THE STRUCTURAL CHARACTERIZATION OF A NEW FORM OF CLENBUTEROL (CLENBUTEROL HEMIHYDRATE) A WELL KNOWN DECONGESTANT AND BRONCHODILATOR, ALSO USED AS A PERFORMANCE-ENHANCING DRUG.

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Clenbuterol hydrochloride is an Active Pharmaceutical Ingredient usually prescribed for the treatment of respiratory diseases due to its activity as a decongestant and bronchodilator. It has also been used as a performance-enhancing drug. In the PDF-4 Organics 2012 database there are four entries for this compound. Three of them correspond to the powder diffraction patterns calculated using the crystallographic data contain in the Cambridge Structural Database (the racemic mixture: 02-060-0184, REFCODE: ACBUET; the *S* isomer: 02-089-4160, REFCODE: SAZRUH and the *R* isomer: 02-089-4161, REFCODE: SAZSAO). The PDF-4 Organics 2012 database also contains an unindexed experimental entry: 00-057-1640.

In this contribution the crystal structure, determined using single crystal X-ray diffraction techniques, and the powder diffraction data of Clenbuterol hemihydrate, $C_{12}H_{18}Cl_2N_2O\cdot 0.5H_2O$, an unreported phase, is presented. Colorless plate-shaped crystals of this material were obtained by slow evaporation of an ether solution of Clenbuterol hydrochloride previously extracted from an aqueous basic solution. The single crystal structure study reveals that this compound crystallizes in space group *C2/c* with unit cell parameters ***a*** = 16.2685(9) Å, ***b*** = 11.2647(6) Å, ***c*** = 15.8089(9) Å, β = 91.82(0)°, V = 2895.67(29) $Å^3$, Z = 4. FT-IR spectra indicates that the amino group is deprotonated (ν=3469.80 cm^{-1}, -OH stretch) compared with that obtained for the original sample (ν=3401.00 cm^{-1}, -OH stretch and ν=3351.65 cm^{-1}, 3247.06 cm^{-1} for the -NH stretch). The single crystal X-ray diffraction analysis confirms the chemical nature of the material. Two clenbuterol molecules form hydrogen bonded dimers with graph set symbol $R^2_2(10)$. Water molecules connect these dimers to other dimers to form chains approximately parallel to the **c**-axis. The thermal stability of this compound was also examined by thermal analysis (TGA and DSC). The authors thank Dr. J. Bruno-Colmenárez (INZIT) for data collection and the support of FONACIT (Grant LAB-97000821).

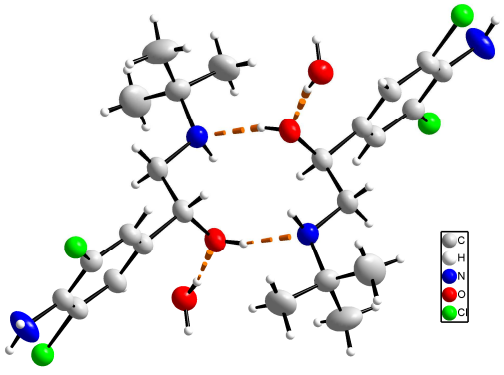

Figure 1. A view of part of the hydrogen bonding pattern in Clenbuterol·0.5H_2O.