Development bioinformatics tools for wine fermentation, wine quality and wine health - DTU Orbit (25/11/2018)

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A diverse, complex, and poorly characterised community of microorganisms lies at the heart of the wine – an industry worth over €220 billion globally. These microorganisms play key roles at all stages of the viniculture and vinification processes, from helping the plants access nutrients from the soil, driving the plants’ health through protection against pathogens, to the fermentation process that transforms the must into wine with its complex array of aromas and flavours. Given this importance, an improved understanding of the microbial community and its interplay will have significant effects on the wine industry. In recent years, the 'Next Generation' DNA sequencing revolution has revolutionised many areas of biology, including microbiology, in particular through conferring the ability to characterise microbes on the deep community scale, through both 'shotgun' and 'deep amplicon' sequencing approaches. To exploit the power of such approaches for the benefit of the wine industry, we propose MICROWINE, a 15 ESR Marie Curie Actions European Training Network. The network is constructed as a close collaboration between industry and academic partners, around the theme of the role of the microbial community in the wine production process. Through combining microbial metagenomic sequencing with powerful computation analyses, with metadata generated using techniques such as metabolomics and geochemistry, we will study the action of microbes from the plant protection and nutrition, through to wine fermentation process, using samples collected from both Europe and beyond. We will further train the ESRs within a wide range of relevant disciplines, and maximise information transfer through multiple host and academic-industry cosupervision and secondments. In this way, we anticipate contributing to the strength and scientific progress of the wine industry through training of a cohort of leading, interdisciplinary and tightly interconnected scientists at the forefront of modern microbiological, genomic, computational and related techniques.

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