



LC-MS/MS profiling of the poisonous wild mushroom, *Entoloma mastoideum*, (Entolomataceae, Basidiomycota) in Sabah (Northern Borneo), Malaysia

Ily Azzedine Alaia M.H. Subari^a, Gowri Mutthumanickam^{b,k}, Muhammad Hj. Jikal^c, Muhammad Dawood Shah^d, Jen Kit Tan^e, Yee Shin Tan^{f,g}, Praneetha Palasubermaniam^h, Kishneth Palaniveloo^{i,j}, Jaya Seelan Sathiya Seelan^{a,*}

^a Mycology Laboratory, Institute for Tropical Biology and Conservation, Universiti Malaysia Sabah, Jalan UMS, 88400, Kota Kinabalu, Sabah, Malaysia

^b Kota Marudu District Health Office, Kota Marudu, Sabah, Malaysia

^c Jabatan Kesihatan Negeri Sabah, Kota Kinabalu, Sabah, Malaysia

^d Borneo Marine Research Institute, Universiti Malaysia Sabah, 50603, Kuala Lumpur, Malaysia

^e Department of Biochemistry, Faculty of Medicine, Universiti Kebangsaan Malaysia, 56000, Kuala Lumpur, Malaysia

^f Institute of Biological Sciences, Faculty of Science, Universiti of Malaya, 50603, Kuala Lumpur, Malaysia

^g Mushroom Research Centre, Universiti Malaya, 50603, Kuala Lumpur, Malaysia

^h Department of Biomedical Sciences, Faculty of Medicine & Health Sciences, Universiti Malaysia Sabah, Malaysia

ⁱ Institute of Ocean and Earth Sciences, Universiti Malaya, Wilayah Persekutuan, Kuala Lumpur, 50603, Malaysia

^j Centre for Natural Products Research and Drug Discovery (CENAR), Level 3, Research Management & Innovation Complex, Universiti Malaya, Kuala Lumpur, 50603, Malaysia

^k Department of Social and Preventive Medicine, Universiti Malaya, Kuala Lumpur, 50603, Malaysia

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ABSTRACT

In Malaysia, mushroom poisoning poses a significant public health concern, particularly as local communities frequently consume wild mushrooms without fully recognizing the potential dangers they present. Ingestion of wild mushrooms, which resemble edible species but contain deadly chemicals, is the main cause of poisoning risk. The genus *Entoloma* (Fr.) P. Kumm is dispersed worldwide, with over 1500 species recorded. *Entoloma mastoideum*, a poisonous mushroom, was recorded for the first time at Kota Marudu district, Sabah, Malaysia, where ten cases of mushroom poisoning outbreaks were recorded during the rainy season of October 2019. The morphological characters of the specimens were documented and their microscopic features were analyzed using compound microscope and scanning electron microscope. A phylogenetic tree was constructed using Maximum likelihood and Bayesian analysis. Chemical profiling of the poisonous mushroom specimen was done via liquid chromatograph mass spectrometry (LC-MS/MS) to identify toxic metabolites. The phylogenetic analysis showed that the Bornean *E. mastoideum* is closely related to the Chinese isolates (100% BS/1.0 PP). LC-MS/MS profiling detected a total of 162 metabolites that were classified into ten general groups, where several toxic compounds were detected amongst the aromatics, essential amino acids, and fatty acid derivatives. The toxic compounds identified in the mushroom extract, including amino acid derivatives such as 3,4,5,6-tetrahydroxyynorleucine, valpromide, and betaine, have been reported to cause neurotoxicity, cardiotoxicity, liver damage, and gastrointestinal harm. The presence of these toxic compounds underscores the need for caution when consuming wild mushrooms. Further research on poisonous *Entoloma* species is vital for developing accurate identification methods and understanding their toxic potential. This knowledge is essential for enhancing public awareness, preventing mushroom poisoning incidents and safeguarding public health.

* Corresponding author.

E-mail address: seelan80@ums.edu.my (J.S. Sathiya Seelan).

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