



# The 8th International Electronic Conference on Medicinal Chemistry (ECMC 2022)

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Chaired by **DR. ALFREDO BERZAL-HERRANZ**;  
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*pharmaceuticals*



**Sanja Lj. Matić <sup>1,\*</sup>, Vladimir J. Cvetković <sup>2</sup>, Ivan Milovanović <sup>3</sup>, Ana Bijelić <sup>4</sup>, and Niko Radulović <sup>5</sup>**

<sup>1</sup> Department of Science, Institute for Informational Technologies Kragujevac, University of Kragujevac, Jovana Cvijića bb, 34000 Kragujevac, Serbia; sanjamatic@kg.ac.rs

<sup>2</sup> Department of Biology and Ecology, Faculty of Sciences and Mathematics, University of Niš, Višegradska 33, 18000 Niš, Serbia; vladimir.cvetkovic@pmf.edu.rs

<sup>3</sup> Innovation Centre of the Faculty of Technology and Metallurgy, Karnegijeva 4, 11000 Belgrade, Serbia; imilovanovic@tmf.bg.ac.rs

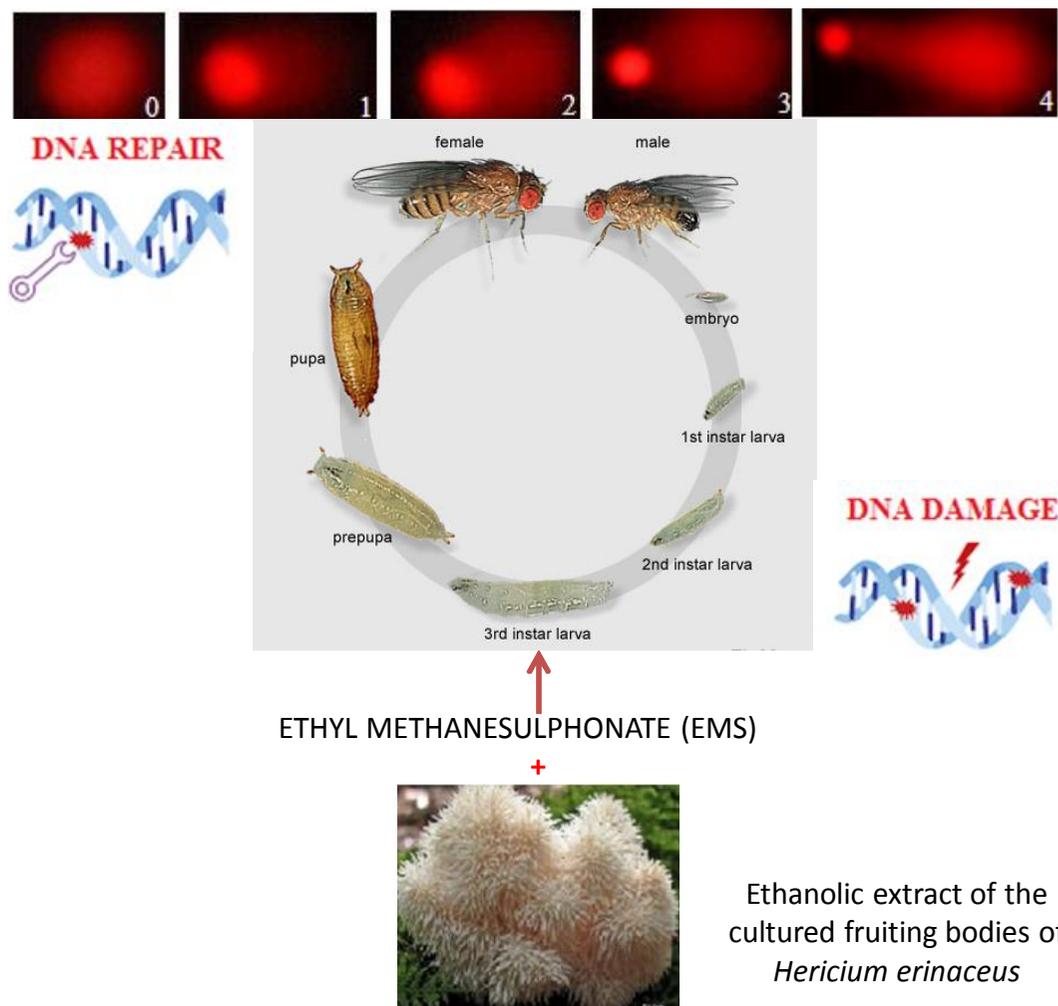
<sup>4</sup> Faculty of Occupational Safety, University of Niš, Čarnojevića 10a, 18000 Niš, Serbia; ana.miltojevic@znr fak.ni.ac.rs

<sup>5</sup> Department of Chemistry, Faculty of Sciences and Mathematics, University of Niš, Višegradska 33, 18000 Niš, Serbia; nikoradulovic@yahoo.com

\* Corresponding author: sanjamatic@kg.ac.rs



# *In vivo* antigenotoxic properties of *Hericium erinaceus* ethanolic extract



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**Abstract:**

*Hericium erinaceus* (Bull.) Pers., also known as lion's mane or monkey's head, is a well-established culinary and medicinal mushroom used traditionally against dementia, depression, anxiety, ulcers, heart disease, cancer, and diabetes in animals. This mushroom with a variety of health benefits has strong anti-inflammatory, antioxidant and immune-boosting abilities. Ethanolic extract of the cultured fruiting bodies of *H. erinaceus* were investigated for antigenotoxic activity against ethyl methanesulphonate (EMS)-induced genotoxicity in third instar larvae of *Drosophila melanogaster* using alkaline comet assay. A simultaneous 24-h treatment with seven different concentrations of the extract (1.25, 2.5, 5, 10, 20, 40, and 80 mg/mL standard *Drosophila* food) and 1 mM EMS, show decreased in total comet score compared to positive control. The results showed that the ethanolic extracts of *H. erinaceus* have a remarkable DNA protective activity against EMS-induced DNA damage, suggesting that this mushroom has potential to be used as a natural preventive compound against DNA damage caused by monofunctional alkylating agents such as EMS.

