1.4 TERMODINÁMICA

DETERMINATION OF VAPOUR PRESSURE FOR ORGANIC COMPOUNDS BY THE METHOD OF GAS CHROMATOGRAPHY

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ABSTRACT

The knowledge of the vapour pressure of natural substances, as well as their critical properties are of great interest for the application of supercritical extraction, and necessary to obtain the modelling of thermodynamic equilibrium of phases. The scarcity of experimental data for these substances results from their low volatility and easy degradation at low temperatures, therefore, requiring the use of special methods. In this work, the vapour pressure of organic compounds have been determined with a method that is based on the retention time in gas chromatography, A column with non-polar stationary phase was used,, under isothermal conditions, with a flame ionisation detector. This method has the advantages of giving faster analysis, uses small samples, and shows good reproducibility. For the determination of the vapour pressure of these natural compounds, the normal boiling or fusion temperature, and the vapour pressure of the homologous series of these compounds is required. The objective of this work was develop a systematic for the calculation of the vapor pressure of natural compounds, through the GC method, using the retention times. This GC method is based on the use of a non-polar stationary phase and isothermal condition such that a compound's GC retention time is related directly to its vapour pressure. The retention time of tests compounds are related with the retention times of references compounds (compounds homologous), has been the Clapeyron's equation as a theorical basis. However, as the homologous of the natural substances are also difficult to be found in the literature will be used compounds with the same chemical groups that the molecules of the studied natural substances. In this paper, the experimental data showed that the GC method yields equally good results in determining equilibrium vapour pressures of more polar compounds: Curcumin and Nicotine. The obtained results were compared with data the experimental of the literature and in the case of the curcumin, were compared with the data predicted by method contribution group UNIFAC and of the 2nd coefficient virial.