**Aim**
To produce a dry antioxidant powder from onion sample using pressurized hot water extraction (PHWE) coupled on-line to supercritical CO$_2$ (scCO$_2$) particle formation.

**Background**
Water is a sustainable solvent, and when used at higher temperature and pressure, fast and clean extraction can be obtained. The main drawback is that dilute aqueous extracts are produced, and concentration of the extract by for instance evaporation or freeze drying, is energy demanding.

**Equipment**
Equipment has been designed combining PHWE with drying “on-the-fly” by mixing the flowing extract solution with scCO$_2$ in a small Tee-connection, which has an attached pressure restrictor that sprays the solution into an expansion chamber [1-3]. The resulting aerosol is instantaneously dried by hot N$_2$ in the expansion chamber, and particles are collected on a filter.

**Extraction**
A PHWE method has been developed using water as a solvent at 120 °C and 80 bar, 5 min static plus 40 min dynamic extraction, at a flow rate of 0.3 mL/min, resulting in a quantitative extraction of quercetin species from an onion sample of 2 g.

**Particle formation**
Obtained particles were investigated by HPLC with UV/Vis detection, scanning electron microscopy (SEM), and thermogravimetric analysis. Onion extract produced by PHWE was also freeze dried and used as a control.

**Conclusions**
The developed WEPO process offers on-line extraction and particle formation of antioxidants from plants using only water and scCO$_2$ as solvents. Dry spherical particles of high antioxidant capacity have been obtained from onion.

**References**