

Sumac Sprouts: From in Vitro Seed Germination to Chemical Characterization

Authors : Leto Leandra, Guaitini Caterina, Agosti Anna, Del Vecchio Lorenzo, Guarrasi Valeria, Cirlini Martina, Chiancone Benedetta

Abstract : To the best of our knowledge, this study represents the first attempt to investigate the in vitro germination response of *Rhus coriaria* L., and its sprout chemical characterization. *Rhus coriaria* L., a species belonging to the Anacardiaceae family, is commonly called "sumac" and is cultivated, in different countries of the Mediterranean and the Middle East regions, to produce a spice with a sour taste, obtained from its dried and ground fruits. Moreover, since ancient times, many beneficial properties have been attributed to this plant that has been used, in the traditional medicine of several Asian countries, against various diseases, including liver and intestinal pathologies, ulcers and various inflammatory states. In the recent past, sumac was cultivated in the Southern regions of Italy to treat leather, but its cultivation was abandoned, and currently, sumac plants grow spontaneously in marginal areas. Recently, in Italy, the interest in this species has been growing again, thanks to its numerous properties; thus, it becomes imperative to deepen the knowledge of this plant. In this study, in order to set up an efficient in vitro seed germination protocol, sumac seeds collected from spontaneous plants grown in Sicily, an island in the South of Italy, were, firstly, subjected to different treatments, scarification (mechanical, physical and chemical), cold stratification and imbibition, to break their physical and physiological dormancy, then, treated seeds were in vitro cultured on media with different gibberellic acid (GA3) concentrations. Results showed that, without any treatment, only 5% of in vitro sown seeds germinated, while the germination percentage increased up to 19% after the mechanical scarification. A further significant improvement of germination percentages was recorded after the physical scarification, with (40.5%) or without (36.5%) 8 weeks of cold stratification, especially when seeds were sown on gibberellin enriched cultured media. Vitro-derived sumac sprouts, at different developmental stages, were chemically characterized, in terms of polyphenol and tannin content, as well as for their antioxidant activity, to evaluate this matrix as a potential novel food or as a source of bioactive compounds. Results evidenced how more developed sumac sprouts and, above all, their leaves are a wealthy source of polyphenols (78.4 GAE/g SS) and tannins (21.9 mg GAE/g SS), with marked antioxidant activity. The outcomes of this study will be of support the nursery sector and sumac growers in obtaining a higher number of plants in a shorter time; moreover, the sprout chemical characterization will contribute to the process of considering this matrix as a new source of bioactive compounds and tannins to be used in food and non-food sectors.

Keywords : bioactive compounds, germination pre-treatments, *rhus coriaria* l., tissue culture

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