EFFECTS OF THE INDOLBUTIRIC ACID IN THE APICAL STAKES OF HYPTIS PECTINATA (L.) POIT.

Josabete Salgueiro Bezerra de Carvalho¹, Izanielle Batista dos Santos², Marcos de Oliveira², Conceição Aparecida Soares Mendonça³

²Graduandos em Agronomia, Universidade Federal Rural de Pernambuco, Unidade Acadêmica de Garanhuns, UFRPE, UAG, Brasil.
³Dra., Técnica em Laboratório, Universidade Federal Rural de Pernambuco, Unidade Acadêmica de Garanhuns, UFRPE, UAG, Brasil.

Abstract
Hyptis pectinata (L.) Poit., popularly known as sambacaitë, is used as medicinal herb due to its healing, analgesic and anti-inflammatory effects. In relation to its commercial propagation by seeds, that is unfeasible for presenting dormancy, thus the cutting propagation is one of the most viable methods because a great number of seedlings can be obtained from few cultivars, as well as their forwadness to achieve the reproductive stage. The growth regulators, in particular the indolbutiric acid, (IBA), an auxin, have provided higher rates of root formation when adopted the vegetative propagation by cutting. The aim of this work was to verify the effect of the indolbutiric acid in apical stakes of Hyptis pectinata. The work was carried out in a glasshouse in the municipality of Garanhuns, located at the Southern Agreste of Pernambuco. The experimental design was in random blocks, using four replications per treatment, i.e., four blocks with five cuttings per plot (experimental unit), providing a simple 4x2 factorial (IBA concentrations x cuttings types). The work found that the control plants showed a rooting percentage of 85%, demonstrating that the amount of endogen auxin in these cuttings is sufficient for rooting. Thus, it can be concluded that Hyptis pectinata plants do not need stimuli to rooting with the use of growth regulator such as indolbutiric acid (IBA) and the presence or absence of leaves is not a limiting factor for adventitious rooting.

Key words: Sambacaitë, Medicinal plants, Seedling production, Auxins. Lamiaceae.

INTRODUCTION
The Lamiaceae family has a cosmopolitan distribution, including about 300 genera and 7,500 species. In Brazil there are 38 genera and about 500 species (Souza and Lorenzi, 2012). Many species of this family are endemic to the semi-arid region, with emphasis on the genus Hyptis. The special metabolism of plants of the genus Hyptis is remarkable variability, demonstrating the predominance of essential oils, which have much value with various communities that use the therapeutic properties (Oliveira et al., 2011). Hyptis pectinata (L.) Poit, is an herb or subshrub, erect, 1-2m tall, branched, hairy stem and branches quadrangular, green-gray. Leaves opposite, aromatic, limbo oval or oval-elliptic, apex acute, base obtuse or obtuse-truncate, serrate margins. The flowers are small, clustered in terminal inflorescences, hermaphrodites, pentamorous, zygomorphic and bilabiadas. Characterized by shrublet be a permanent, low density leaf, fruit esquizontârico separating into four cashew nuts, in addition to producing a large number of seeds with diminutive sizes (Basil et al. 2,006; Neto et al. 2009). Hyptis pectinata is popularly known as sambacaitë and widely used as a medicinal herb for its healing effect, analgesic and anti-inflammatory conditions both inside where it is used in the treatment of gastritis and ulcers, and for external wounds, by the use of aqueous extracts of leaves and stems (Martins, 2011).

According to Maia et al. (2008) the natural propagation of plants of the genus Hyptis occurs by seeds, but its commercial propagation is unfeasible due to numbness presented by its seeds. H. pectinata is still a little cultivated species, and studies concerning its medicinal action or on their way of propagation are few, and their collection coming from extraction (Neto et al., 2007). In this context...
vegetative propagation by cuttings is configured in one of the most viable, because in addition to obtain a large number of seedlings from a few mother plants, also stands to plant early in the stage production and achieve standardization of agronomic mother plants (Kathiravan et al., 2009).

