



# The use of wild fruits of *Fragaria vesca* L. in preparations with bioactive properties: chemical characterization, antioxidant, antibacterial and antibiofilm activities

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## Introduction

Wild strawberry, *Fragaria vesca* L., belongs to Rosaceae family and is commonly found in roadsides and slopes [1]. The most consumed parts of this plant are its sweet small fruits, which constitute a source of vitamins and phenolic compounds, being also used in infusions due to their organoleptic properties and for the treatment of some intestinal disorders [2, 3].

## Methodology

In the present work, *F. vesca* fruits were evaluated for their nutritional value and further used in the preparation of infusions. The chemical composition of the fruits and corresponding infusions was determined in terms of soluble sugars, organic acids, tocopherols, folates (by HPLC coupled to different detectors), phenolic compounds (by HPLC-DAD/ESI-MS) and mineral elements (atomic absorption spectroscopy). Some of these bioactive compounds were correlated with antioxidant and antibacterial properties evaluated either in infusions as also in hydromethanolic extracts.



## Results and discussion

Carbohydrates were the main macronutrients in the fruits, followed by fat and proteins. Regarding the fatty acids, polyunsaturated fatty acids showed higher prevalence, mainly due to the presence of  $\alpha$ -linolenic (C18:3n3) and  $\gamma$ -linolenic (C18:3n6) acids. Sucrose and citric acid were, respectively, the main sugar and organic acid found in the fruits and in its infusions. The microelement found in higher amounts in both samples was manganese, while potassium and calcium were the macroelements present in higher levels in the fruits and infusions, respectively. Both samples presented folates and tocopherols, being  $\gamma$ -tocopherol the main isoform detected in the fruits, while  $\alpha$ -tocopherol was the only isoform quantified in the infusion. The hydromethanolic extract prepared from the fruits gave higher antioxidant and antibacterial activities, namely against *Escherichia coli* and *Pseudomonas aeruginosa*, than the infusion; it also showed capacity to inhibit the formation of bacterial biofilm. Both bioactivities are highly correlated with the presence of phenolic compounds, in which the major are ellagic acid derivatives (sanguin h10) followed by flavan 3-ols ((+)-catechin) and anthocyanin compounds (pelargonidin-3-glucoside).

	Hydromethanolic extracts	Infusions	t-Students test p-value
<b>Antioxidant activity EC<sub>50</sub> values (mg/mL)</b>			
DPPH scavenging activity	164 ± 4	282 ± 7	<0.001
Reducing power	62.0 ± 0.1	185.0 ± 3.2	<0.001
$\beta$ -carotene bleaching inhibition	28 ± 2	100 ± 6	<0.001
TBARS inhibition	9.2 ± 0.2	33 ± 1	<0.001

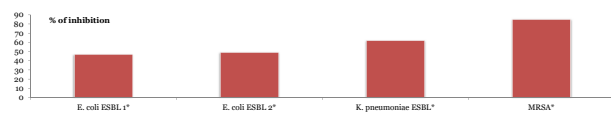


Figure 1. Biofilm formation inhibition in the hydromethanolic extract.

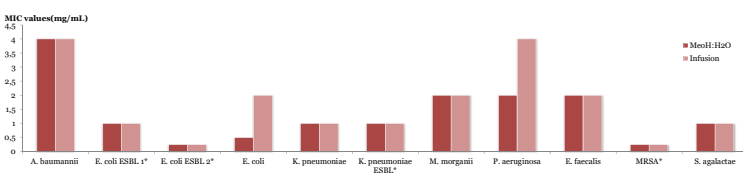


Figure 2. Antimicrobial activity of the hydromethanolic extract and infusion obtained from wild *Fragaria vesca* L. fruits.

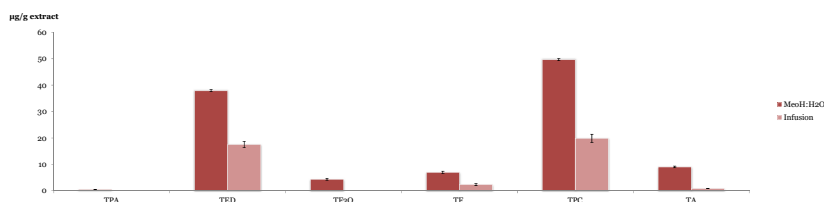


Figure 3. Families of phenolic compounds identified in the hydromethanolic extract and infusion form of wild fruits of *F. vesca*. TPA- Total phenolic acids; TED- Total ellagic acid derivatives; TF3O- Total flavan-3-ols; TF- Total flavonoids; TPC- Total phenolic compounds; TA- Total anthocyanins.

## Conclusion

Although fruits of wild *F. vesca* are mainly consumed in fresh, this study also proves the potentiality of their infusions as a source of bioactive molecules and properties.

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## References

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