

# SUPERCRITICAL FLUID EXTRACTION AS A POTENTIAL EXTRACTION TECHNIQUE FOR THE FOOD INDUSTRY

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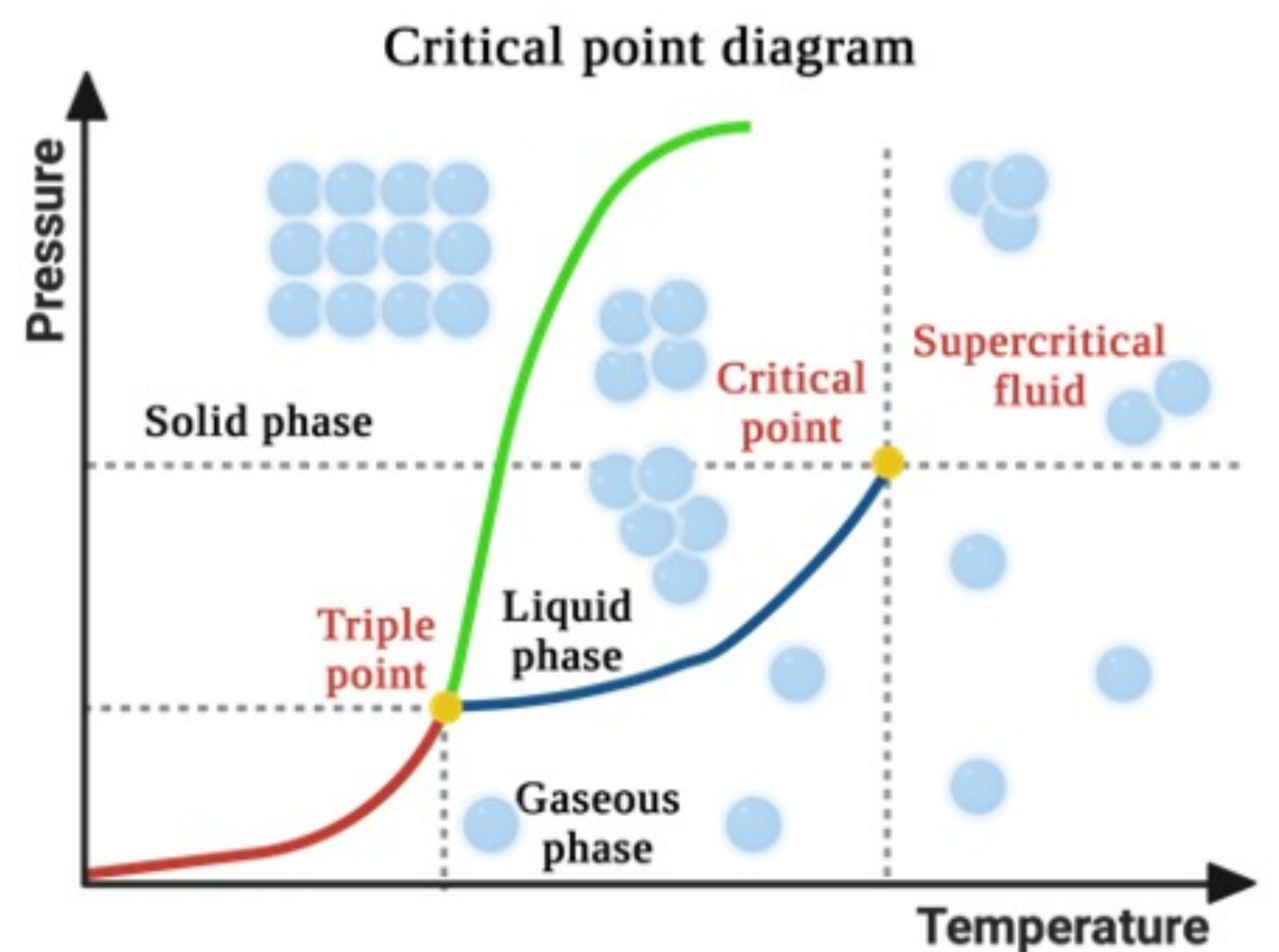
