**Supplementary information**

**Identifying the biological potential of Western Balkan Polypore mushroom species to mitigate the negative effects of global mushroom cultivation**

**Maja Kozarski 1, Anita Klaus 1, Bojana Špirović-Trifunović 2, Srdjan Miletić 3, Vesna Lazić 1, Željko Žižak 4 and Jovana Vunduk 5,\***

1 Institute for Food Technology and Biochemistry, Faculty of Agriculture, University of Belgrade, Nemanjina 6, 11080 Belgrade, Serbia; [maja@agrif.bg.ac.rs](mailto:maja@agrif.bg.ac.rs) (M.K.); [aklaus@agrif.bg.ac.rs](mailto:aklaus@agrif.bg.ac.rs) (A.K.); [vlazic93@gmail.com](mailto:vlazic93@gmail.com) (V.L.)

2 Institute for Phytomedicine, Faculty of Agriculture, University of Belgrade, Nemanjina 6, 11080 Belgrade, Serbia; [spirovic@agrif.bg.ac.rs](mailto:spirovic@agrif.bg.ac.rs) (B.Š.-T.)

3 Institute of Chemistry, Technology and Metallurgy, University of Belgrade, Njegoševa 12, 11000 Belgrade, Serbia; [srdjan.miletic@ihtm.bg.ac.rs](mailto:srdjan.miletic@ihtm.bg.ac.rs) (S.M.)

4 Institute of Oncology and Radiology of Serbia, Paterova 14, 11000 Belgrade, Serbia; [zizakz@ncrc.ac.rs](mailto:zizakz@ncrc.ac.rs) (Ž.Ž.)

5 Institute of General and Physical Chemistry, Studentski trg 12/V, 11158 Belgrade, Serbia; [jvunduk@iofh.bg.ac.rs](mailto:jvunduk@iofh.bg.ac.rs) (J.V.)

**\*** Correspondence: [jvunduk@iofh.bg.ac.rs](mailto:jvunduk@iofh.bg.ac.rs); Tel.: +381 64 020 9819

**Table 1S.** Relationship between EC50 values in antioxidant activities and analyzed secondary metabolite content.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Inhibition of LPx | SA•DPPH | SA•OH | FRAP | Fe2+ chelating ability | |
| Inhibition of LPx | 1 | 0.68 | 0.76 | 0.57 | | 0.17 |
| SA•DPPH | 0.68 | 1 | 0.62 | 0.85 | | 0.23 |
| SA•OH | 0.76 | 0.62 | 1 | 0.26 | | 0.26 |
| FRAP | 0.57 | 0.85 | 0.26 | 1 | | 0.13 |
| Fe2+ chelating ability | 0.17 | 0.23 | -0.21 | 0.13 | | 1 |
| TPC | -0.68 | -0.25 | -0.70 | 0.16 | | -0.30 |
| Vitamin C | 0.45 | 0.35 | 0.83 | 0.17 | | -0.71 | |
| β-carotene | -0.74 | -0.37 | -0.40 | -0.16 | | -0.69 | | |
| likopene | -0.56 | -0.21 | -0.11 | -0.078 | | -0.85 | | |

Correlation coefficient(*r*)– all values are statistically significant (*P*<0.05); for absolute values of *r*, 0-0.19 is regarded as a ‘very weak’, 0.2-0.39 as a ‘weak’, 0.40-0.59 as a ‘moderate’, 0.6-0.79 as a ‘strong’, and 0.8-1 as a ‘very strong’ correlation.

**Table 2S.** Relationship between IC50 values in enzyme inhibition and analyzed secondary metabolite content

|  |  |  |
| --- | --- | --- |
|  | Tyrosinase inhibitory activity | ACE inhibitory activity |
| TPC | -0.88 | -0.71 |
| Vitamin C | 0.66 | 0.78 |
| β-carotene | -0.60 | -0.39 |
| likopen | -0.38 | -0.15 |

*r*\* – all values are statistically significant (p ≤ 0.05); for absolute values of *r*, 0-0.19 is regarded as a ‘very weak’, 0.2-0.39 as a ‘weak’, 0.40-0.59 as a ‘moderate’, 0.6-0.79 as a ‘strong’, and 0.8-1 as a ‘very strong’ correlation

