Ibn Al-Haitham Journal for Pure and Applied Science | مجلة إبن الهيثم للعلوم الصرفة و التطبيقية
No. 1 Vol. 25 Year 2012 | 2012 السنة 25 المجلد 1 العدد

In Vitro Propagation of *Albizia Lebbeck* Through Axillary Bud Culture

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Received in : 20 April 2011 Accepted in : 16 November 2011

Abstract

The present study describes a protocol for rapid *in vitro* micropropagation of *Albizia lebbeck* during the period of October 2007 to October 2009 through nodal segments containing axillary buds. The buds induced to produce a large number of multiple shoots by culturing on MS medium supplemented with different concentrations of BA (benzyladenine) and NAA (α-naphthalene acetic acid). The maximum number of shoots per explants was obtained on MS medium supplemented with 1.0 mg/L BA and 0.1 mg/L NAA was (4.8) after 4 weeks of culture. Excised shoots were rooted on half strength MS medium fortified with 0.5 mg/L either IBA (indolbutyric acid) or NAA alone. The complete plantlets thus obtained were successfully transferred to soil.

Key words: *Albizia lebbeck*, tissue culture, *in vitro*, plant regeneration

Indroduction

The genus Albizia (also Albizzia) *Albizia lebbeck* (L.) Benth. commonly known as Siris is a mimosoid tree legume widely distributed in the world. belongs to subfamily Mimoseae of family Leguminosae (Fabaceae) / Pea Family and is highly valued multipurpose tree legume. [1,2] . The genus Albizia consists of approximately 150 species distributed in Asia , Africa , Australia , and tropical and subtropical America Several Albizia species are planted as ornamentals or as a source of tannin extracts [3] *Albizia lebbeck* is a deciduous woody trees and shrubs and forms symbiotic relationship with Rhizobium and fix atmospheric nitrogen used for its growth and also for the enrichment of the rhizosphere [4]

One of the most important problems in the woody legumes in the establishment of propagules of high quality of regeneration as *Albizia lebbeck* has long seed dormancy. Under tissue culture approach the plant spp belonging to the family leguminoseae are in general considered to be recalcitrant to *in vito* regeneration. under these efforts *Albizia lebbeck* was subjected to tissue culture technique for developing the avenues for mass production and development of elite genotype of *Albizia lebbeck* from diggerent explants. [5]

It is thus necessary to device a rapid and efficient micropropagation protocol for obtaining true - to - type regenerants without detriment to the survival of mother/donor plant and saving its populations from getting rarer in nature. aiming to study the micropropagation of *Albizia lebbeck* to solve some of the propagation problems in this plant.

Material and Methods

Shoot apices having nodal segments with axillary buds were collected from natural trees growing in Al-Rashdia area. The buds were disinfected with 0.5% sodium hypochlorite solution with 3-5 drops of Tween- 20 for 20 minutes and washed thoroughly with tap water.

The buds were also treated with 0.05% mecuric chloride solution for 5 minutes then washed with sterile distilled water and pretreated with citric acid (150 mg/l), ascorbic acid (100 mg/l). The sterilized nodal explants were transferred to Murashige and Skoog (1962) (MS) medium supplemented with growth regulators at various concentrations and combinations of BA with NAA for shoot induction. Excised shoots from these cultures were rooted on ½ MS supplemented with IBA (or NAA at different concentrations for root induction pH was adjusted to 5.6 using 0.1 N NaOH or 0.1 N HCl before autoclaving (121°C under 1.05 kg/cm2, 20 min). The cultures were maintained in a culture room at 25±2°C and were exposed to continuous fluorescent light for 16 h per day and successfully transferred to soil. Significant differences among mean values were using One-way ANOVA followed by Duncan's multiple-range test was conducted to evaluate differences among the treatments.

