

Raman spectrometry for pharmaceutical water solutions analysis

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Certification, counterfeit revealing, raw material inspection and so on are tasks related to drug solutions identification. The problem in this case is to perform it routinely and during short time as defined by the controlling authorities.

Chromato-mass-spectrometry does not allow practically to perform the identification routinely for the complexity of the method itself, lack of portable spectrometer modification, required sample preparation as well as the need of a highly qualified operator. Chromato-mass-spectrometry analysis requires as well ampoules opening that is generally forbidden without the manufacture's permission.

Raman spectrometry does not have these drawbacks being a rapidly expanding non-destructive method for solid and liquid samples analysis. Raman spectroscopy allows measurements of liquid and powder substances through a transparent or semi-transparent package without its destruction, the identification of pure substances and mixes in a matter of seconds. The main problem though about quantitative Raman analysis of water solutions with portable setup is the detection of water itself.

We report on experimental results of Raman spectra analysis of pharmaceutical water solutions with the concentration of about one percent with unprecedented accuracy in an intact ampoule using a specially developed portable Raman spectrometer. The investigation of water Raman band depending on a pH-value, the luminescence and Raman scattering from a glass package, the analyte spectra chemical shift in water are performed in order to archive the mentioned characteristics.

In conclusion a new technique is given for the distinguishing between different medicines in water solutions and following calculation of the concentration of the main and additional components. This technique was successfully tested by Russian federal service of surveillance in healthcare and proved all the mentioned characteristics.

