Extraction of essential oil from cloves using steam and hydro distillation

Ch. Chilev[1], D. Peshev[1], N. Lazarova[2]

1 Department of Chemical Engineering, University of Chemical Technology and Metallurgy

2 Department of Biotechnology, University of Chemical Technology and Metallurgy

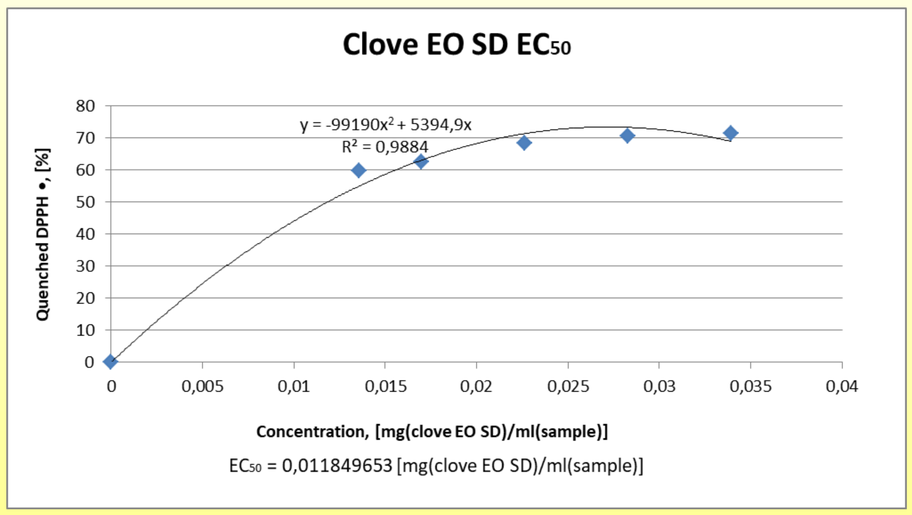
Steam distillation

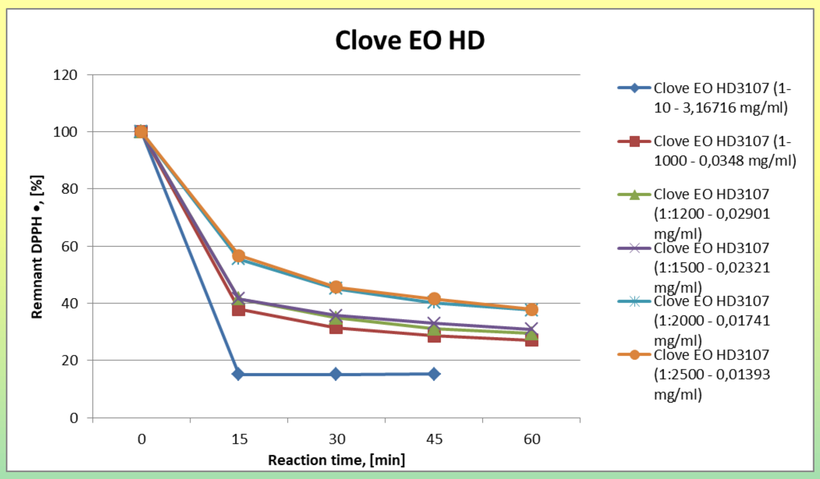
The goal of this study is to isolate the contained in the cloves essential oil using either steam distillation or hydro-distillation. Both techniques are commonly used in the essential oil industry. The experiments and detailed procedures of hydro- and steam distillation are developed and presented. The optimal clove-to-distillate ratio [g(cloves)/ml(obtained distillate)] with respect to total oil production were determined. The ratio was varied between 0.125÷0.2 g/ml for hydro-distillation and 0.4÷0.6 g/ml for stem-distillation, respectively. It was found that the optimal ratio clove-to-distillate of 0.167 g/ml for hydro and 0.6 g/ml for stem-distillation were obtained. The antioxidant activity of the samples was also analyzed by the DPPH free radical method where a gallic acid solution was used as a reference.

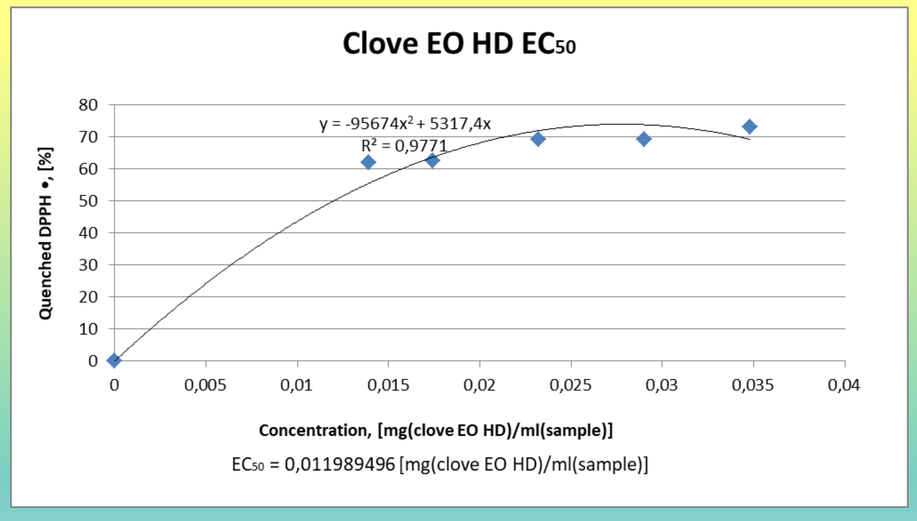
Hydro distillation

Clove-to-distillate ratio [g(cloves)/ml(obtained distillate)]

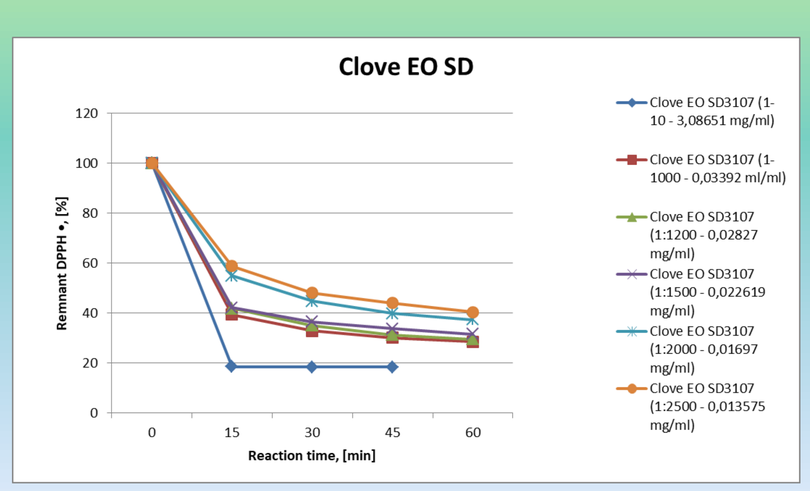
Type of Distillation	Clove	Distillate	Clove-to-distillate ratio	% mass	$\rho\left[g/cm^3\right]$
Hydro	50g	250	0,2	7,302	1,0541
Hydro	50g	300	0,167	11,714	1,0525
Hydro	50g	400	0,125	10,62	1,0631
Steam	100g	400	0,4	2,331	1,0568
Steam	100g	600	0,6	4,986	1,0575







Kinetic of antioxidant activity



All samples exhibit high antioxidant activity $EC_{50} < 0{,}05$

Acknowledgements

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