A Chemical Evaluation of the Lamivudine Produced by Lafepe

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Introduction: Lamivudine (3TC) is a powerful anti-retroviral (anti-HIV) agent. The enantiomerically pure form has been reported as the most active one. The Pharmaceutical Laboratory of the Pernambuco State (Lafepe) is a pioneer Brazilian public company developing anti-retroviral drugs, such as anti-HIV, anti-HBV and anti-CMV, with the purpose of decreasing the treatment costs for the Health Ministry. Lafepe recently introduced the Lamivudine. A bioequivalence study has always been carried out for all the medicines introduced by Lafepe. Among the inherent factors known to affect absorption, there are the method of manufacture or compounding, the particle size, the crystal form of the drug, and the diluents and excipients used in the formulation. The achievement of a high-degree of bioavailability requires a particular attention to all production aspects and quality control that may affect the nature of the finished dosage form. The chemical evaluation of Lamivudina produced by Lafepe is reported here.

Experimental methods: The chemical equivalence was investigated by the identification and the characterization of the product by the following methods: H NMR, IV, mass spectrometry, elementary analyses and UV/VIS spectroscopy, optical rotation and melting point. The final Lafepe product was then compared to a reference product.

Results and discussion: Melting point softens at 123-125o C; the optical rotation at $[\alpha]D = 144,2^{o}$. The compound presents chemical shifts characteristics of H NMR 3.08 (1H, 4'a-H), 3.43 (1H, 4'b-H), 3.88 (2H, 2'- CH_2OH), 5.28 (1H, CH_2OH), 5.83 (1H, H-5), 6.28 (1H, 5'-H), 7.92 (1H, H-5). The H NMR spectra with $Eu(fod)_3$ suggest that this product is enantiomerically pure. The IR spectra showed characteristic group absorption for NH stretch, OH stretch, intermolecular hydrogen bonded, aliphatic C-H stretch and C=C and C=N ring stretching. The elementary analyses did not present significant differences between theoretical and practical values. The UV/VIS spectroscopy evidenced reference bands at 270 nm. Mass spectra give characteristic profile for Lamivudine.

Conclusions: This work investigated physicochemical properties of the Lamivudina 150 mg produced by Lafepe. The analyzed properties clearly showed that such a Lamivudina is equivalent to a reference product (Epivir, Glaxo 150 mg). Such studies were carried out prior to an *in vivo* bioavailability test.