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The effects of plant growth regulators and L-phenylalanine on phenolic compounds of sweet basil

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1 **The effects of plant growth regulators and L-phenylalanine on phenolic compounds of**  
2 **sweet basil**

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13 **ABSTRACT**

14

15 The effects of methyl jasmonate (MeJA), spermine (Spm), epibrassinolide (EBL) and  
16 L-phenylalanine on sweet basil (*Ocimum basilicum* L.) were studied to determine the amount  
17 of phenolic compounds and enzymatic activity of phenylalanine ammonia-lyase (PAL). Total  
18 phenolic and total flavonoid contents of sweet basil were determined by a spectrophotometer,  
19 and individual phenolic compounds and activity of PAL were analyzed by HPLC/UV. The  
20 highest total phenolic (6.72 mg GAE/g) and total flavonoid contents (0.92 mg QE/g) obtained  
21 from 1.0 mM Spm+MeJA application. Rosmarinic acid (RA) and caffeic acid contents  
22 significantly enhanced after the applications but no such differences observed in chicoric acid  
23 content or PAL activity. RA was the main phenolic acid in all samples and its concentration  
24 varied from 1.04 to 2.70 mg/g FW. As a result the combinations of Spm+MeJA and  
25 EBL+MeJA can induce secondary metabolites effectively and those interactions play  
26 important role in the production of phytochemicals in plants.

27 Chemical compounds studied in this article

28 Methyl jasmonate (PubChem CID 5367719); Spermine (PubChem CID 1103); 24-  
29 Epibrassinolide (PubChem CID 115196); Phenylalanine (PubChem CID 6140); Caffeic acid  
30 (PubChem CID 689043); Chicoric acid (PubChem CID 5281764); Rosmarinic acid  
31 (PubChem CID 5281792)

32 **Keywords:**

33 *Ocimum basilicum*, phenolic, spermine, precursor, brassinosteroid, MeJA, secondary  
34 metabolites.

35 **1. Introduction**

36 The health benefits of the foods in humans have been attributed to phytochemicals,  
37 particularly secondary metabolites e.g. polyphenolic compounds and flavonoids. Because of  
38 their bioactive functional features, there is a high research interest, including investigations on  
39 improving their production (Kim, Chen, Wang, & Rajapakse, 2005).

40 Jasmonic acid (JA) and MeJA are lipid-based hormones, synthesized from linolenic acid  
41 widely occurring in plants. These endogenous phytohormones play important roles in plant

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