COMPARISON OF ROOT AND LEAF TOMATO (SOLANUM LYCOPERSICUM L.) PLANT DEFENSE AGAINST ROOT-KNOT NEMATODE USING NUCLEAR MAGNETIC RESONANCE ANALYSIS

[1]RUDI HARI MURTI, [2]ENIK NURLAILI AFIFAH, [3]TRI RINI NURINGTYAS

[1,2,3]Faculty of Agriculture Universitas Gadjah Mada, Faculty of Biology Universitas Gadjah Mada
E-mail: [1]rhmurti@ugm.ac.id, [2]enik.afifah@gmail.com, [3]nuningugm@gmail.com

Abstract: Tomato plants that resistance to nematode produce the various biochemical compounds that associated to defense mechanism to root-knot nematode attack. If systematically response, the resistant plant will express the chemical compounds in all the cell not only in the infected area. This study aimed to compare the expression of defense mechanism in the root and leaf of the plant. Approximately 50mg freeze-dried root and leaf were taken for assessing metabolomic analysis.[1]H-NMR (Nuclear magnetic resonance) spectroscopy combined with OPLS-DA (multivariate data analysis) were used to analyze the different metabolites involved in the leaf and root of tomato-nematode interactions. Identified signals were semi-quantitively calculated by scaling the intensity of the [1]H-NMR to the signals of internal standard (TMSP) at 0.00 ppm. In the root samples resulted 16 metabolites and the leaf resulted 15 metabolites consisted of amino acid, sugar compounds and aromatic compounds. Both of root and leaf sample analysis in the resistant plant has higher concentration of α-glucose and β-glucose and phenolic compounds (caffeic acid) than susceptible plants. In the root samples has more fumaric acid than leaf samples, but this compound was not differentiated the resistant and susceptible plants. Based on the statistics analysis,the root and leaf samples had the same concentration of sugar and caffeic acid. This finding indicated that the mechanism of resistance tomato plants to root-knot nematodes expressed systemically in the root and leaf.

Keywords: Comparing, Leaf, NMR, Root, Tomato, Nematode