

Abstract

Fomes fomentarius (L.) Fr. 1849: natural antioxidant and novel inhibitor of aldo-keto reductase activity [†]

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[†] Presented at the 9th International Electronic Conference on Medicinal Chemistry, 1-30 November 2023, Available Online: <https://ecmc2023.sciforum.net/>

Abstract: Fungi have received much attention as a source of bioactive compounds with variety of therapeutic properties such as antioxidant, antibacterial, antiviral, antiparasitic and anticancer activities. With great biomedical potential, these pharmacologically-active natural products tend to replace the currently used synthetic drugs. The objective of this study was to evaluate the antioxidant potential, aldo-keto reductase (AKR) inhibition, and estrogen receptor binding affinity of two different extract types (70% ethanolic and hot water) derived from one indigenous fungal species, namely *Fomes fomentarius* sampled from Uzbekistan. Evaluation of antioxidant activity in the tested fungal extracts was conducted using established *in vitro* assays, including ABTS, DPPH, and FRAP. Fungal extracts were tested *in vitro* for binding affinity to ligand-binding domains of estrogen receptor α and estrogen receptor β using fluorescent screen in yeast and their potential to inhibit aldo-keto reductases, valuable targets for the treatment of hormone-dependent diseases. The results revealed that the highest scavenging activity and reducing power potential was observed for the analyzed 70% EtOH extract (DPPH: 12.11 mmol TEAC/g d.w., ABTS: 124.24 mmol TEAC/g d.w. and FRAP: 350.52 mmol TEAC/g d.w.). Similarly, the 70% EtOH extract of *F. fomentarius* exhibited higher inhibition potential against AKR1C3 (91.9%) than the hot water extract (35.7%). These fungal extracts showed weak inhibition against AKR1C4 isoform and no estrogenicity, making them promising candidates for the design of anticancer therapeutics against estrogen-dependent breast cancer. In conclusion, our study highlights the promising potential of *F. fomentarius* extracts as a basis for additional study in the searching for novel natural anticancer drugs.

Keywords: aldo-keto reductase; anticancer; antioxidant; estrogen receptor; extracts; *Fomes fomentarius*; macrofungi; Uzbekistan.

Citation: Lastname, F.; Lastname, F.; Lastname, F. Title. *Med. Sci. Forum* **2023**, *2*, x. <https://doi.org/10.3390/xxxxx>

Academic Editor: Firstname Lastname

Published: date

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Author Contributions: Conceptualization, M.R., S.B. and Y.G.; methodology, M.R., S.B., A.Č. and E.P.; software, M.R. and S.B.; validation, M.R., S.B., A.Č. and E.P.; formal analysis, M.R., S.B. and M.K.; investigation, M.R. and S.B.; resources, M.R., Y.G. and D.B.; data curation, M.R. and S.B.; writing—original draft preparation, M.R. and S.B.; writing—review and editing, M.R., S.B., Y.G., A.Č., E.P.; visualization, M.R.; supervision, M.R., A.Č. and E.P.; project administration, M.R. and

Y.G.; funding acquisition, M.R. and Y.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia (Grant No. 451-03-47/2023-01/200125) and CAS PIFI (Grant no. 2022VBA0021), the State Scientific and Technical Program of Institute of Botany of Uzbekistan Academy of Sciences.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Acknowledgments: Plasmid constructs pET28b(+)-AKR1C3 and pET28b(+)-AKR1C4 were generously provided by dr. Chris Bunce (The University of Birmingham). *Saccharomyces cerevisiae* FY250 strain (*MAT α* , *ura3-52*, *his3 Δ 00*, *leu2 Δ 1*, *trp1 Δ 6*) and plasmid constructs pRF4-6-hER α LBD-EYFP and pRF4-6-hER β LBD-EYFP for the fluorescent cellular sensor used in this study, were generously provided by dr. Blake Peterson (The University of Kansas).

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