

植物生长调节剂对构树外植体快繁体系的影响

周嘉康¹ 刘洋¹ 吴良¹ 赵运林¹ 张婉¹ 杨桂燕² 徐正刚^{1,2}

(¹中南林业科技大学 湖南省环境资源植物开发与利用工程技术研究中心
长沙 410004; ²西北农林科技大学 林学院 杨凌 712100)

摘要: 构树是重要的生态和经济树种, 构树的有性繁殖不仅发芽率低, 而且对环境条件要求较高。因此, 利用组织培养技术进行无性繁殖可有效提高构树的繁殖效率。本研究将野生构树的叶片和带芽茎段做为外植体, 在 MS 培养基中加入不同浓度的植物生长调节剂, 建立了适合构树外植体愈伤组织形成、不定芽分化和生根的体系。此外, 通过不同浓度的植物生长调节剂对构树外植体生根数的影响实验, 筛选出适宜的生根培养基, 将构树苗接种到生根培养基中进行培养, 当根长到 4cm 时进行炼苗和移栽。结果表明, 生长素 (NAA) 对愈伤组织的形成、根的数量、芽的长度和根的长度有较大的影响。细胞分裂素 (6-BA) 对外植体分化不定芽和不定叶的数量影响较大。MS+0.50 mg/L NAA+0.25 mg/L 6-BA 和 MS+0.25 mg/L NAA+0.50 mg/L 6-BA 分别为诱导叶片外植体和带芽茎段外植体愈伤组织的最佳培养基。不定芽分化增殖的最佳培养基为: MS+0.05 mg/L NAA+0.50 mg/L 6-BA, 此浓度下繁殖系数高并且能够促进不定芽生长。构树组织培养最佳的生根培养基为: MS+0.25 mg/L NAA, 在此条件下, 叶外植体和茎外植体的平均生根数分别为 1.71 和 13.86 个。此外, 最佳移栽基质为土壤: 珍珠岩: 蛭石 (20: 1: 1) 的混合物, 成活率为 91.1%。本研究为构树的组织培养提供了一套可提高其繁殖效率、培育优良种质资源的组织培养体系, 也为其他木本植物的组织培养提供了一定的参考。

关键字: 构树; 细胞分裂素; 赤霉素; 生长素; 种子萌发

Effects of plant growth regulators on the rapid propagation system of

Broussonetia papyrifera explants

Zhou Jiakang¹ Liu Yang¹ Wu Liang¹ Zhao Yunlin¹ Zhang Wan¹
Yang Guiyan² Xu Zhenggang^{1,2}

(1. Central South University of Forestry and Technology, Hunan Research Center of Engineering
Technology for Utilization of Environmental and Resources Plant, Changsha 410004, China;
2. Northwest A&F University, Forestry College, Yanglin, 712100, China)

Abstract: *Broussonetia papyrifera* is an important ecological and economic tree species. The sexual reproduction of *B. papyrifera* not only has a lower germination rate, but also requires higher environmental conditions. Therefore, asexual propagation using tissue culture can effectively improve the propagation efficiency of *B. papyrifera*. In this study, the leaves and budded stems of *B. papyrifera* were used as explants, and different concentrations of plant

growth regulators were added to MS medium to establish a suitable system for explant callus formation, adventitious buds differentiation and rooting. In addition, the suitable medium for rooting was selected through the experiment of different plant growth regulators combinations on the number of roots of *B. papyrifera* explants. The *B. papyrifera* shoots were inoculated on the rooting medium. After rooting induction culture, tissue culture plantlets of *B. papyrifera* could be opened and acclimatized when the height was about 4 cm and the root system was strong. The results showed that auxin (NAA) has a greater impact on the formation of callus, the number of roots, the length of shoots and roots. Cytokinin (6-BA) has a greater influence on the number of adventitious buds and leaves differentiated from explants. MS + 0.50 mg/L NAA + 0.25 mg/L 6-BA and MS + 0.25 mg/L NAA + 0.50 mg/L 6-BA were the best mediums for rapid callus induction from leaf explants and stem explants, respectively. The best medium combination for stem differentiation and proliferation was MS + 0.05 mg/L NAA + 0.50 mg/L 6-BA, and the high propagation coefficient could also promote adventitious buds growth. The best rooting medium in the establishment of *B. papyrifera* tissue culture was MS + 0.25 mg/L NAA. Under this condition, the average rooting numbers of leaf explants and stem explants were 1.71 and 13.86, respectively. In addition, the best transplanting substrate was a mixture of soil: perlite: vermiculite (20:1:1), and the survival rate was 91.1%. This study established a propagation system in vitro culture of *B. papyrifera*, and provided a certain reference for tissue culture of other woody plants.

Keywords: *Broussonetia papyrifera*; MS medium; NAA; 6-BA; differentiation and proliferation; rooting