

研究报告

南瓜组培根根系分泌物的化感效应研究

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摘要

使用组织培养技术、生物测试法及室内分析相结合的方法研究了南瓜组培根在不同生长时期与不同营养胁迫下(利用正交设计调节标准B₅培养基中的大量元素、微量元素、有机质和激素)根分泌物对南瓜、萝卜和小麦3种受体的种子萌发及幼苗生长的化感作用.结果表明,南瓜具有自毒作用,南瓜组培根根系分泌物对受体幼苗生长的抑制作用呈现出高抑低促的作用表型;南瓜组培根根系分泌物产生化感作用的活性与南瓜组培根生长速度有关,南瓜组培根根系分泌物的生长抑制活性以15~17 d即生长速度指数末期为最高,21 d生物量最大时的南瓜组培根根系分泌物的生长抑制活性最低;营养元素的改变明显影响了南瓜根系分泌物的产生,并通过筛选出能诱导南瓜组培根对受体具有强烈抑制作用的大量元素、微量元素、维生素和激素种类和含量的最优化组合,为研究南瓜化感作用营养胁迫机理提供依据.

关键词 [南瓜; 根系分泌物; 化感作用; 组培; 正交技术](#)

分类号

Allelopathic effects of cultured *Cucurbita moschata* root exudates

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Abstract

By using the techniques of tissue culture, bio assay and laboratory analysis, this paper studied the effects of the allelopathic chemicals from pumpkin (*Cucurbita moschata*) roots on the seed germination and seedling growth of pumpkin, wheat (*Triticum aestivum*), and radish (*Raphanus sativus*). The pumpkin root was cultured on a sterile B₅ media, and the concentrations of macro- and microelements, organic supplements and hormones in the media were adjusted by using an orthogonal design. After culturing, the culture media was filtered and used in a bioassay to test the autotoxicity and allelopathic effects. The results showed that the pumpkin had both autotoxic and allelopathic effects, and the media having been used to culture the pumpkin roots contained the chemicals that significantly inhibited the seedling growth of wheat and radish. The allelopathic effect decreased when the culture media was diluted. The production of allelochemicals seemed to be related to the growth rate of the

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pumpkin roots. When the root growth was rapid, the concentration of allelochemicals was high. The allelopathic effect was stronger on radish than on wheat. The optimum concentrations of macro- and microelements, vitamins and hormones for culturing pumpkin root were determined, and the effect of pumpkin root nutrition on the production of allelochemicals was tested. The results indicated that pumpkin root nutrition had a significant effect on the production of allelochemicals.

Key words [Cucurbita moschata](#) [Root exudates](#) [Allelopathy](#)
[Orthogonal design](#)

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