

CHIRAL PROCESS MONITORING USING FOURIER TRANSFORM MICROWAVE SPECTROSCOPY

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We present the application of Fourier transform microwave (FTMW) spectroscopy in monitoring the chiral purity of components in a reaction mixture. This is of particular interest due to the increasing use of continuous pharmaceutical manufacturing processes, in which a number of attributes (including the chiral purity of the product) can change on short time scales. Therefore, new techniques that can accomplish this measurement rapidly are desired. The excellent specificity of FTMW spectroscopy, coupled with newly developed techniques for measuring enantiomeric excess in a mixture, have motivated this work.

In collaboration with B. Frank Gupton (Virginia Commonwealth University), we are testing this application first with the synthesis of artemisinin. Artemisinin, a common drug for malaria treatment, is of high global health interest and subject to supply shortages, and therefore a strong candidate for continuous manufacturing. It also has moderately high molecular weight (282 amu) and seven chiral centers, making it a good candidate to test the capabilities of FTMW spectroscopy. Using a miniature cavity-enhanced FTMW spectrometer design,^a we aim to demonstrate selective component quantification in the reaction mixture. Future work that will be needed to fully realize this application will be discussed.

^aR.D. Suenram, J.U. Grabow, A.Zuban, and I.Leonov, *Rev. Sci. Instrum.* 70, 2127 (1999).