J Pharmacogn Nat Prod 2016, 2:3(Suppl)
http://dx.doi.org/10.4172/2472-0992.C1.003



## TASCMAR –Tools and strategies to access original bioactive compounds from cultivation of marine invertebrates and associated symbionts

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TASCMAR is a European Commission funded project aspiring to develop new tools and strategies to overcome existing bottlenecks in the discovery and industrial exploitation of marine-derived bio-molecules (secondary metabolites and enzymes) with applications in the pharmaceutical, nutraceutical and cosmeceutical industries. Exploitation of neglected and underutilized marine invertebrates and symbionts from the mesophotic zone will be combined with innovative approaches for the cultivation and extraction of marine organisms, from lab to pilot-scale, including the construction of new biotechnological equipment. This approach will ensure the sustainable supply of biomass while promoting the production of high added value bioactive marine compounds. State-of-the-art analytical instrumentation and in-house databases will be employed for the de-replication and characterization of valuable compounds and a focused panel of *in-vitro*, cell-based, *in-ovo* and *in-vivo* bioassays, for discovering metabolites with anti-ageing and/or angiogenesis modulating activity, will guide the project's workflow to reveal the lead compounds. In addition, the catalytic potential of mesophotic symbionts and deriving enzyme candidates will be evaluated in the fine chemicals and bioremediation industries. TASCMAR will be continuously evaluated for its socioeconomic and environmental impact in order to balance industrial development and sustainable growth. The project also aims to develop higher standards for bio-prospecting in areas of rich marine biodiversity.

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## The natural phytochemical dehydroabietic acid is an anti-aging reagent that mediates the direct activation of SIRT1

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Dehydroabietic acid (DAA) is a naturally occurring diterpene resin acid of confers, such as *Pinus* species (*P. densiflora, P. sylvestris*) and grand fir (*A. grandis*), and it induces various biological actions including antimicrobial, antiulcer and cardiovascular activities. The cellular targets that mediate these actions are largely unknown yet. In this report, we suggest that DAA is an anti-aging reagent. DAA has lifespan extension effects in *C. elegans*, prevents lipofuscin accumulation and prevents collagen secretion in human dermal fibroblasts. We found that these anti-aging effects are primarily mediated by SIRT1 activation. Lifespan extension effects by DAA were ameliorated in sir-2.1 mutants and SIRT1 protein expression was increased, resulting in the deacetylation of SIRT1 target protein PGC-1α. Moreover, DAA binds directly to the SIRT1 protein independent of the SIRT1 substrate NAD+ levels. Through a molecular docking study, we also propose a binding model for DAA-SIRT1. Taken together, our results demonstrate that the anti-aging effects are the first identified biological property of DAA and that the direct activation of SIRT1 enzymatic activity suggests the potential use of this natural diterpene or related compounds in age-related diseases or as a preventive reagent against the aging process.

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