

PA-17**Rice (*Oryza sativa* L.) Growth Promotion by Various Plant Extracts Produced Using Different Extraction Methods**Ei Ei¹, Hyun Hwa Park¹, Yong In Kuk^{1*}¹Department of Bio-oriental Medicine Resources, Sunchon National University, Suncheon 57922, South Korea**[Abstract]**

Modern agricultural production needs to provide sustainable management practices that are eco-friendly and low cost. Plant extracts are a cost-effective and environmentally friendly alternative to synthetic plant growth regulators. This study was therefore carried out to investigate the effects of various plant extracts produced using different extraction methods on the vegetative growth of rice under laboratory and greenhouse conditions. For this study, seventeen plant extracts were made from plant species such as leaves of *M. arvense*, *C. asiatica*, *M. oleifera*, *V. radiata*, *V. unguiculate*, *P. guajava*, *A. vera*, and *A. tuberosum*, aboveground plant parts of *C. rotundus*, *M. sativa*, and *P. frutescens*, roots of *R. undulatum*, tubers of *A. sativum*, leaves and stems of *G. max* (cv. Taegwang) as well as rice straw and hulls (cv. Hopyeong). As a test crop, we applied these extracts to rice plants. For the purpose of making our extracts, some plant materials and species were collected in fields and others were purchased from Chonnam Hanyaknonghyup Cooperation (South Korea). Leaves, roots, and aboveground plant parts of plant species were dried, ground, extracted (water, boiling water and ethanol) and fermented. Rice growth promotion effects were determined using plant extracts at 0, 0.05, 0.1, 0.5, and 1% concentrations under petri dish conditions. Seven selected plant extracts were applied to rice seeds with soil drench application or seedling at 3-4 leaf stages with soil and foliar applications under greenhouse conditions. For comparison with extracts, we used urea at 0.6%. Of the 17 water extracts used in this study, 10 extracts reduced rice growth, but the other 7 extracts (*P. guajava*, *A. vera*, *A. tuberosum*, *M. sativa*, *A. sativum*, and *G. max*) increased growth by 40-60% on compared to the control in Petri dish bioassay. Thus, these 7 extracts were selected for further study. Under greenhouse conditions, rice growth also increased by 20-40% when the same 7 extracts were applied to rice seeds using soil drench application. Furthermore, at the 3-4 leaf stage rice growth also increased 30-80% or 30-60% when the same 7 extracts were applied using soil and foliar applications. Overall, the 7 extracts produced higher rates of growth promotion when soil drench application was used than when foliar application was used. In the case of boiling water and ethanol extracts, rice growth increased only 20% in response to both soil drench and foliar application of the same 7 extracts. Rice growth promotion was greater when extracts were produced using water extraction method than boiling water and ethanol extraction methods. Most notably, the 7 water extracts used in this study produced higher rates of growth promotion than urea at 0.6% which is typically used for crop growth promotion. Overall, the 7 water extracts when applied using soil drenching method can be used as effective growth promoters of rice in organic agriculture.

[Acknowledgement]

This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (No. 2021R1F1A104972212)

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