

Phenolic content and antioxidant activity of leaves and stems of selected *Vaccinium* species



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CONTEXT

Vaccinium myrtillus L.



Identification of edible sources rich in antioxidant phenolic compounds as well as development of new plant-based functional foods have been great preoccupations in recent years. *Vaccinium* species are known for their high content and structural diversity in phenolic compounds.

Bilberry (*Vaccinium myrtillus* L.) and blueberry varieties are known as natural source of food, beverage and nutraceutical ingredients due to his richness in nutritional and bioactive compounds. Polyphenols are the most important biologically active constituents that are found in *Vaccinium* species [1,2].

Generally, the quality and quantity of phenolic compounds in plants are influenced by the parts of the plant to be used, the stage of growth, the environmental conditions (temperature, sunlight, soil nutrients, latitude and altitude of the growth location) and genetic factors.

Objective: The aim of this study is to identify and to compare the phenolic composition, the total phenolic content and the antioxidant capacity in leaves and stems of three *Vaccinium* species (*Vaccinium myrtillus* L. - wild bilberry and 2 varieties of *Vaccinium corymbosum* L. (Blueray and Coville) - cultivated blueberry).

MATERIALS AND METHODS

Leaves and stems of bilberry and blueberry (Blueray and Coville)

Extraction, analysis of phenolic compounds and evaluation of antioxidant activity

Bilberry



- Blueberry varieties, Blueray (Blu.) and Coville (Cov.), were harvested in June 2018 (Crovu, Odobești, Dâmbovița) and bilberry (BB) in August 2018 (Borca, Neamt).

- Solvent: 50% aq. ethanol
- 2 static cycle, for 10 minutes
- Temperature: 40 °C
- Flush volume: 50%
- Pressure: 1500 psi



ASE 350 extractor
Thermo Scientific, Dionex

- Total Phenolic Content (TPC)** by Folin Ciocâlțeu test [3] (Specord 210 Plus UV/VIS spectrophotometer)



- DPPH test for antioxidant activity** Phenolic extracts (100 µL) added to 0.2 mM DPPH/MeOH (2 mL), vis. spectroscopy at 515 nm [2].

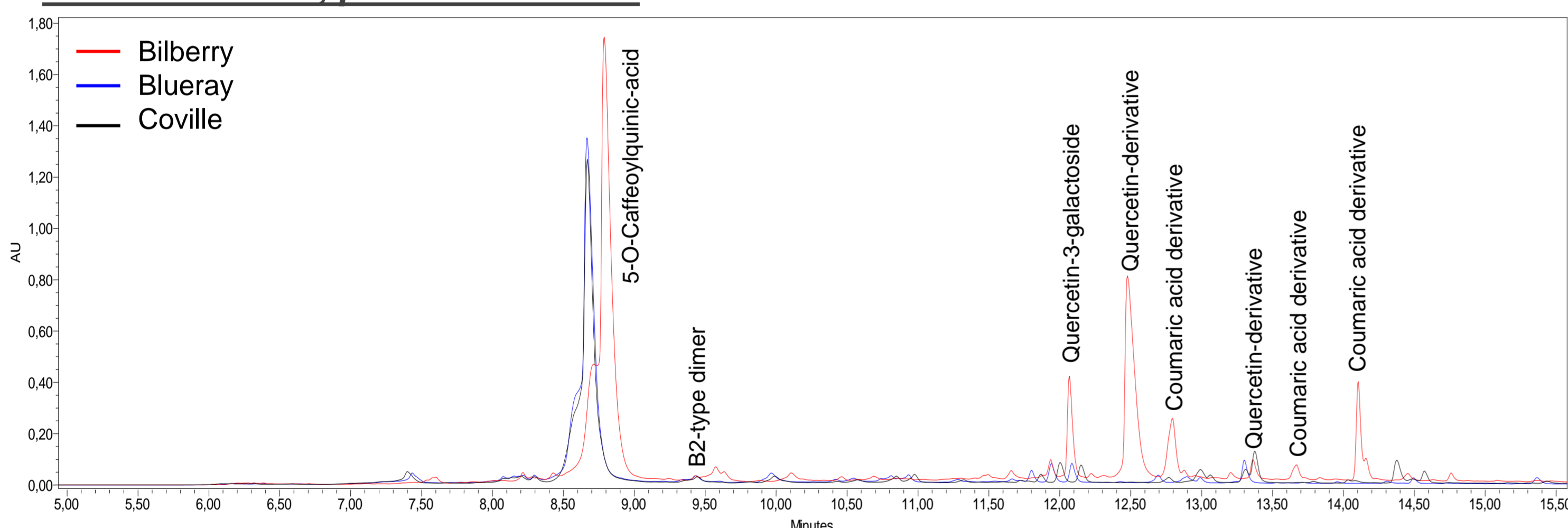
- UPLC analysis** Identification of phenolic compounds (Waters ACQUITY UPLC/PDA I Class chromatograph)



