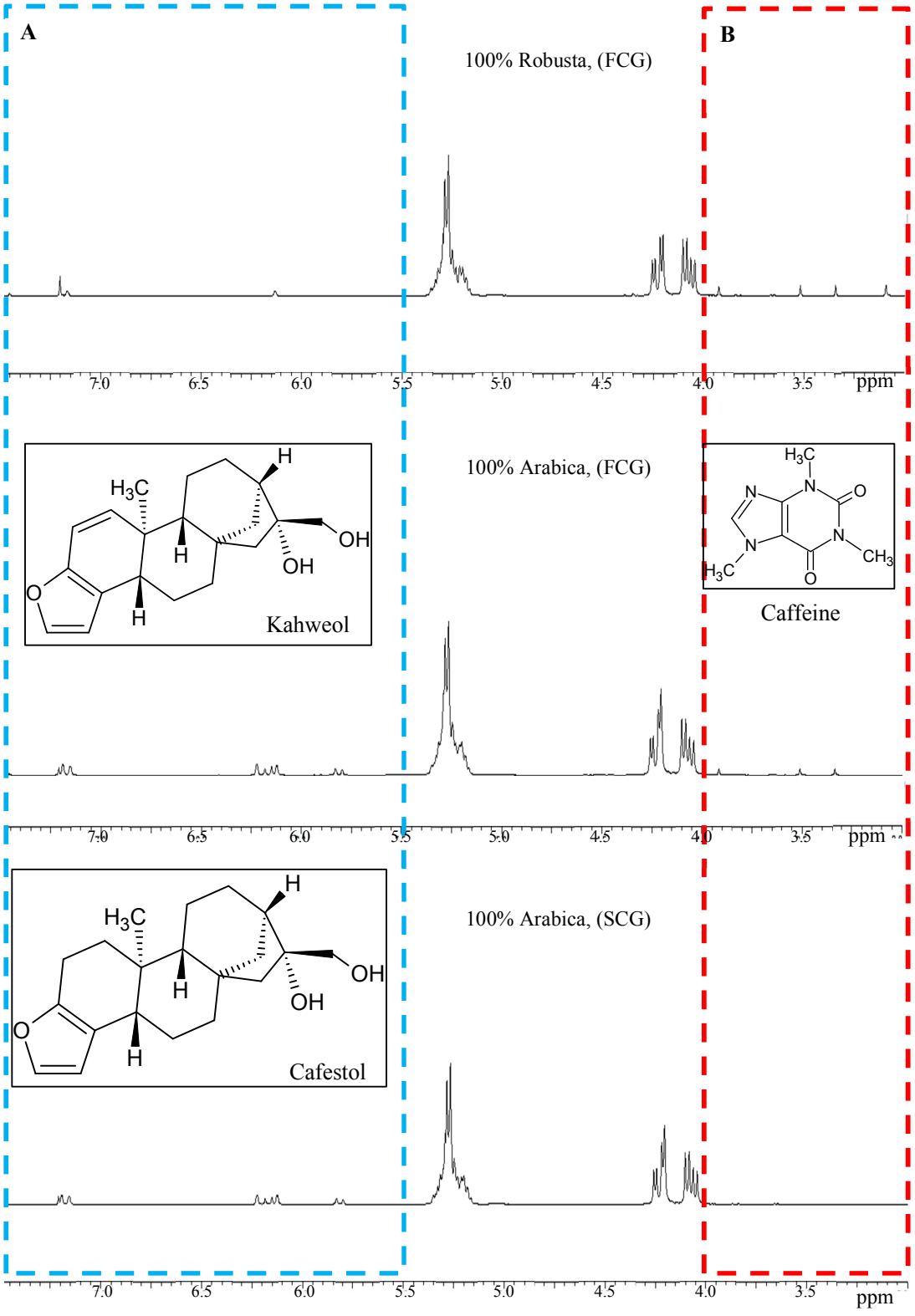
A
B
100% Robusta, (FCG)
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
ppm
100% Arabica, (FCG)
Kahweol
Caffeine
100% Arabica, (SCG)
Cafestol

Figure S1 *^{1}H NMR spectra of coffee oil from 100% Robusta FCG, 100% Arabica FCG and 100% Arabica SCG (from top to bottom). The aromatic peaks of the either Kahweol or cafestol are present in all samples, where peaks relating to the methyl groups of the caffeine molecule are not present in the SCG, the full NMR assignments of the terpene species are presented in the literature [1].*

Supporting information References

[1] D'Amelio, N.; De Angelis, E.; Navarini, L.; Schievano, E.; Mammi, S., Green coffee oil analysis by high-resolution nuclear magnetic resonance spectroscopy. *Talanta* **2013,** 110, 118.