Substances with Physiological Effects in Several Tissues of Different Coffee Species - Part 2 Chlorogenic acids and Mangiferin/Isomangiferin

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Introduction

As is well known, the beans of Coffea arabica and Coffea canephora differ in their chlorogenic acid content. The aim of our studies was to examine in addition to the beans also the leaves, roots, branches, pulps, and blossoms of various Arabica varieties and other Coffea species with regard to their chlorogenic acids as well as to their mangiferin and isomangiferin contents. This should provide an insight into the occurrence and the respective distribution of these antioxidative effective compounds so that certain parts of the plant could be used for commercial exploitation, all the more since the diterpenes and alkaloids of the same samples were also analyzed (see poster S6-PO-06, S6-P-08).

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.

According to the DIN method 10767, the chlorogenic acids (and the xanthones) were extracted with methanol/water (50:50) and analyzed with HPLC-PDA. Three isomers of caffeoylquinic acid (CQA), three isomers of di-caffeoylquinic acid (diCQA), 5-feruylquinic acid (5-FQA), mangiferin, and isomangiferin were quantified (LoQ = 10 mg/100 g).

Results/Discussion

In most tissues, 5-CQA was the main compound, mostly followed by the 3,5 di-CQA. The blossoms and beans contained a high amount of CQAs while branches and roots showed only low contents.

As expected, mangiferin and isomangiferin were present in the leaves and, to a lesser extent, in the pericarp of most arabica varieties, with isomangiferin in lower amounts. Both compounds were now analyzed in blossoms of the Arabicas as well. In the leaves of *C. eugenioides*, the mangiferin content was over 4 g/100 g, well above that of the CQAs. Both xanthones could not be detected in Robusta, Excelsa, and Liberica.

According to the literature, in the leaves, the contents of the chlorogenic acids as well as that of the xanthones were much less in the samples obtained from the greenhouse.

Economic considerations prohibit the isolation of chlorogenic acids from flowers and beans, whereas the waste product pericarp, which occurs in considerable quantities, could be used for the isolation of the chlorogenic acids.

In the coffee leaf tea from India, the chlorogenic acids were detectable in traces only.

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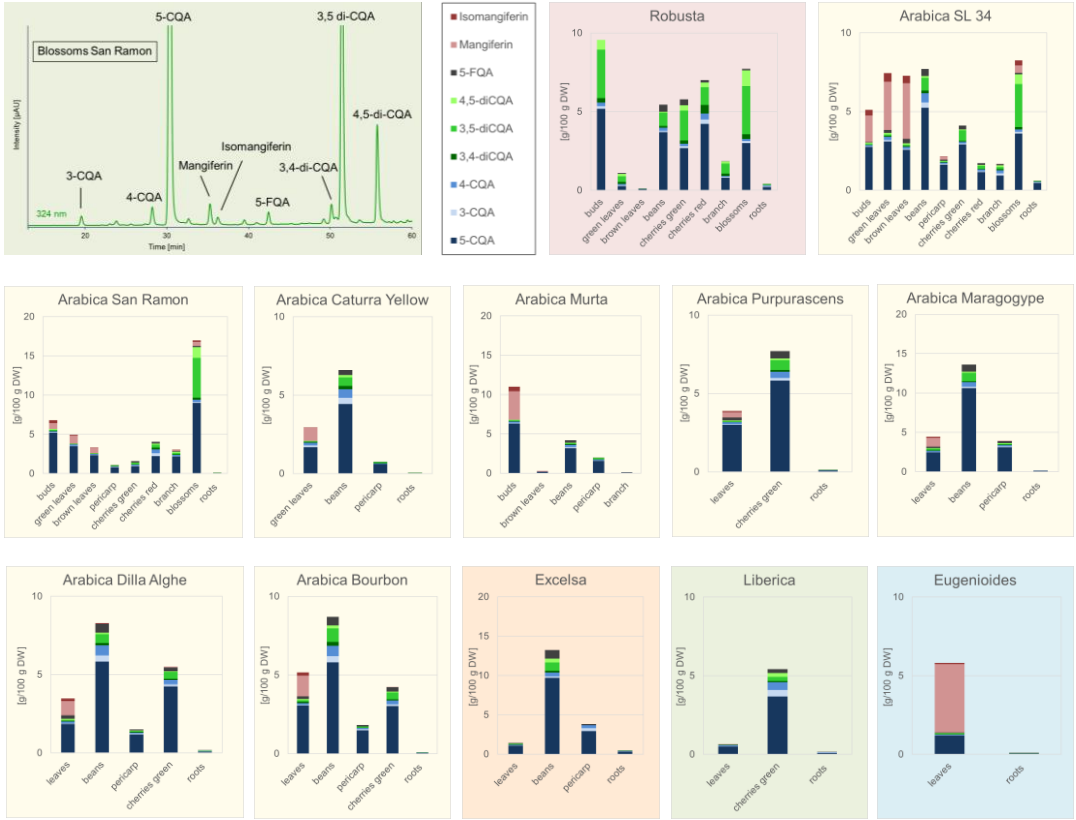

Contents of chlorogenics acids, mangiferin, and isomangiferin; all data from samples from Kenya (exception: Robusta green leaves from the greenhouse)