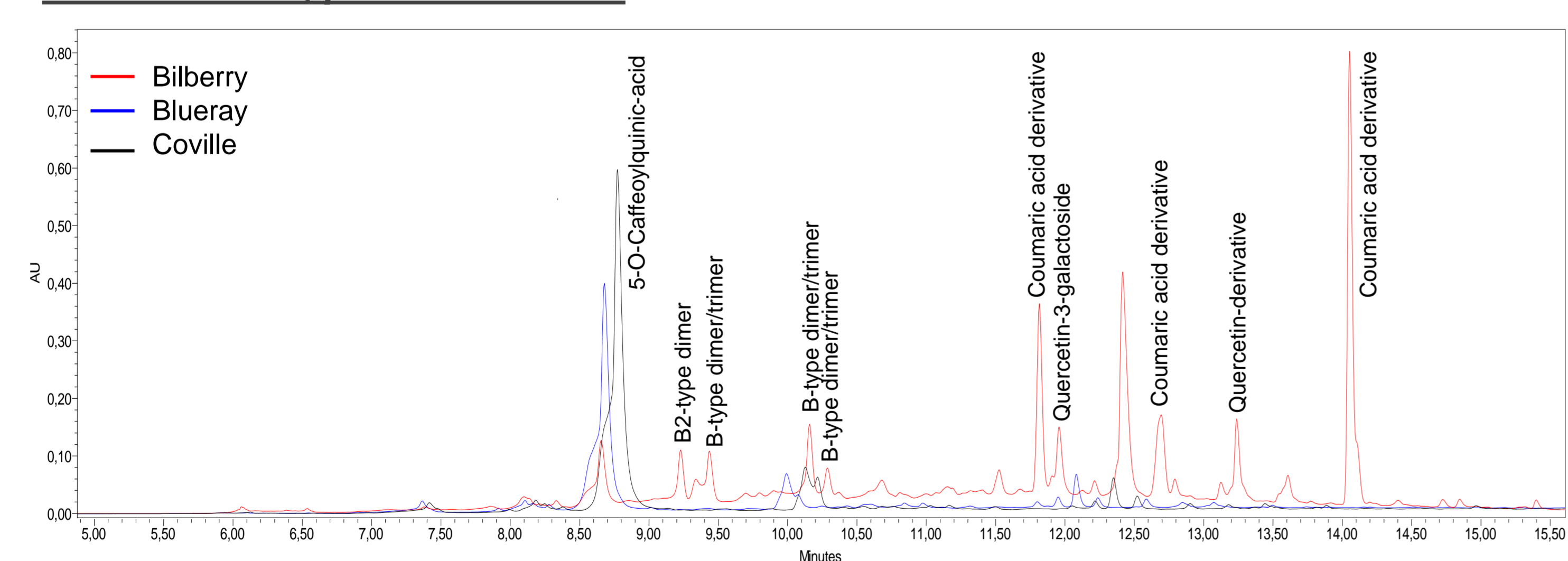
RESULTS AND DISCUSSIONS

Phenolic profile by UPLC

Leaves extracts, profile at 280 nm



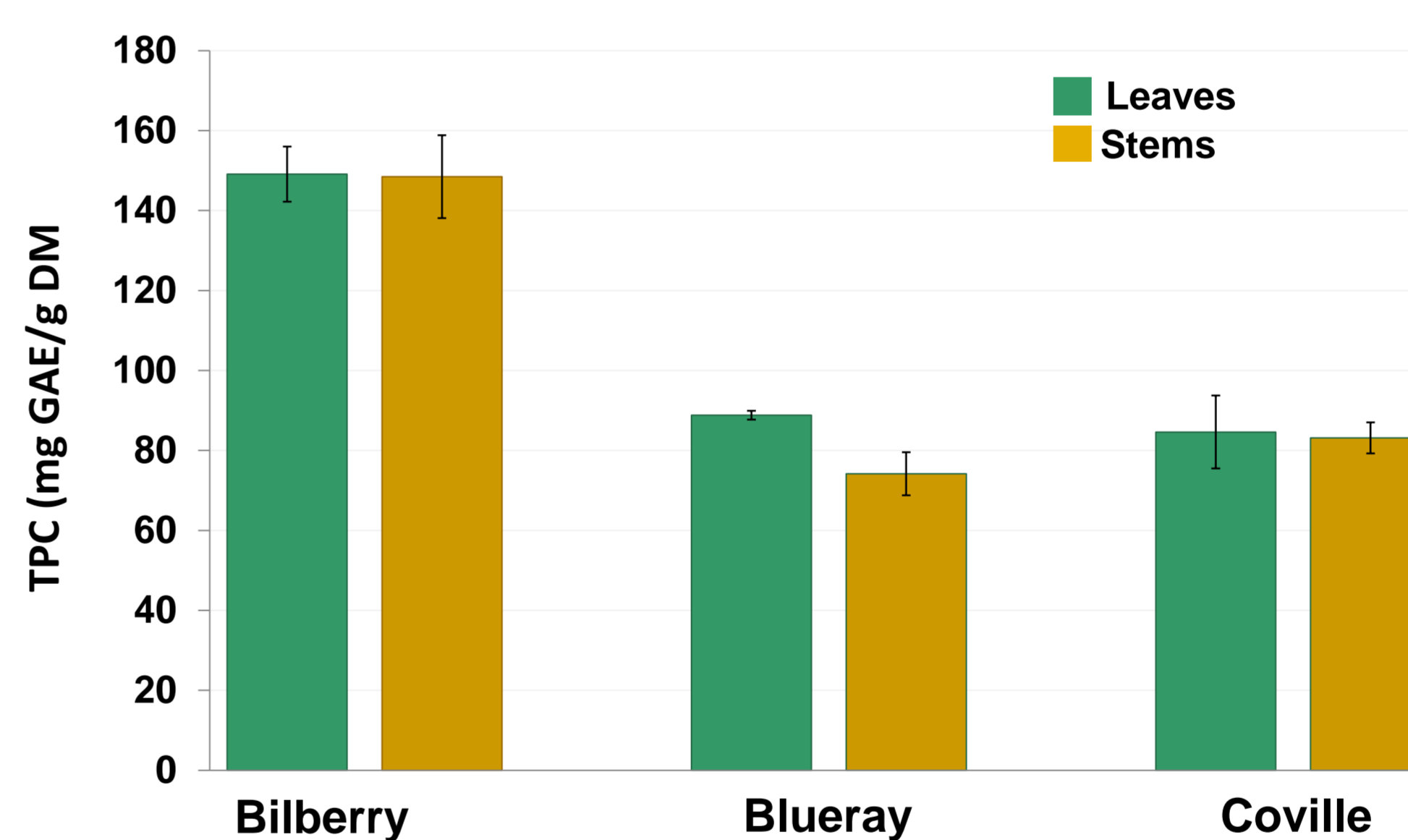
Stems extracts, profile at 280 nm



- Chlorogenic acid, coumaric acid derivatives and quercetin glycosides was identified in leaves whereas in stems epicatechin-derived oligomers were additionally identified.

