

RESEARCHPROJECT



Evaluation of antioxidant capacity of individual compounds by a micro-fluidique tool (AntioxDevice)

Partner(s) Financial partner : HES-SO - Field "Engineering and architecture"
Thematic programme: "Healthfood"

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Description Today, foods are not only consumed to cover nutritional needs, but also in order to gain benefit from their health-promoting effects. Antioxidant activity is believed to play a predominant role in the beneficial effect of food compounds. It follows that for industrial food processing it is important to be assess how processes such as pasteurization, drying and aging, influence the antioxidant profile. Normally, antioxidants are analysed by a combination of chromatography (HPLC) to determine the concentration of compounds followed by a photometric spotting-plate analysis to determine antioxidant capacity. This approach is badly suited to assess antioxidant profile changes in industrial food processing.

The project's objective is to combine both approaches into a system that for one sample injection fingerprints the bioactive compounds and assesses the antioxidant activities of individual compounds at the same time. This is done by a plug-in device that can be fitted to different HPLC instruments or stand-alone with FIA systems. The device is based on a microfluidic chip that splits the HPLC eluent stream between three anti-oxidant analysis modules operating in parallel with conventional UV/Vis fluorescence detector. Two modules will assay antiradical scavenging activity (DPPH[•] and ABTS^{•+} (TEAC assay)) and the third total antioxidant capacity (ferric reducing antioxidant power FRAP). The results enable assessment of the compounds responsible for the antioxidant capacity of analysed food sample. This knowledge helps to select the most promising marker compounds for tracing antioxidant evolution from farm to fork through the food chain. The potential for rapid raw material screening and process optimization will ensure the project will have a significant impact in the food industry. Thereby, giving a strong motivation for commercialization by analytical companies.

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