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Polyphenols as biogenic additives and value added products

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Poor aqueous solubility is a common obstacle to delivering bioactive compounds. Numerous examples are known for influencing the absorption by natural adjuvant compounds. Bioavailability of compounds in a plant extract might be influenced by other components in the mixture which are not active themselves but can act to improve the stability, solubility, or the absorption of active compounds. Hypericin, a major active ingredient in St. John's wort, is a compound which is practically insoluble in water. Our search for natural solubilizers revealed that quercitrin and isoquercitrin, but not hyperoside, quercetin or rutin increased the uptake of hypericin in Caco-2 cells. Higher amounts of hypericin were recovered after cell extraction when hypericin was given in combination with various flavonoids [1]. Biogenic additives based on flavonoid structures may therefore provide an interesting strategy to address formulation problems of biopharmaceutically challenging drugs. From a toxicological standpoint flavonoids are ideal excipients since they are biodegradable. In addition, flavonoids are moderately water soluble and cannot cross lipid membranes in the intestine. Thus, their bioavailability is very low. Further, flavonoids are extensively metabolized by gut bacteria in the colon [2]. Many health benefits of flavonoids have been reported, however, the active compounds may not be the native polyphenols found in food, they are more likely to be metabolites [3]. These considerations make the development of a value added polyphenol based dietary supplement for oral intake difficult. To circumvent issues related to the low oral bioavailability of polyphenols a topical application seems to be the preferential form of treatment. However, the industrial development and utilization of flavonoids for medicinal uses are limited because their chemical synthesis is extremely complex and expensive. Using the example of rose oil distillation waste water a promising biotechnology approach will be presented for the recovery and biological activity of high value added flavonoid based 'bioproducts' [4,5].

References

[1] Verjee S et al. *Planta Med* 2015; 81:1111-1120.
[2] Mosele JI et al. *Molecules* 2015; 20:17429-17468.
[3] Dall'Asta M et al. *Nutrition* 2012; 28:197-203.
[4] Solimine J et al. *Fitoterapia* 2016; 108:13-19
[5] Walgren RA et al. *J Pharmacol Exp Ther* 2000; 294:837-843.