Vegetative propagation and proposal for sustainable management of *Valeriana carnosa* Sm., a traditional medicinal plant from Patagonia

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Abstract

Valeriana carnosa is an important medicinal herb in the Patagonian popular medicine. The underground parts of this native species are used for the preparation of various formulations in the traditional health system for treatment of hepatic, circulatory, urinary and digestive disorders as well as having analgesic, anti-inflammatory and anti-depressive properties. Although *V. carnosa* is one of the most used medicinal plants in Patagonia, currently the raw material (roots and rhizomes) is obtained from natural populations. The aim of this study was to generate novel tools for stimulating *in situ* cultivation of *V. carnosa* to improve the sustainable management of this phytomedicinal resource and the quality control of its commercial plant material. The agamic multiplication of *V. carnosa* was tested, applying different concentrations of indole-3-butyric acid (IBA), α-naphthaleneacetic acid (NAA) and a commercial rooting mix product (containing NAA 3000 ppm) in leafless and leafy cuttings. The application of NAA was more effective than IBA to stimulate roots development in stem cuttings. The results indicate that leafy cuttings treated with NAA (1000 ppm and 3000 ppm) give 40–60 propagules from each adult mother plant, ensuring significantly ($p < 0.05$) higher rooting percentages. To determine the effect of the phytohormones application on the root system development, five morphological root variables were analyzed by non-parametric analysis of variance (Kruskal–Wallis) at P-value (0.05) significance levels and differences were observed depending on the treatment used. In this study we

propose: 1- an efficient and inexpensive protocol for vegetative multiplication, and 2- provide information for *in situ* cultivation of *V. carnosa* in Patagonia.