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Chemical Sciences and Advanced Chromatography 2019: Stability-indicating HPLC method of forced degradation products of catecholamines - Leticia Coli Louvisse de Abreu - Federal University of Rio de Janeiro

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Introduction: Catecholamines (CA) are an important class of neurotransmitters in mammalian central and peripheral nervous systems. Epinephrine and norepinephrine are used in therapy combined with local anesthetic agents because of their vasoconstriction action, thus extending the duration of local anesthesia and reducing bleeding. A major problem of pharmaceutical formulations containing epinephrine or norepinephrine is the low stability of these drugs in solution. In this way, the purpose of this study was to identify and characterize CA degradation products.

Methods: Catecholamines degradation was tested under forced conditions including alkaline and acidic hydrolysis, oxidation, metallic and photolysis according ICH guidelines. The suitability of epinephrine and norepinephrine stability indicating method was evaluated by the use of a RP-18 column in isocratic elution using octane sulphonate ion pair and methanol as mobile phase. Degradation Products (DPs) resulted from hydrolysis, oxidative and metallic degradation were subjected to the liquid-liquid extraction with ethyl acetate. All those fractions were analyzed by TLC and HPLC-DAD. Isolated DPs by preparative TLC were characterized by high-resolution mass spectrometry (HRMS), 1H-NMR, 13C-NMR and infrared (IR) spectroscopy.

Results and Discussion: Forced degradation of CA led to the formation of three DPs which have never been previously reported as CA degradation products.

Conclusions: The identification and characterization of CA DPs enabled us to understand not only the drug's behavior in stressful conditions, but also its DPs formed.

Recent Publications:

1. Bicker J, Fortuna A, Alves G and Falcão A (2013) Liquid chromatographic methods for the quantification of catecholamines and their metabolites in several biological samples - A review. Analytica Chimica Acta 768:12- 34.

2. Grouzman E and Lamine F (2013) Determination of catecholamines in plasma and urine. Best Practice & Research Clinical Endocrinology & Metabolism 27(5):713-723.

3. Brown R S and Rhodus N L (2005) Epinephrine and local anesthesia revisited. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology 100(4):401-408.

4. Yagiela J A (1995) Vasoconstrictor agents for local anesthesia. Anesthesia Progress 42(3-4):116-120.

5. Grubstein B and Milano E (1992) Stabilization of epinephrine in a local anesthetic injectable solution using reduced levels of sodium metabisulfite and EDTA. Drug Development and Industrial Pharmacy 18(14):1549- 1566

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