‘Plant Form’, a temporary immersion system, for *in vitro* propagation of *Myrtus communis* and *Olea europaea*

Benelli Carla [1, *], Fernanda C.M.[2] and De Carlo A.[1]

[1] IVALSA/Istituto per la Valorizzazione del Legno e delle Specie Arboree, CNR (National Research Council), via Madonna del Piano 10, Sesto Fiorentino, Florence, Italy

[2] UFLA, Universidade Federal de Lavras, Departamento de Biologia, Lavras, Brazil

* Corresponding author: benelli@ivalsa.cnr.it

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The “Temporary Immersion System” (TIS) can bring many advantages in micropropagation for reducing plantlet production costs, for automation and simplifying procedures. This approach uses systems in liquid medium bioreactor and its application in different researches showed a general reduction of costs. Although the micropropagation of several woody and shrubs species has been reported using conventional semi-solid medium culture methods, so far only a few can be successfully propagated in liquid culture in bioreactors. Recently, a new type of TIS bioreactor has been developed by M. Welander and A.J. Sayegh (http://plantform.se/index. html). Compared with the other existing ones, this Plant Form bioreactor has several advantages: it is easy to handle, transparent, autoclavable and the gas exchange, including oxygen and carbon dioxide, can be controlled using air pumps and a timer. The container can be filled with 500 mL of nutrient medium, the immersion time and the frequency with the gas exchange are set by the timer. The aims of the present study are: (I) to optimize a simple and effective method for mass propagation of *Myrtus communis* and *Olea europaea* plantlets in Plant Form bioreactor (II) to investigate the possibility to reduce mineral nutrition compounds or plant growth regulators, in order to reduce production costs. The effectiveness of the bioreactor in micropropagation of myrtle and olive was examined through measurements of biomass production during subcultured period in comparison to semi-solid medium culture. The results showed that both species are well adapted to growth in the bioreactor, with survival rates and quality of the crops higher than those obtained under standard culture conditions. Furthermore, the case of myrtle shoot cultures demonstrated the possibility to reduce the concentration of macro and micronutrients in the liquid medium without compromising the growth rates. In olive, only zeatin hormone ensures a good rate of proliferation, but its high cost has always penalized the olive *in vitro* culture systems. We observed that zeatin concentration reduction, from 10 µM to 5 µM, improved the growth rate when compared to the culture in semi-solid medium. In conclusion, the bioreactor Plant Form represents a valid alternative to conventional systems *in vitro* culture, resulting in a reduction of cost, labour and time for the mass propagation. Comparative investigations between semi-solid medium and bioreactor culture revealed that shoot proliferation and growth were more efficient in temporary immersion bioreactor system.