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# Evaluation of analytical methods to determine regulatory compliance of coffee leaf tea

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## Introduction

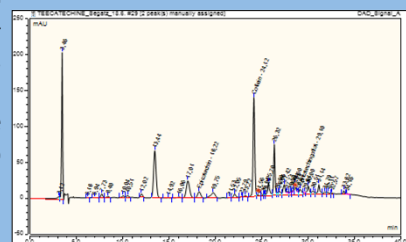
The leaves of the coffee plant (genus *Coffea*) are traditionally used in several countries worldwide to prepare tea-like beverages using aqueous infusion in hot water. Since 1 July 2020, the placing on the market of coffee leaf tea was authorized in the European Union (EU) under the framework of the novel food regulation [1]. The implementing regulation for coffee leaf tea established **several conditions of use**, including maximum amount of dried leaves per litre of water, a necessary pasteurization step and several chemical requirements including maximum levels for chlorogenic acid, caffeine and epigallocatechin gallate. To date, there are **no standard methods available to control these parameters** to check the regulatory compliance of coffee leaf tea. In this presentation, we have for the first time **evaluated standard methods for *Camellia sinensis* tea analysis for transferability to coffee leaf tea**.


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## Methods

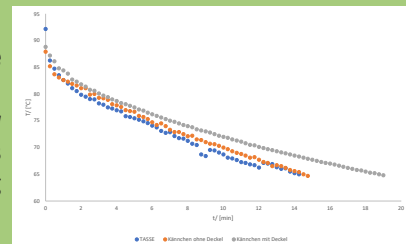
The coffee leaf samples contained two *Coffea arabica* and two *C. canephora* varieties, which were dried and processed using various methods. In order to assure the homogeneity of the samples, each one of them was granulated to a size at which they could pass a sieve with a pore size of 500 µm. The following methods were applied:

1. **ISO 14502-1:2005-03** [2], which is generally applied to **determine the total polyphenols** in green and black tea, based on a colorimetric method using Folin-Ciocalteu reagent
2. **ISO 14502-2:2007-12** [3], which is used to **ascertain the content of catechins and other characteristic substances including caffeine** in green tea, utilizing high-performance liquid chromatography. Both methods contain an extraction method, using 70% methanol, preheated to a temperature of 70°C.
3. Regarding pasteurization, an experiment was conducted in which the temperature of brewed coffee leaf tea was constantly recorded, after being poured into a cup as well as a tea pot [4].
4. Nuclear magnetic resonance (NMR) spectroscopy methods for coffee analysis [5]


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## Results

The results showed that the methods for polyphenol and catechin analysis could be transferred without modifications to coffee leaf tea. The only difference found was a much lower content of some catechins in coffee leaf tea compared to *Camellia sinensis* tea, but the methods were clearly applicable to be used to control the EU's maximum limits for coffee leaf tea. Furthermore, standard European tea brewing methods using 90-95°C hot water will ensure the EU's necessary pasteurization conditions (at least 71°C for 15 seconds).



## Literature

- [1] Commission Implementing Regulation (EU) 2020/917. *Off. J. Europ. Union* 2020; L209, p. 10.
- [2] ISO 14502-1:2005-03. Determination of substances characteristic of green and black tea - Part 1: Content of total polyphenols in tea - Colorimetric method using Folin-Ciocalteu reagent
- [3] DIN ISO 14502-2:2007-12. Determination of substances characteristic of green and black tea - Part 2: Content of catechins in green tea - Method using high-performance liquid chromatography (ISO 14502-2:2005 + Corrigendum 1:2006)
- [4] T. Langer, G. Winkler, and D. W. Lachenmeier. Untersuchungen zum Abkühlverhalten von Heißgetränken vor dem Hintergrund des temperaturbedingten Krebsrisikos. *Deutsche Lebensmittel-Rundschau* **2018**, 114(7), 307-314. doi: 10.5281/zenodo.1402983.
- [5] Claassen, L.; Rinderknecht, M.; Porth, T.; Röhnisch, J.; Seren, H.Y.; Scharinger, A.; Gottstein, V.; Noack, D.; Schwarz, S.; Winkler, G.; Lachenmeier, D.W. Cold Brew Coffee—Pilot Studies on Definition, Extraction, Consumer Preference, Chemical Characterization and Microbiological Hazards. *Foods* 2021, 10, 865. <https://doi.org/10.3390/foods10040865>