# Application of the compact mid-infrared spectrometer (MIR) for classification of lamivudine and zidovudine tablets

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## Introduction

The Acquired Immunodeficiency Syndrome (AIDS) is a disease caused by the HIV virus, which attacks the immune system of the patient by destructing the white blood cells. Today, the disease affects nearly 781 thousand people in Brazil and approximately 400 thousand people are being treated with antiretroviral drug that is mainly produced by FURP (Foundation for the Popular Medicine).[1] Aiming to improve the production process it was suggested that a mid-infrared analysis were applied between the steps of the process: the first step is the mixture of the active principle as a powder; the second is the compression of that powder with 1% of excipient; and the third and last is the coating process.

## Results and Discussion

In the present study 10 replicates of each of the following samples were analyzed: the mixture of active principles (Red spectrum on Figure 1); the non-coated tablet (Blue spectrum on Figure 1); and the coated tablet (Green spectrum on Figure 1). These samples were analyzed on the Agilent FTIR Cary 630 spectrometer. The absorption spectrum was collected on the spectral region of 4000-650cm$^{-1}$ and resolution of 4cm$^{-1}$ using the diamond attenuated total reflection (ATR) accessory. The overlap spectrum are showed in *Figure 1*.
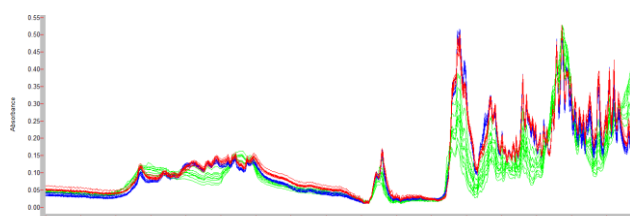


**Figure 1.** Spectrum of the tablets samples.

Of all the Exploratory Data Analysis, the main chemometric tool used for classification of infrared spectrum is the Principal Component Analysis. This analysis were made on the Statistica software and the result is disposed in *Figure 2* and it can be

evidenced the spacing and the differentiation between the different groups of samples.
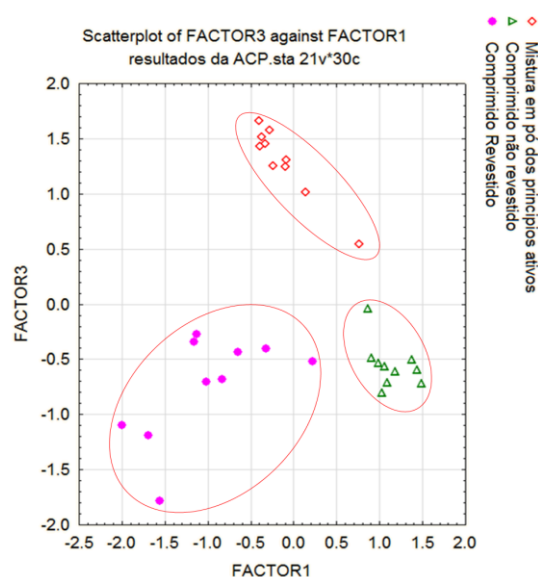


**Figure 2.** PCA graph.

The PCA showed above can explain 98.2% of the experiment samples.

## Conclusion

According to these results, it can be concluded that the procedure described can be used to follow the steps of the production process and identify possible problems. The FTIR technique is fast, cheap and does not request a sample preparation step.

## Acknowledgment

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[1] MINISTÉRIO DA SAÚDE – GOV. Disponível em: < http://www.brasil.gov.br/saude/ 2014/12/ministerio-divulga-dados-sobre-aids-no-pais-nesta-segunda-1 > Acessado em 08/11/2014 as 16 h