

Optimization of *in vitro* culture system for biomass and polyphenolics production in *Inula britannica* and *Sideritis scardica* Sofia 2 cultivar

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Inula britannica is used as an anti-inflammatory, anti-bacterial, anti-hepatic, and anti-tumor agent [1]. Species of the *Sideritis* genus possess anti-inflammatory, antiulcerative, antimicrobial, vulnerary, antioxidant, antispasmodic, anticonvulsant, analgesic and carminative properties [2]. *Sideritis scardica* is a Balkan endemic species traditionally employed as expectorant for the treatment of pulmonary emphysema and angina pectoris [3]. *In vitro* culture was initiated by axillary buds formation of surface sterilized stem explants of *I. britannica*, collected from its wild habitat in Bulgaria, and of *S. scardica* – from sterile germinated seeds of the commercial cultivar Sofia 2, distributed on the Bulgarian market. Vitamin and plant growth regulators (PGR) were modified in order to optimize biomass production and polyphenolics accumulation *in vitro*. In *I. britannica* long-term growth of stock cultures was achieved in PGR-free medium. Biomass and polyphenolics formation were successfully stimulated by supplementation of Gamborg vitamins and a combination of N⁶-Benzyladenine (BA) and Naphthylacetic acid. For Sofia 2 cultivar PGR-free medium resulted in a low multiplication index, has been unfavourable for long-term maintenance (over 4 weeks) and required more frequent subculture in order to avoid necrosis of explants. Addition of PGR allowed for optimization of biomass production with only slight reduction of the proportion of high molecular flavonoids as a part of total polyphenolic content.

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References:

1. Khan AL et al. (2010) *Molecules* 2010, 15, 1562-1577;
2. Gonzalez-Burgos E et al. (2011) *J Ethnopharmacol* 135: 209–225;
3. Ivancheva S, Stantcheva B (2000) *J Ethnopharmacol* 69, 165–172

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