Results and Discussion

Micropropagation is the true-to-type propagation of selected cultivar using *in vitro* technique. The segments of *Albizia lebbeck* exhibited browning of the explant and medium due to leaching of phenolics. This phenomenon results from physiological changes within the cultured tissues that lead to gradual browning and eventual death of tissues. [6]

Tissue browning is a problem frequently observed during *in vitro* establishment of explants from woody plants [7]. The problem of phenolic browning was minimized to a great extent by leaching of phenolic compounds due to agitation in antioxidants solution and by proper drying of explants prior to inoculation [8] Significantly reduced leachin by supplementing the medium with citric acid (150 mg/l), ascorbic acid (100 mg/l) This was in agreement with [9]. The variance analysis of the axillary bud cultures showed that the effects of the treatments with different combination of BA and NAA were significant on number of shoot. The nodal segments proved to be excellent explants for multiple shoot formation and the first response of axillary buds within two weeks. New shoot development from axillary bud was observed within three weeks of culture and more shoots were found to develop during subcultures. The best response was found under 1.0 BA+0.1 NAA mg /L combination which was found most effective (Fig. 1). The combined effects of BA+NAA on shoot induction were reported earlier in different plants. Our results agreed with those obtained by [10,11,12]. On the other hand the adding of NAA in different concentrations developed the multiple shoots in this study but the best concentration was 0.6 mg/l. Root formation was induced when elongated shoots (1-2 cm) were transferred to ½ MS medium fortified with 0.5 mg/L IBA or NAA . The result showed that the IBA is considered as the most effective auxin in root induction. Elongated shoots derived from the explants were separated and cultured on half strength MS supplemented with IBA (0.5 mg/l) for induction of rooting. (Fig. 2) The optimum concentration was 0.5 mg/l of IBA and it resulted in 85% of root initiation within 1-2 weeks of culture[13,14] The complete plantlets were transferred to small plastic pots, and bags containing a mixture of soil and compost then transferred to the field. (Fig. 3)

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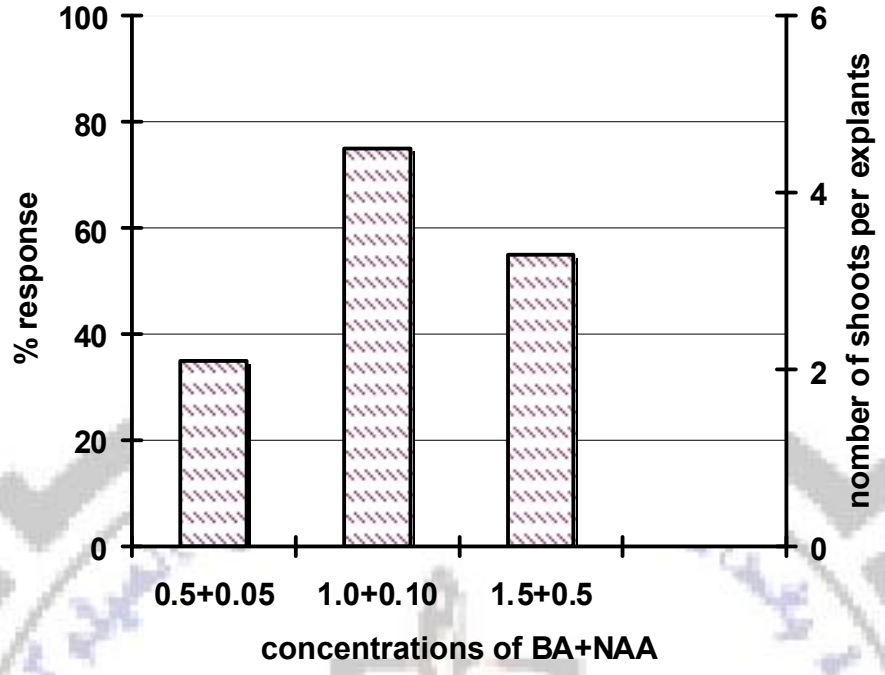
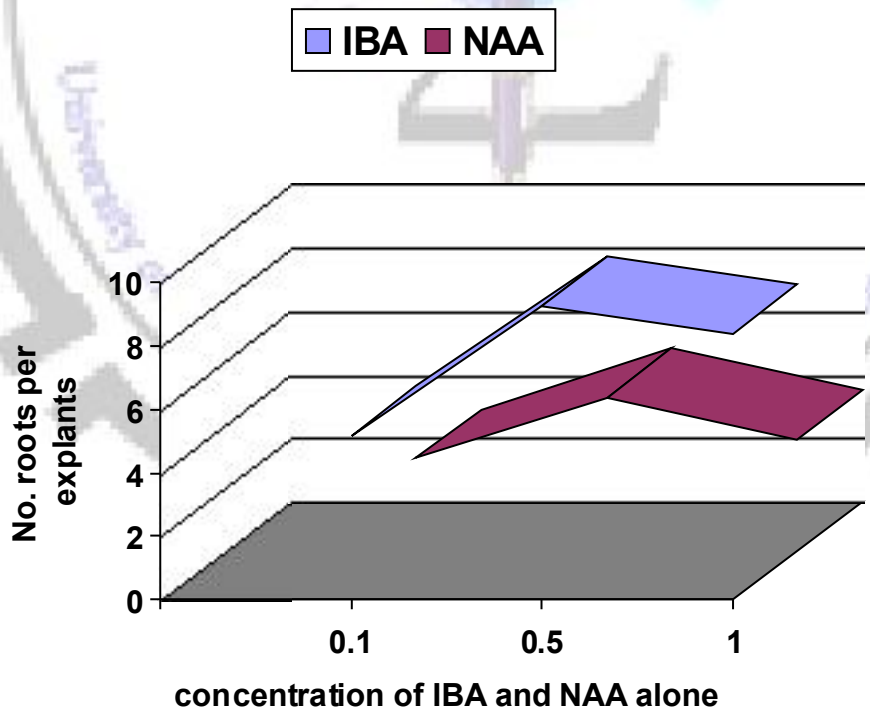