An increase in viability of plant propagation via cuttings is obtained through the use of growth regulating substances such as auxin, which have shown the greatest effect on the formation of adventitious roots (Hartmann et al. 2002). The butyric acid (IBA) is considered the most effective auxin for this purpose, to be stable to the action of light, and join the stake and his atoxidade (Hartmann et al., 1990).

The present work aimed to study the effect of IBA in apical cuttings *Hyptis pectinata*.

**MATERIAL AND METHODS**

The experiment was conducted at Seed municipal Garanhuns, located in the arid zone of southern Pernambuco, located at latitude 8° 53’ 25”, longitude 36° 29’ 34” and average altitude of 866m, during the period from May to July 2012. The average annual temperature in the region is 20.4 ° C, with average annual rainfall of 788mm (ITEP, 2009). The region has the rainy season in the fall, being classified as mesothermal climate type. The soil is classified as Oxisol. The area of macro-Garanhuns is representative of these spaces humid and sub-humid and was included in the garb of morfoclimática "Swamps" Elevation or exposure. These swamps surrounding vegetation present as hypo and the rough hiperxerófila true.

The branches used in the experiment were obtained from plants of six years from planting seed existing in the municipality of Garanhuns. The gathering was held in the morning, the same day the making of cuttings and the branches were placed in containers with water. The apical cuttings were standardized, with approximately 20 cm long and each containing four yolks. After preparation, the cuttings were immersed in liquid solution of butyric acid (IBA), dipping the base in the same respective concentrations according to the treatments in order to remain in the solution for 5 minutes after it was done planting bags polyethylene (13 x 13 cm) containing topsoil so that the last yolk stay buried. The substrate was subjected to chemical analysis in the laboratory of chemical analysis of the Federal Rural University of Pernambuco / Academic Unit Garanhuns. The chemical characterization of the soil was: pH = 6.5, P = 64.6 mg.kg-1, K-1 = 0.77 cmolc.kg; Na = 0.47 cmolc.kg-1, Ca = 2.90 cmolc.kg-1, Mg = 2.60 cmolc.kg-1, Al = 0.47 cmolc.kg-1, H + Al = 1.48 cmolc.kg-1; = 6.74 SB-; CTC-1 cmolc.kg = 8.23, V (%) = 82; CC = 0.110 gg-1; PMP = 0.057 gg-1 and AD = 0.053 gg-1.

The experimental design was a randomized block design, using four replicates per treatment, ie four blocks with five cuttings per plot (experimental unit), providing a simple factorial 4x2 (IBA concentrations x types of cuttings). The treatments consisted of the combination of two types of cuttings (cuttings with two leaves, and cuttings without leaves) and four concentrations of growth regulators indol butyric acid (0, 500, 1000 and 2000 mg l-1).

The material was kept in the nursery with brightness of 75%. The evaluation was performed 40 days after cutting, and the parameters analyzed were: percentage of rooted cuttings, budding cuttings, root number and average length of the longest root (cm). The data collected were subjected to analysis of variance.

**RESULTS AND DISCUSSION**

The values for rooting, sprouting, root number and average length of the longest root in apical cuttings with and without leaves are shown in Table 1. Although the statistical analysis did not reveal significant values in variables is observed that the highest percentage of rooting (90%) was obtained in cuttings with leaves and 500 mg l-1 IBA. According Fachinello et al. (2005) The maintenance of leaves and vegetative buds in cuttings is important because these sites are responsible for the synthesis of cofactors, auxin and carbohydrates which are essential to rooting.

