Substances with Physiological Effects in Several Tissues of Different Coffee Species - Part 3 Caffeine, Theobromine, Trigonelline

S6-P-08

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Introduction

The beans of the two economically most important coffee species *Coffea arabica* and *Coffea canephora* differ in their caffeine content. The aim of our studies was to examine, in addition to the beans, the leaves, roots, branches, pericarp, and blossoms of various Arabica varieties and other *Coffea* species with regard to their caffeine, theobromine, and trigonelline content. This should provide an insight into the occurrence and the respective distribution so that certain parts of the plant might be used for commercial exploitation, all the more since the diterpenes and chlorogenic acids were analyzed from the same samples (poster S6-PO-06, S6-P-07).

Materials/Methods

The plant material was provided by the Coffee Research Foundation Ruiru, Kenya and the Greenhouse for Tropical Crops Witzenhausen, University of Kassel, Germany. Each sample was freeze-dried. One coffee leaf tea from India (Coffee Store GmbH, Mannheim, Germany) was delivered by CVUA Karlsruhe, Germany.
The alkaloids and trigonellin were extracted according to the DIN method 10767 (chlorogenic acid) with methanol/water (50:50) and analyzed with HPLC-PDA. In addition, caffeine was determined according to the DIN method 10777-2. The caffeine contents determined via the two methods were directly comparable.

Results/Discussion

Higher caffeine contents were determined in the blossoms and the buds of the Robusta and the Arabicas analyzed. Contents of 0.35 - 1.4 g/100 g were found in the leaves and pericarp of the Arabicas. Branches were generally poor in caffeine, the roots of the most Arabica varieties did not contain caffeine just as, according to the literature, the leaves of the species Excelsa, Liberica, and Eugenioides. The relationship between caffeine and chlorogenic acids known for beans has now been confirmed for pulps and blossoms (see poster S6-P-07).
Theobromine was mainly determined in the buds both of the Robusta and the Arabicas analyzed and in the same amounts in the blossoms of both species. It was also detected in the green cherries of the Liberica.
Trigonelline was present in each sample, however in very different amounts.
In the coffee leaf tea from India, caffeine, theobromine, and trigonelline were determined with 2.3 g, 0.2 and 0.5 g/100 g.

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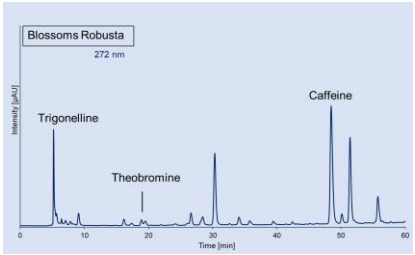

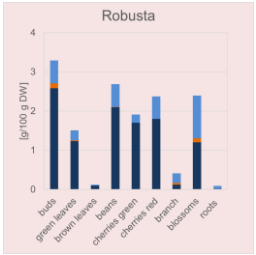

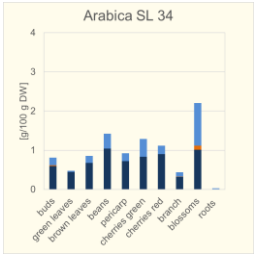

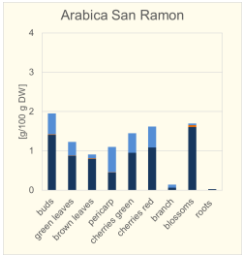

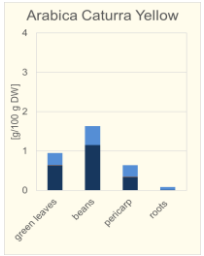

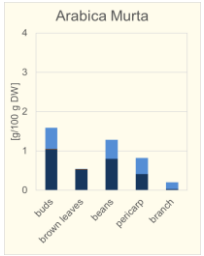

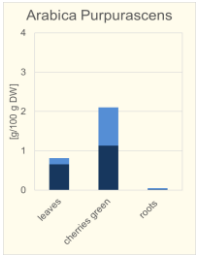

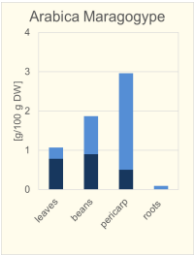

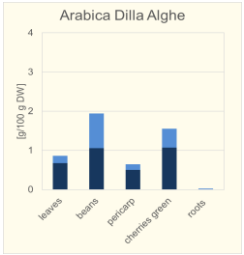

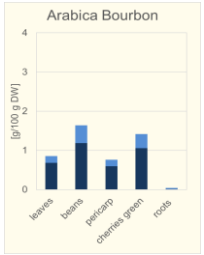

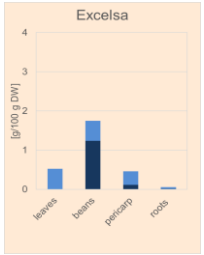

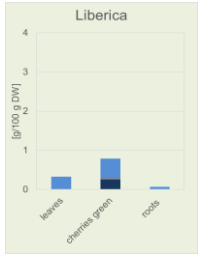

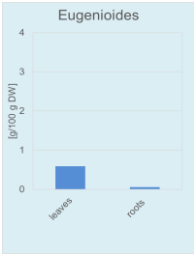

Contents of caffeine, theobromine, and trigonelline; all data from samples from Kenya (exception: Robusta green leaves from the greenhouse)