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# Allelopathic Potential of Rice and Identification of Published Allelochemicals by Cloud-Based Metabolomics Platform

Thi L. Ho <sup>1,\*</sup> , Tu T. C. Nguyen <sup>2</sup>, Danh C. Vu <sup>3</sup> , Nhu Y. Nguyen <sup>4</sup>, Trang T. T. Nguyen <sup>5</sup>, Trieu N. H. Phong <sup>1</sup>, Cuong T. Nguyen <sup>1</sup>, Chung-Ho Lin <sup>4</sup>, Zhentian Lei <sup>6</sup>, Lloyd W. Sumner <sup>6,7</sup> , and Vang V. Le <sup>2</sup>

<sup>1</sup> Cuu Long Delta Rice Research Institute, Can Tho 94000, Vietnam; pnhtrieu@gmail.com (T.N.H.P.); cuongnt.clrri@mard.gov.vn (C.T.N.)

<sup>2</sup> College of Agriculture and Applied Biosciences—Can Tho University, Can Tho 94000, Vietnam; ntct1608@gmail.com (T.T.C.N.); lvvang@ctu.edu.vn (V.V.L.)

<sup>3</sup> Faculty of Technology, Van Lang University, Ho Chi Minh City 70000, Vietnam; dcvgwc@mail.missouri.edu

<sup>4</sup> Center for Agroforestry, School of Natural Resources, University of Missouri, Columbia, MO 65211, USA; nynb5b@mail.missouri.edu (N.Y.N.); linchu@missouri.edu (C.-H.L.)

<sup>5</sup> Cultivation and Plant Protection Station, Thoi Lai District, Can Tho 94000, Vietnam; nguyenthithuytrang.jan16@gmail.com

<sup>6</sup> Metabolomics Center, University of Missouri, Columbia, MO 65211, USA; leiz@missouri.edu (Z.L.); sumnerlw@missouri.edu (L.W.S.)

<sup>7</sup> Department of Biochemistry, Bond Life Sciences Center, University of Missouri, Columbia, MO 65211, USA

\* Correspondence: thihl.clrri@mard.gov.vn; Tel.: +84-944-376-329

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**Abstract:** The methanol extracts of nine popular cultivated Vietnamese rice cultivars (*Oryza sativa* L.cv. OM 2395, 5451, 6976, 380, 5930, 4498, 3536, N406, and 7347) were used to explore their allelopathic potential on barnyardgrass (*Echinochola crus-galli* L.). At 0.1 g mL<sup>-1</sup>, OM 5930, OM 4498, and OM 6976 correlatively possessed greatest phytotoxicity on barnyardgrass shoot (98.77%, 90.75%, and 87.17%) and root (99.39%, 92.83%, and 86.56%) growth. The following study aimed to detect previously-known allelochemicals in those rice using XCMS online cloud-based metabolomics platform. Twenty allelochemicals were semi-quantified and seven of them were detected predominantly and five was putatively confirmed in OM 5930 (mg/ 100g fresh rice) as salicylic acid (5.0076), vanillic acid (0.1246), *p*-coumaric acid (0.1590), 2,4-dimethoxybenzoic acid (0.1045), and cinnamic acid (3.3230). These compounds were active at concentrations greater than 0.5 mM and the average EC<sub>50</sub> were 1.24 mM. The results indicated that OM 5930 may use as promising candidates in weed biological control for rice production.

**Keywords:** rice; barnyardgrass; allelochemicals; metabolomics; weed control

## 1. Introduction

In Vietnam, rice (*Oryza sativa* L.) is one of the most important crops, accounting for a large proportion of the daily food intake of more than 90 million people. Rice is grown about 82% of cultivated land and plays an important role in the country's economy. Vietnam has exported rice to about 150 countries and territories around the world, of which the Asian market accounts for 68.41%, followed by the African market (14.93%), the American market (6.54%), and the Oceania (5%) [1,2]. However, due to the crop intensification, an outbreak of pests on rice, including weeds has recently raised concerns. Weeds can reduce productivity by up to 60% due to competition for nutrients, light,