

ADAPT

Project title: Active Dihydrochalcones from APple Trees: towards added value to local apple production

Acronym: **ADAPT**

Project duration: 24 months – Start date: 01/06/2018 End date: 31/05/2020

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Summary.

Apples have a good image, often associated to an “healthy” fruit. Apple trees (*Malus x domestica* Brokh.) are widely cultivated all around the world, whereas apple is the first fruit produced in Europe. In France, the “Région des Pays de la Loire” appears as the second national producer of apples, apple trees being the main cultivated surfaces in this area.

Natural products have a long history of providing important medicinal agents or inspiring the development of new drugs. Here our project ADAPT is focused on dihydrochalcones (DHCs), a class of secondary metabolites characteristically produced by apple trees with a limited occurrence in the rest of the plant kingdom and generally described as a class of minor flavonoids. Nevertheless, some recent studies have shown that some DHCs exhibit significant pharmacological effects (anti-inflammatory, anti-tumoral). Unfortunately, as the DHCs are mainly found in the peel, seeds and core of the fruit (and in leaves), most of the apple DHCs are not ingested when eating an apple, especially if fruits are eaten peeled. ADAPT aims first at identifying relevant biological targets for DHCs through a virtual (*i.e.* computer-aided) screening approach. The CMBI, our Austrian partner, will be in charge of this pivotal step of the project. A close collaboration along with fruitful discussions will help modeling chemists and organic chemists to go through the second stage dedicated to the *in silico* optimization of the previously identified hits and to the rankings of the potential ligands based on their calculated affinity with the biological targets. IRHS-ResPom will provide selected apple trees leaves from a local production. SONAS will extract and purify natural DHCs from this renewable natural source to use them as starting materials for the chemical synthesis. SONAS will then embark on the (semi-)synthesis of the most promising compounds. Biological evaluation will then be conducted with all the (semi-)synthesized structures by our Austrian partner. ADAPT will thus increase the knowledge associated to dihydrochalcones and their biological activities. Previously reported studies on the significant but under-exploited pharmacological profile of this class of secondary metabolites and the expertise of the partners in medicinal chemistry, more specifically in the development of new anti-inflammatory agents, give to ADAPT a great rate of success. Results obtained during this project will be undoubtedly published in high impact factor journals in the field of natural products chemistry and pharmacology. SONAS and IRHS-ResPom will particularly pay attention to every opportunity to patent data that could contribute to enhance the added value of a local production such as apples and other apples derived products