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## **Rapid instrumental detection and quantification of counterfeit pharmaceutical tablet formulations: Is ATR-FTIR an option?**

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From therapeutic to lifestyle medicines, the counterfeiting of medicines has been on the rise in recent times. Estimates indicate that about 10% of medicines worldwide are counterfeits with much higher figures in developing countries. Currently, the rapid screening of medicines is a challenge leaving many patients at risk. This study considered the potential use of Attenuated Total Reflectance-Fourier Transform Infrared Spectroscopy (ATR-FTIR) for rapid quantitative analysis of tablet formulations. ATR-FTIR requires minimal sample preparation as it only requires crushing the tablet before analysis unlike the conventional methods where time-consuming solvent extraction of the Active Pharmaceutical Ingredient (API) is necessary. Reference spectra for pure API and excipients were recorded as part of a reference library for identification purposes. Preliminary studies were carried out with tablets having a single API (Paracetamol). API could be identified down to 5% w/w of the tablet. Tablet samples with multiple APIs were also identified. For quantitative analysis, IR spectra of standard mixtures of Paracetamol in excipient were recorded and used in calibration. Paracetamol tablets from Europe, Africa and Southeast Asia were then quantified based on calibration data. Quantification data for selected characteristic peak areas for each API/excipient mixture was linear. Results were in the expected range with conventional UV analysis confirming data obtained. Therefore, ATR-FTIR can be applied in the rapid identification and quantification of tablet formulations. The faster sampling time, simplicity and portability of ATR-FTIR makes it valuable in the authentication of medicines especially in developing countries where facilities are not readily available.

### **Biography**

John Ogwu completed his undergraduate degree in Biochemistry from the University of Jos, Plateau State, Nigeria and an MSc with distinction in Advanced Biomedical Science (Chemical Pathology) from De Montfort University Leicester, United Kingdom. He is currently a Doctoral research student in the School of Pharmacy, Faculty of Health and Life Sciences, De Montfort University Leicester, UK. His research under the supervision of Sangeeta Tanna and Graham Lawson is titled: 'Rapid Instrumental Identification of Counterfeit Medicines'.

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