

## Evaluation of allelopathy by volatile natural chemicals in closed ecosystem

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We have developed a bioassay for allelopathy in closed ecosystems. We named this method as a kind of Life cycle assesent (LCA). This method is also valuable to evaluate the allelopathic activity in the closed ecosystems in space and also contribute for the future agricultural interaction in grass house or agriculture on earth. LCA Method was established using agar medium, and Arabidopsis or Rapid Plants (*Brassica* sp.). DNA microarray analysis using plant material with LCA method could analyze the gene expression to specific allelochemicals. *Fagopyrum esculentum* is one of the several crop species possessing strong allelopathic properties. In our previous study we had identified eight allelochemicals in buckwheat and analyzed by microarray analysis two important compounds such as rutin and gallic acid. The gene expressions of 20 days old *A. thaliana* plants were analyzed using Affymetrix GeneChips ATH1. The results showed 168 and 55 genes with higher expression after 6 hours of exposure to gallic acid and rutin, respectively. However, only 14 genes were found common for both compounds. The study revealed some genes which are important in regulating plant responses to stress. Induced genes fell into different functional categories mainly, metabolism; cell rescue, defense and virulence; cellular communication/signal transduction mechanism and transcription. This study may lead to a better understanding of the allelochemicals mode of action which in the future could be used in biological control of weeds..

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