**Table 3S.** Selectivity of methanol extracts in antitumor action

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SCα in the antitumour action  [IC50 (normal-human cells)/  IC50 (human malignant cells)] | *F.betulina* | *F. pinicola* | *G. applanatum* | *G. lucidum* | *C. versicolor* |
| MRC-5/HeLa | 1.02 | 1.33 | 1.38 | 2.20 | 1.73 |
| MRC-5/ K562 | 1.08 | 1.10 | 1.10 | 2.43 | 1.83 |
| MRC-5/MDA-MB-453 | 1.02 | 1.39 | 1.26 | 2.12 | 1.60 |
| BEAS-2B/HeLa | 0.95 | 1.21 | 1.32 | 1.83 | 1.21 |
| BEAS-2B/ K562 | 1.00 | 1.00 | 1.04 | 1.55 | 1.28 |
| BEAS-2B/ MDA-MB-453 | 0.95 | 1.26 | 1.20 | 1.35 | 1.12 |

αSelectivity coefficient

**Table 4S.** Mushroom species collected with corresponding family, habitat, sampling locations and usability. According to the map of Fig. 1.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Species | Family | Habitat | Sampling location | Usability/edibility |
| *Fomitopsis betulina* | [Fomitopsidaceae](https://en.wikipedia.org/wiki/Fomitopsidaceae) | Brown rot fungi, common [bracket,](https://en.wikipedia.org/wiki/Bracket_fungus)  mainly on birch trees | 1-Divcibare, resort on the mountain Maljen (1,104 m), western Serbia;  44° 5'51.68"N  19°59'39.77"E | Medicinal/good |
| *Ganoderma lucidum* | Ganodermataceae | White rot fungi, on decaying hardwood trees | 2-Avala, mountain (511 m), near Belgrade, Serbia;  44°41'29.93"N  20°30'34.09"E | Medicinal/hard |
| *Ganoderma applanatum* | Ganodermataceae | White rot fungi, causes a rot of [heartwood](https://en.wikipedia.org/wiki/Heartwood) of deciduous and coniferous trees | 3-village Babe,  mountain Kosmaj (626 m), south of Belgrade, Serbia 44°32'4.36"N  20°30'10.41"E | Medicinal/hard |
| *Fomitopsis pinicola* | [Fomitopsidaceae](https://en.wikipedia.org/wiki/Fomitopsidaceae) | Brown rot fungi, causes a [stem decay](https://en.wikipedia.org/wiki/Wood-decay_fungus) on softwood and hardwood trees | 4-Kopaonik, mountain (2,017m), national park, south Serbia  43°18'13.45"N  20°45'55.52"E | Medicinal/hard |
| *Coriolus versicolor* | [Polyporaceae](https://en.wikipedia.org/wiki/Polyporaceae) | White rot fungi, in groups on logs  and stumps of deciduous trees | 5- Kosutnjak, a large forest area, Belgrade, Serbia  44°45'37.48"N  20°26'24.86"E | Medicinal/good |

**Supplementary Materials:** The following supporting information can be downloaded at: www.mdpi.com/xxx/s1, Table 1S: Relationship between EC50 values in antioxidant activities and analyzed secondary metabolite content; Table 2S: Relationship between IC50 values in enzyme inhibition and analyzed secondary metabolite content; Table 3S: Selectivity of methanol extracts in antitumor action; Table 4S: Mushroom species collected with corresponding family, habitat, sampling locations and usability. According to the map of Figure 1.

**Author Contributions:** Conceptualization, J.V., A.K. and M.K.; Methodology, J.V., A.K., M.K., B.Š-T. and Ž.Ž.; Software and Validation, S.M. and M.K.; Formal analysis, J.V., M.K., A.K., B.Š-T., Ž.Ž. and V.L.; Investigation, M.K., J.V. and A.K.; Resources, A.K., M.K. and J.V.; Data curation, M.K. and S.M.; writing – original draft preparation, M.K., J.V., SB.Š-T. and S.M.; writing – review and editing, M.K., J.V and S.M.; Visualization, M.K. and S.M.; Supervision, J.V. and A.K.; Project administration, A.K.; Funding acquisition, A.K., M.K. and J.V. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research has been financially supported by the Ministry of Science, Technological Development and Innovation of Republic of Serbia (Contracts No: 451-03-47/2023-01/200051 and 451-03-47/2023-01/200026).

**Acknowledgments:** The authors are grateful to Ph.D. Snežana Spasić (Principal Research Fellow at the Institute of Chemistry, Technology and Metallurgy, University of Belgrade,) for the valuable comments and help during the preparation of original draft.

**Conflicts of Interest:** The authors declare no conflict of interest.