Fig (1): Effect of BA and NAA concentrations on shoot induction of *Albizia lebbeck* at 4 weeks .



Fig(2): Effects of different concentrations of IBA and NAA on rooting of excised shoot in *Albizia lebbeck*

A- B-

Fig(3): *In vitro* propagation of *Albizia lebbeck* A-rooting of excised shoot in ½ MS medium supplemented with 0.5 IBA (mg/L), B-establishment of plants in plastic pot

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الإكثار خارج الجسم الحي لـ *Albizia* lebbeckبوساطة البراعم الابطية

خنساء رشيد الجبوري

مركز بحوث ومتحف التاريخ الطبيعي/ جامعة بغداد

استلم البحث في : 20 نيسان2011 ، قبل البحث في :16 تشرين الثاني 2011

الخلاصة

بينت هذه الدراسة طريقة الإكثار الخضري السريع خارج الجسم الحي لـ*Albizia* lebbeck المدة من أكتوبر2007 – الى أكتوبر 2009 باستعمال قطع عقدية حاوية براعم ابطية التي استحثت لإنتاج اكبر عدد من السيقان من خلال زراعتها في وسط حاوٍ على تراكيز مختلفة من BA و NAAبصورة منفردة. وتم الحصول على اكبر عدد من النموات في وسط حاوي على تركيز 1.0 ملغم / لتر BA و 0.1 ملغم/ لتر NAA، إذ كان عددها 4.8، ثم جذرت هذه النموات في وسط حاوٍعلى نصف القوة من الوسط MS مضافا إليه IBA بتركيز 0.5 ملغم / لتر ثم نقلت النموات الناتجة بصورة ناجحة إلى التربة .

الكلمات المفتاحية : *Albizia lebbeck* ، زراعة الانسجة ، خارج الجسم الحي ، إكثار النباتات

Ibn Al-Haitham Journal for Pure and Applied Science

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