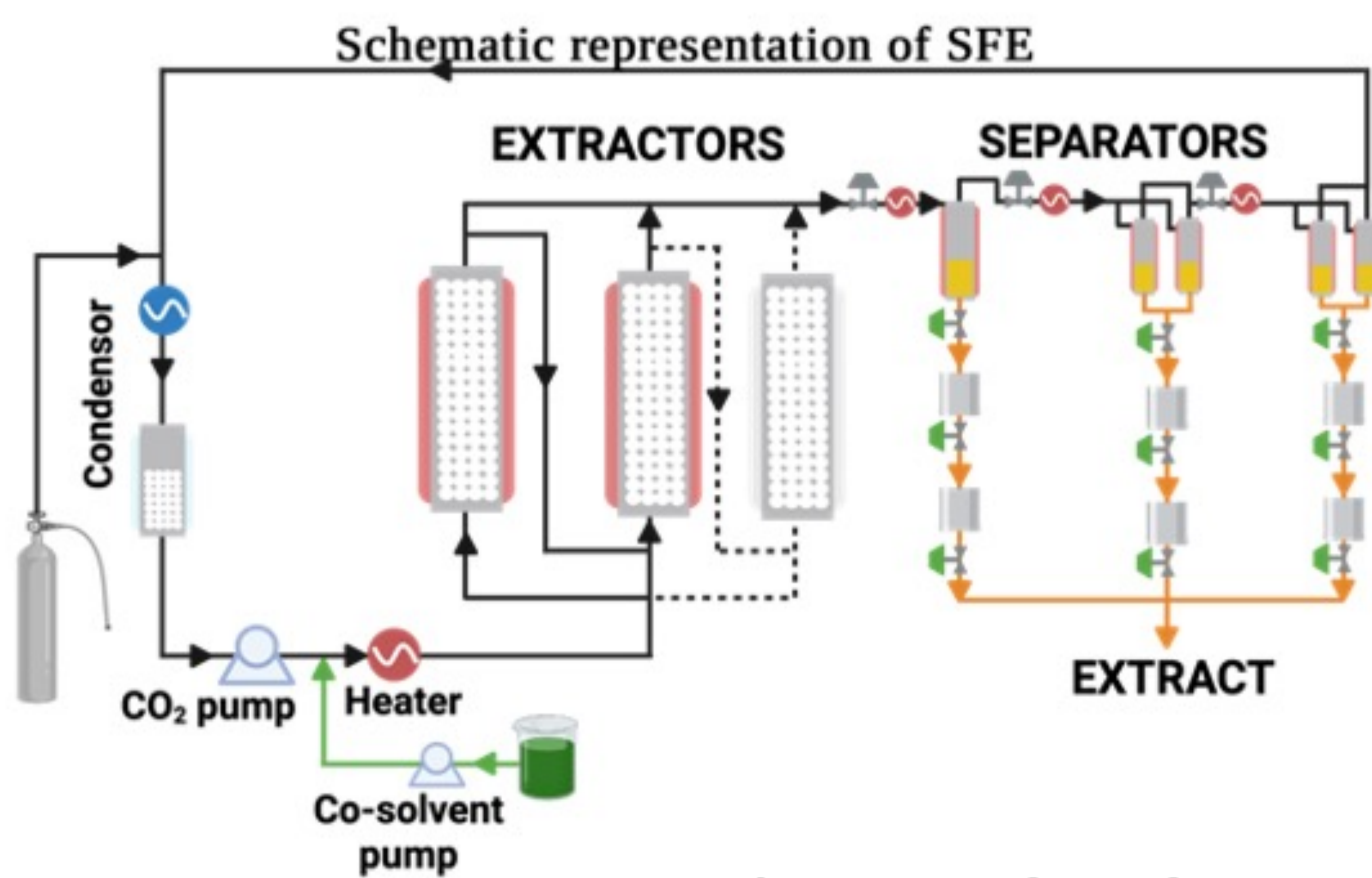
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## INTRODUCING SUPERCRITICAL FLUID EXTRACTION

