Determination of influential factors during enzymatic extraction of ginger oil using immobile isolated cow rumen enzymes

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With respect to its multiple uses, such as in cosmetics, foods, aromatherapy and the pharmaceutical industry, ginger oil has a high value in the world market. The ginger oil obtained from conventional extraction usually has low zingiberene content, possibly due to thermal degradation. To overcome this problem, an alternative ginger oil production process by enzymatic extraction using cow rumen enzymes is investigated. The aim of the research is to obtain the optimum conditions for zingiberene-rich ginger oil extraction by using immobile isolated cow rumen enzyme. The experiments were conducted under varying temperatures (40–60oC), enzyme-substrate ratios (0.05–0.2) and extraction times (1–5 days). The microwave assisted distillation was conducted for 90 minute to separate the ginger oil from its mixture. The zingiberene content in the oil was measured by GC analysis. The most influential factor in the enzymatic extraction of ginger oil was determined by experimental design 23. Analysis of the results shows that for the extraction with a rumen ratio of 1:5 at 60oC, the most influential factor was the extraction time, in this case 5 days, and ginger oil was obtained with zingiberene contents of 21.56% and 26.28% at pH 5 and pH 4 respectively. Prolonging the extraction time to 6 days with pH 5 caused a decrease in zingiberene content to 20.76%.