Supercritical Fluid Extraction of Allicin

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Garlic and garlic extracts have numerous therapeutical properties that result from its organosulfuric compounds, notably allicin. The first primary objective of this experiment was to construct a supercritical fluid extraction system capable of extracting allicin from garlic. The second primary objective was to determine the impact variations in temperature and pressure had upon the extraction capabilities of the system. Supercritical fluid CO2 was produced by compacting dry ice into a pressure vessel and heating it until it reaches a supercritical state. The final temperature and pressure of the supercritical CO2 was recorded, and the resulting allicin extract for each pressure/temperature variation was recorded. Increasing the pressure of the SCF from 1230 Psi to 3240 Psi increased the percent yield by 0.0936%. However, considering that the percent yield appeared to vary quadratically with the pressure of the SCF, slightly higher pressures could potentially yield even higher percent yields. Increasing the temperature of the SCF from 34.1°C to 70.0°C increased the percent yield by 0.0090%. Since the percent yield appeared to vary linearly with the temperature of the SCF, further increasing temperature will not have significant impacts on the percent yield. Thus, increasing pressure can significantly increase the percent yield, while increasing temperature will also slightly increase the percent yield. When designing new supercritical fluid extraction systems for industrial applications, it may be more efficient to create a high-pressure environment over a high-temperature environment.

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