**Keywords:** *Hericium erinaceus*; antigenotoxic; *Drosophila melanogaster*, comet assay

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## Introduction

*Hericium erinaceus* (Bull.) Pers. (Figure 1) has a long history of usage as culinary and medicinal mushroom. This mushroom has been used in folk medicine against various diseases including dementia, depression, anxiety, ulcers, heart disease, cancer, and diabetes in animals. Among these health-beneficial roles, this mushroom has strong anti-inflammatory, antioxidant and immune-boosting abilities. To the best of our knowledge, the *in vivo* protective potential of ethanolic extract of *H. erinaceus* against ethyl methanesulphonate (EMS)-induced genotoxicity in third instar larvae of *Drosophila melanogaster* have not been investigated so far.



**Figure 1.** *Hericium erinaceus* (Bull.) Pers.  
(<https://morningchores.com/growing-lions-mane-mushrooms/>)

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## Results and discussion

The protective effect of ethanolic extract of the cultured fruiting bodies of *H. erinaceus* against ethyl methanesulphonate (EMS)-induced genotoxicity in third instar larvae of *D. melanogaster* was assessed using alkaline comet assay (Table 1).

Results showed that EMS effectively induced DNA damage by significantly increasing the total comet score with mean frequency of  $147.6 \pm 0.84$ .

A simultaneous 24-h treatment with seven different concentrations of the extract (1.25, 2.5, 5, 10, 20, 40, and 80 mg/mL standard *Drosophila* food) and 1 mM EMS, show a decreases in total comet score compared to positive control.

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**Table 1.** Antigenotoxic activity of different doses of *Hericum erinaceus* extract

Groups	Comet class					Total comet score <sup>a</sup>	% R <sup>b</sup>
	0	1	2	3	4		
I	77.4±0.8	22.6±0.23	/	/	/	22.6±0.62 <sup>†</sup>	/
II	13.8±0.42	41.3±0.62	28.4±0.34	16.5±0.62	/	147.6±0.84 <sup>*</sup>	/
III	41.5±0.62	33.5±0.43	23.9±0.21	1.1±0.57	/	84.6±0.71 <sup>*†</sup>	50.4
IV	39.21±0.44	41.5±0.82	18.1±0.22	1.19±0.32	/	83.02±0.24 <sup>*†</sup>	53.1
V	34.7±0.32	52.7±0.54	11.2±0.81	1.4±0.54	/	79.3±0.21 <sup>*†</sup>	54.6
VI	51.3±0.35	35.2±1.40	13.5±0.32	/	/	62.2±0.51 <sup>*†</sup>	68.3
VII	61.2±0.5	29.6±0.61	9.2±0.32	/	/	48±0.22 <sup>*†</sup>	79.7
VIII	52.7±0.34	43.1±0.21	4.2±0.24	/	/	42.2±0.34 <sup>*†</sup>	76.9
IX	69.4±0.32	29.2±0.54	1.4±0.42	/	/	32±0.51 <sup>*†</sup>	92.5

<sup>a</sup>The values are mean ± S.D. from three independent experiments. <sup>b</sup>%R, percentage of reduction. I-Negative control; II-Ethyl methanesulfonate, 1 mM; III-Ethanol extract of *Hericum erinaceus* 1.25 mg/mL + 1 mM EMS; IV-Ethanol extract of *Hericum erinaceus* 2.5 mg/mL + 1 mM EMS; V-Ethanol extract of *Hericum erinaceus* 5 mg/mL + 1 mM EMS; VI-Ethanol extract of *Hericum erinaceus* 10 mg/mL + 1 mM EMS; VII-Ethanol extract of *Hericum erinaceus* 20 mg/mL + 1 mM EMS; VIII-Ethanol extract of *Hericum erinaceus* 40 mg/mL + 1 mM EMS; IX-Ethanol extract of *Hericum erinaceus* 80 mg/mL + 1 mM EMS. \*  $p < 0.05$  when compared with the negative control group; <sup>†</sup> $p < 0.05$  when compared with the positive control group.

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## Results and discussion

As can be seen from Table 1, a concentration-dependent reduction in the DNA damage were observed upon simultaneous treatment with extract and EMS.

EMS-induced DNA damage was reduced even at low concentrations of the extract with a percentage reduction greater than 50%.

At high concentration (80 mg/mL) the ethanolic extract of *H. erinaceus* caused almost completely reduction in DNA damage in third instar larvae of *D. melanogaster* with %R of 92.5%.

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## Conclusions

The results showed that the ethanolic extract of *H. erinaceus* had a remarkable DNA protective activity against EMS-induced DNA damage, and therefore encourage further studies on identification of antigenotoxic constituents and elucidation of the mechanisms underlying their antigenotoxic effect.

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Ministry of Education, Science and  
Technological Development  
Nemanjina 22-26, 11000 Belgrade