It was observed that concentrations above 500 mg l-1 IBA for apical cuttings with or without leaves cause phytotoxic effect, since decreased in roots (Table 1 Design). Probably apical cuttings *Hyptis pectinata* not require rooting stimulator, since branches apical regions are synthetic auxin. Pasqual (2001) states that, regardless of the formula of auxin, the excessive concentration of this regulator can cause toxicity will plant. Similar results were found by Maia et al. (2008) to study the species H.
suaveolens revealed that this species probably does not require exogenous auxin for successful vegetative propagation by cuttings is considered easy to root. In contrast, Oliveira et al. (2011) found that apical cuttings of H. leucocephal need 4,000 mg l-1 IBA for obtaining 81.25% in the percentage of rooting.

Table 1: Effect of concentration of butyric acid (IBA) on rooting, sprouting, root number and average length of root apical cuttings of H. pectinata with and without leaves at 40 days of age. Garanhuns, 2012.

<table>
<thead>
<tr>
<th>April (mg.L-1)</th>
<th>Rooting (%) With Leaves</th>
<th>Sprouting With Leaves</th>
<th>Number of root With Leaves</th>
<th>Root length With Leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With Leaves</td>
<td>Without Leaves</td>
<td>With Leaves</td>
<td>Without Leaves</td>
</tr>
<tr>
<td>0</td>
<td>85</td>
<td>85</td>
<td>2.95</td>
<td>2.25</td>
</tr>
<tr>
<td>500</td>
<td>80</td>
<td>80</td>
<td>3.60</td>
<td>2.05</td>
</tr>
<tr>
<td>1000</td>
<td>85</td>
<td>70</td>
<td>2.90</td>
<td>3.50</td>
</tr>
<tr>
<td>2000</td>
<td>80</td>
<td>65</td>
<td>2.20</td>
<td>2.30</td>
</tr>
</tbody>
</table>

For apical cuttings without leaves the best IBA concentration was 1000 mg L-1 with higher rates of sprouting (3.5), number of roots (7.0) and average length of roots (15.47 cm) compared to other treatments (Table 1). For apical cuttings with leaves the best concentration was 500 mg L-1 IBA as featuring the best treatment, obtaining higher values of budding (3.6), rooting (90%), root number (8, 8), and average length of roots (19.89 cm) compared to other treatments. Lusa & Biasi, (2011) to evaluate the effect of the number of leaves on the development of cuttings of medicinal plant species of the genus Cuphea found that the presence and number of leaves had a positive influence on the rooting of cuttings and budding. It is the results that leaved cuttings require a lower concentration of auxin (500 mg.L-1 IBA) compared with cuttings without leaves, where the optimum concentration was 1000 mg L-1 IBA this shows the direct relationship between the presence of leaves in better growth and development of seedlings of H. pectinata, demonstrating effective role of leaves in auxin and carbohydrate synthesis. These results corroborate Fachinello et al. (2005) who attribute the production of hormones and cofactors of the great importance of the leaves in the process of rooting. The presence of leaves enables the production of assimilates and plant hormones, which are essential in the process of rooting and growth of shoots, especially for cuttings of plants of the genus Hypitis that have reduced the amount of reserves (Oliveira et al., 2011). To evaluate the interaction of IBA with the types of softwood cuttings of grapevine rootstock IAC 572, Faria et al. (2007) observed that treatment with IBA had a positive influence on the rooting of cuttings with leaf concentrations in 1500 and 2000 mg.L-1 with 96.8% of rooted cuttings compared with cuttings without IBA where rooting was 68 , and 7% in cuttings without leaves treatment with IBA not significantly affected, with the highest average rooting was 21.8%. Almeida et al. (1991) also observed that cuttings with leaves of passion fruit cut in half underperformed those maintained with whole leaves.

CONCLUSION
1. The amount of endogenous auxin in the apical cuttings with a pair of leaves or sheets without Hypitis pectinata is sufficient to promote rooting of 85%;
2. A concentration of 500 mg L-1 Idolbutírico acid (IBA) in apical cuttings with two leaves have a positive influence on rooting, sprouting, number and length of roots of Hypitis pectinata.

REFERENCES


10. ITEP-Institute of Technology Pernambuco (2009). Hidromet. Available at


http://mutagens.co.in