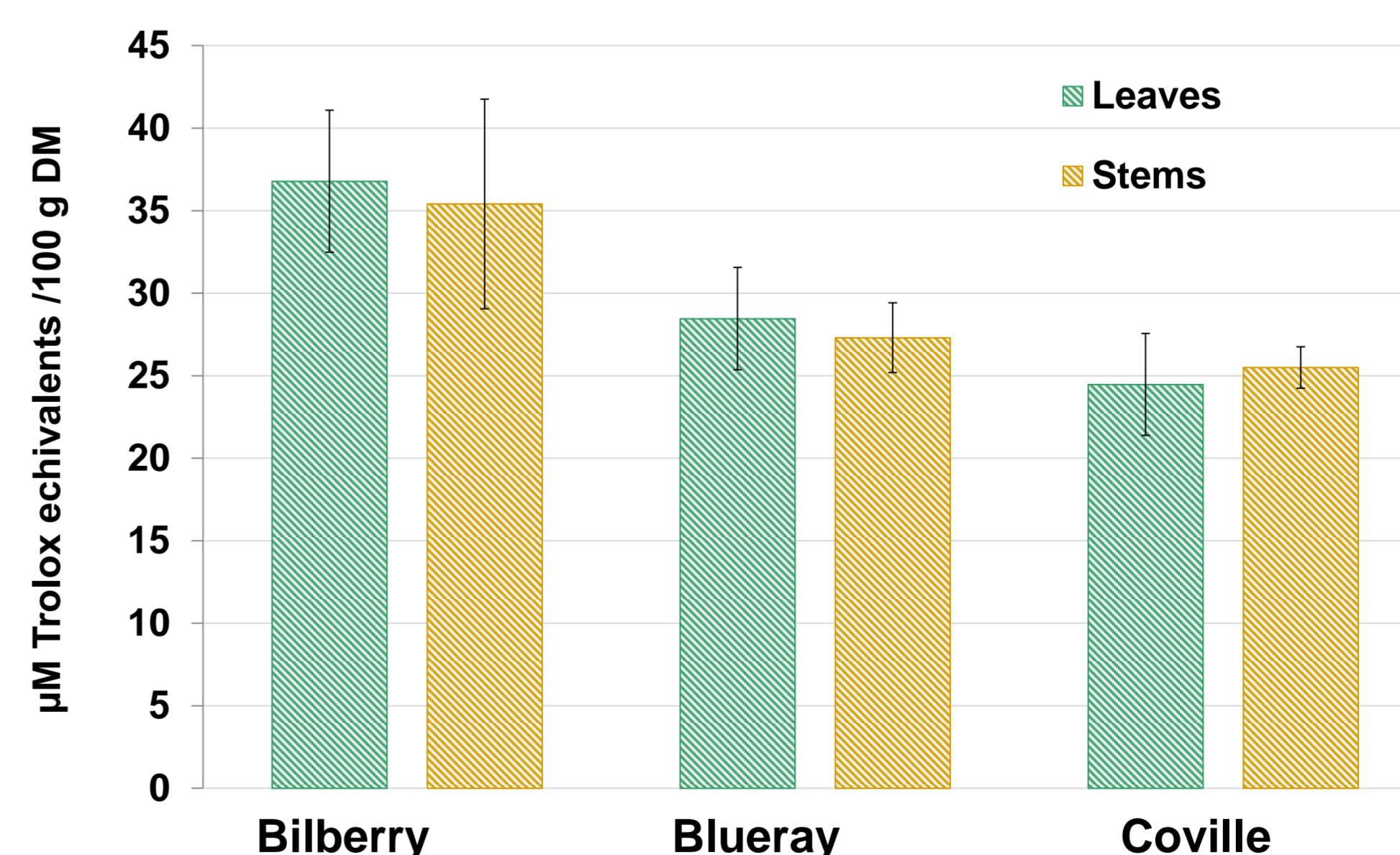
- Similar phenolic profiles were found for leaves and stems of both cultivated varieties, Blueray and Coville.

Total Phenolic Content (TPC)



- Leaf extracts :
 - Higher content in spontaneous flora extracts.
 - For Blueray and Coville not significant differences in TPC.
- Stems extracts:
 - not significant differences between Blueray and Coville
 - higher TPC in the extract from bilberry leaves and stems.
- Not a visible difference between leaves and stems for the same species.

Radical-scavenging ability



- Higher antioxidant activity of the stems and leave extracts from bilberry compared to cultivated varieties.
- Lower DPPH radical scavenging activity in stems than in leaves.

CONCLUSIONS

- Results from this study indicated that leaves and stems of *Vaccinium* species studied are suitable for valorization as sources of natural phenolic compounds with a significant antioxidant activity.

References:

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