Supercritical fluid extraction (SFE) is a novel extraction technique developed in both laboratories and industries for the past 60 years. In this extraction technique, three steps are involved: first, a dissolving/resolving process of the analytes takes place; then, there is a sweeping of the analytes; and finally, the analytes are trapped.

When SFE is applied, slightly changes in temperature or pressure leads to large changes in the fluids' density since the solvent is performing near its critical point. Thus, SFE selectivity depends on the density of the solvent.

For the extraction of the target analytes, a solvent above its critical point is used, performing as a **supercritical fluid (SCF)**. A SCF is any substance that is above both temperature and pressure critical point, having both gas and liquid characteristics. In this way, solvents used have liquid-like densities while viscosity is gas-like and diffusivity is around two order of magnitude higher than liquids. In fact, SCF can diffuse through solid matrices as gases and dissolves compounds as liquids.

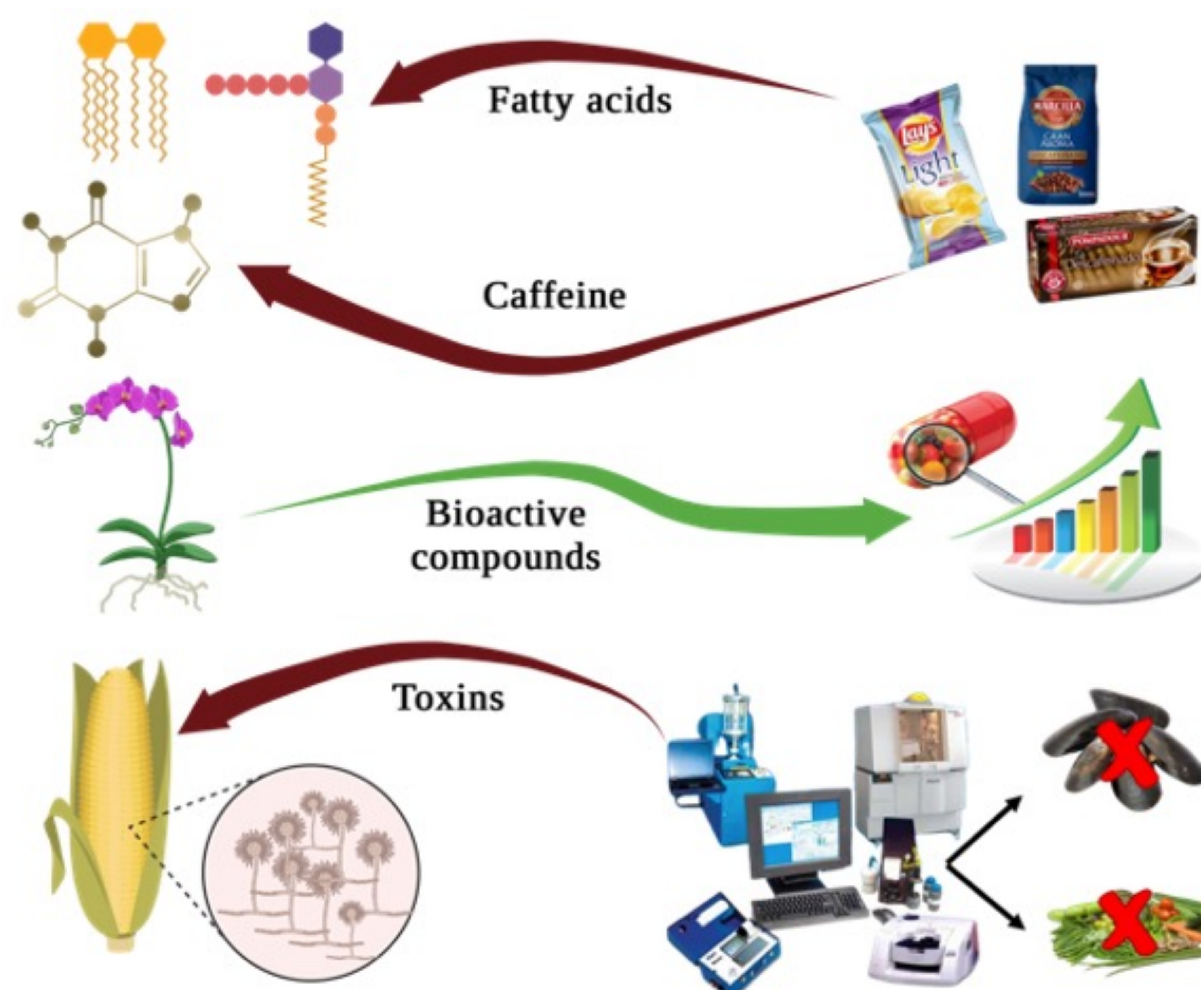


## SUPERCRITICAL FLUID EXTRACTION IN THE FOOD INDUSTRY

The food sector has showed interest in this extraction technique mainly since 2016. Despite the increasing interest of the food sector in SFE, there is a notable delay between research and industrial applications, since there is a need to prove this technology efficiency, validate the process, include the products in the novel foods regulations, as well as confirm the nutritional profile, toxicity, allergenic potential and presence of the contaminants in the products obtained.

Nowadays, SFE is applied in the food industry for:

- The **elimination** of compounds whether to improve its nutritional profile (e.g., fatty acids) or to offer a specific product (e.g., decaffeinated coffee).
- The **incorporation** of compounds to obtain high-value products (e.g., enriched products)
- The **elimination** of compounds that are hazardous for the human health (e.g., toxins)



## CONCLUSIONS

- 1 SFE is a green extraction technique with **potential application in the food industry** for both elimination and incorporation of compounds.
- 2 The **economic feasibility and efficiency** of SFE in the industrial scale **must be studied**.

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