Optimization of SCCO2 extraction of zerumbone from Zingiber zerumbet (L) Smith.

ABSTRACT

Response surface methodology (RSM) was applied to optimize the variables affecting the Supercritical carbon dioxide (SC-CO_2) extraction of non-polar compounds from Zingiber zerumbet using the Box-Behnken design (BBD). Dependent variables were the percentage of the chemical components in the ginger vis a vis α-caryophyllene (y_1), camphene (y_2), and zerumbone (2,6,10-cycloundecatrien-1-one, 2,6,9,9-tetramethyl-) (y_3). Pressure was the most significant parameter affecting the amount of each compound extracted. When temperature was kept constant and pressure was increased, all of the dependent variables increased concomitantly. Since pressure and temperature are two of the major influential factors in the extraction using SC-CO_2, any combination of these two parameters could be selected to ascertain the optimum combination for a particular compound in the extract. Extraction at 30°C and 55MPa with total amount of 30g of CO_2 used was found to maximize all the responses.

Keyword: Supercritical carbon dioxide; Zingiber zerumbet; Zerumbone; Response surface methodology; Box-Behnken design.