

What is supercritical fluid extraction?

Any solvent or substance at beyond critical temperature and pressure.

The solvent behave like liquid (dissolve the materials) and gas (diffuse through solid).

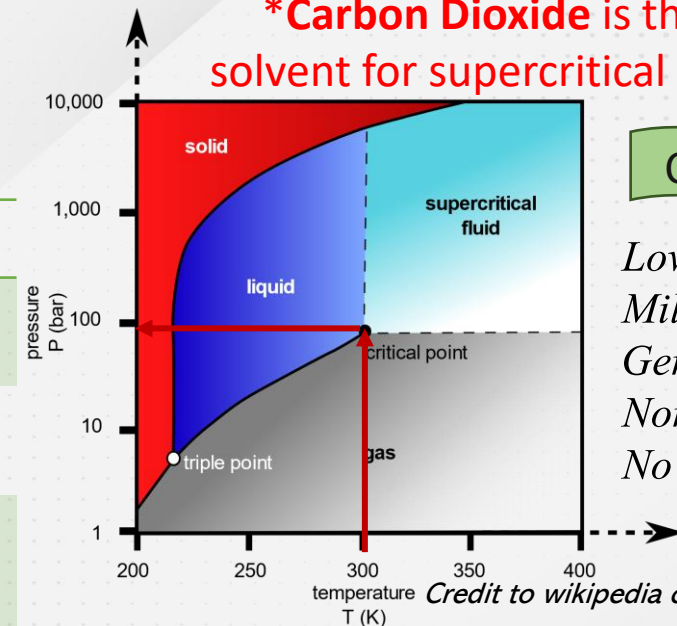
Important parameters in supercritical fluid extraction

Parameters	Response
Temperature	-Increase the vapour pressure of solute -Increase mass transfer coefficient
Pressure	-Density of solvent increase (solvent power) -Increase extraction rate
Flowrate	-High number of solvent molecules and higher intermolecular interaction between solvent and solute -diminish the external mass transfer resistance
Particle Size	-Ideal size between 250 to 1800 μm -break cell wall of the plant matrices
Modifier	-Ethanol normally used due to low toxicity -1 to 15 v/v% amount used -Increase solvent polarity to extract more polar compound
Extraction Time	-2 to 4 hours extraction

Solvents for supercritical fluid extraction

Carbon Dioxide Methanol Ethane
Ethanol Water Methane

***Carbon Dioxide is the most ideal solvent for supercritical fluid extraction**



Carbon dioxide, CO₂

Low critical temperature, 31.1 °C
Mild critical pressure, 7.38 MPa
Generally Recognized as Safe (GRAS)
Non-toxic, Non-flammable
No solvent residue

Applications of supercritical fluid extraction in food industry

Coffee beans - Decaffeinated

Plant – Essential oil

Tea – Flavour ingredient

Fish – Fish oil, DHA

Natural products – Bioactive compounds