Assessment Of The Total Phenolic Contents And Antioxidant Capacities In Roasted Ground Coffee Products In Viet Nam

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Abstract

Coffee tree is a popular non-alcoholic beverage in the world thanks to its taste and health benefits to humans.
TPC results in descending order: light > medium > dark, in which light roast gives the highest total phenolic compounds. Besides, TPC and TEAC differ in degrees of roasting, with light roasting mainly showing the highest value due to the balance between the breakdown of phenolic compounds and the generation of new antioxidant compounds. mainly from the Maillard reactions.
The close correlation between TPC and antioxidant capacity for the correlation coefficient (R^2> 0.7) suggests that phenolic compounds play an important role in the antioxidant capacity of coffee.

Introduction

Coffee has many varieties and processing methods create changes in chemical and biological composition. Coffee beans have antioxidant capacity due to the presence of phenolic compounds.
In this study, spectrophotometric method was used to determine total phenolic compounds (TPC) and Trolox standard equivalent antioxidant capacity (TEAC) through 3 different reaction mechanisms (DPPH, ABTS and FRAP) of coffee was collected from Lam Dong province, specifically in 3 districts of Cau Dat, Lam Ha and Di Linh with 3 different roasting modes.
Analytical methods including calibration curve, repeatability and reproducibility were evaluated according to annex F. AOAC (2016).

Figure 1. Appearance of Robusta and arabica coffee from different roasting levels (*).

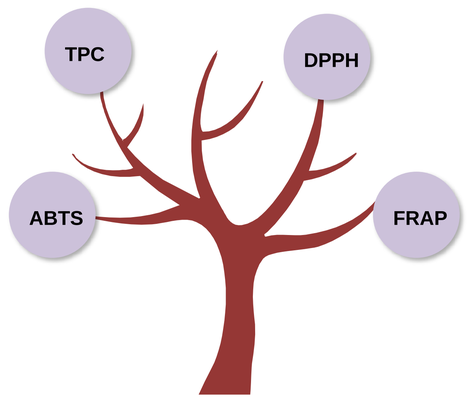
Methods and Materials

Types

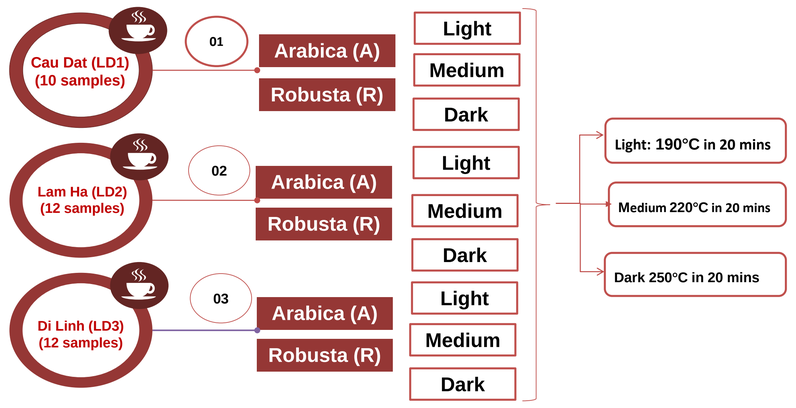
- ☑ Arabica
- ☑ Robusta

Origins

- ☑ Cau Dat
- ☑ Lam Ha
- ☑ Di Linh



Assessment antioxidant



Results

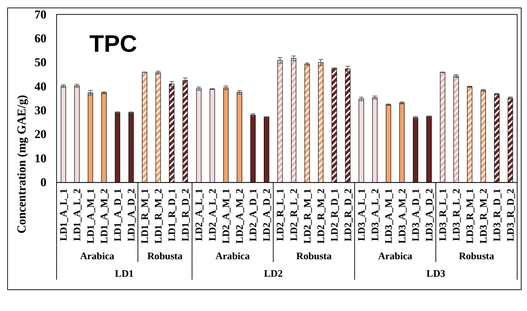


Chart 1. Total phenolic content[6].

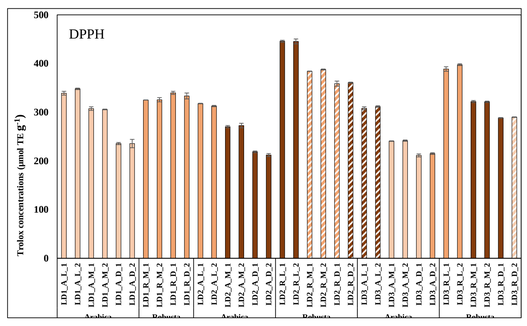


Chart 2. Antioxidant capacity[6].

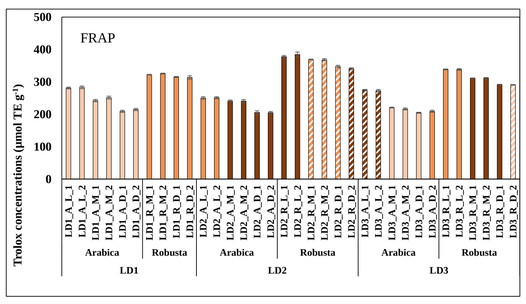


Chart 3. Antioxidant capacity[6].

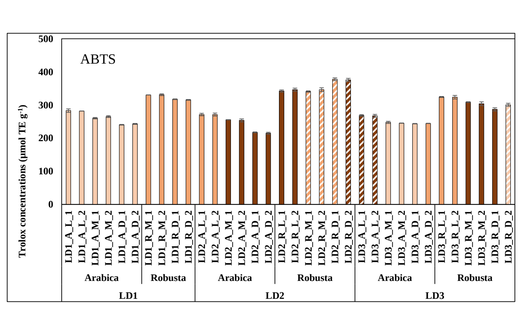


Chart 4. Antioxidant capacity[6].

Discussion

- The total content of phenolic compounds ranges from 27.0 to 51.7 mg GAE g^{-1} .
- The total results of phenolic compounds in Arabica and Robusta roasted coffee range from light > medium > dark, respectively.
- ABTS free radical recovery activity in coffee samples ranged from 214.96 to 377.66 µmol TE g^{-1}
- ABTS in coffee samples increased from light < medium < dark.
- DPPH in coffee products ranges from 211.29 to 445.77 µmol TE g^{-1}.
- DPPH in coffee samples increased from dark < medium < light.
- The iron-reducing activities of the coffee varied from µmol 204.62 to 384.20 µmol TE g^{-1}.
- FRAP in coffee samples increased from Dark < medium < light.

Conclusions

Analytical procedures were applied to evaluate total phenolic compounds as well as antioxidant capacity of 2 types of Arabica and Robusta coffee with 3 roasting modes, light, medium and dark, collected from 3 districts: Cau Dat, Lam Ha and Di Linh.
The results show that the difference in total phenolic compounds content and antioxidant capacity of Arabica and Robusta coffee and roasting mode affects the total phenolic compounds and antioxidant capacity of common coffee through processing and cultivation conditions between regions.

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