

***In Vitro* and *In Vivo* Growth, Chemical and Antimicrobial Studies for *Plectranthus amboinicus* plant.**

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Abstract : The effect of some factors on micro propagation of *P. amboinicus* plant *in vitro*. The results clearly showed that, White's medium recorded the best results in most of growth parameters was recorded in nodes explant comparing with MS and B5 media. BA 1.0 mg/ l in addition to White's medium was significant increasing of shoot number/ explant, while White's medium free hormone (control) was recorded the highest values in survival and rooting percentage, shoot number/ explant and shoot length cm / explant comparing with IBA (from 0.5 to 4.0 mg/l.). Also data showed that, Peat moss and sand interaction (growing media) were recorded the best result in acclimatization of rooted plants comparing with peat moss or sand individually. in a greenhouse of controlled temperature, as well as studying the effect of different seasons in and out normal greenhouse conditions, The results clearly showed the effect of temperature on the survival percentage of plants during acclimatization with significant difference ($p < 0.05$), as the highest significant percentages of survival were obtained with the degrees 31 and 36 °C compared to the other treatments. Interestingly, the results indicated that the summer and autumn showed higher percentages of survival and growth rate compared to the other seasons. However, the best result was observed in the summer. The quantity of essential oil of plant was ≥ 0.6 % (V/W) of yellowish volatile oil, from analysis of the oil using GC and GC/MS; it was obvious that it contained 23 compounds where Limonene represented the highest percentage (40%) while Junipene was the lowest one (0.54 %). The antioxidant activity, total phenolic compounds and flavonoid contents were investigated in plants grown in and out the normal greenhouse. The obtained results outside the greenhouse were 38 %, 77 μ g and 65 μ g, while the results inside the greenhouse were 29 %, 35 μ g % and 31 μ g %, respectively. The antimicrobial activity against yeasts and bacteria was assessed in broth micro-dilution assays to determine antibiotic sensitivity testing and the minimum inhibitory concentration (MIC) necessary to inhibit microbial growth, our results showed that essential oil of *P. amboinicus* could be used as a tool for the developing novel and more efficacious antimicrobial agents.

Keywords: Tissue culture, Phytochemical, Essential oil, Antimicrobial and *Plectranthus amboinicus*.