Stability of vancomycin 50 mg/mL eye drops in low density polyethylene (LDPE) multidose eyedropper

Morgane HELESBEUX[1], Alexandre TEIXEIRA[1], Emmanuelle OLIVIER[1], Chloë DELAUNAY[1], Christine HERRENKNECHT[2], Nicolas CORMIER[1]

[1]University Hospital of Nantes, Hotel-Dieu, Department of Pharmacy

[2]Faculty of Pharmacy of Nantes, Department of general, mineral and analytical chemistry

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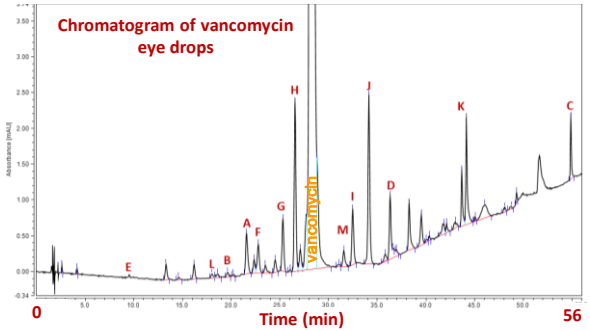
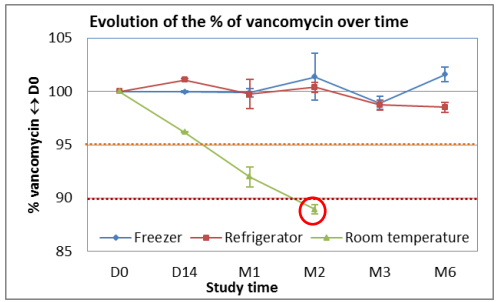
Context & Objective

Vancomycin eye drops are currently supplied in a brown glass bottle with a shelf life of 3 months in the freezer. The presence of leakage or breakage, in particular during thawing, causes loss of eye drops.

The objective of this study is to reduce these discrepancies by assaying physicochemical stability of vancomycin eye drops at 50 mg/mL in LDPE multidose eyedroppers stored in three different ways: in the freezer (-20°C), in the refrigerator (2-8°C) and at room temperature (20-25°C).





Methods

➢ Preparation of 8 mL eye drops in LDPE multidose eyedroppers in an isolateur by reconstituting vancomycin powder for solution for injection 1g (Mylan®) in 20 mL of sterile water for injection (concentration at 50 mg/ml).

Study design

TOTAL	D0	D7	D14	M1	M2	M3	M6
Freezer	6	6	6	6	6	6	6
Refrigerator		6	6	6	6	6	6
Room temp.		6	6	6	6		

6 eye drops per time
- 3 eye drops for HPLC dosage
- 3 eye drops for pH, osmolarity and visual inspection

➢ Vancomycin dosage, monitoring of the content of impurities and degradation products using HPLC/UV detector
- Column: Acquity UPLC® C18 (1,7 µm ; dimensions: 3,0 x 150 mm) at T=40°C
- Mobile phase: acetonitrile/methanol/buffer, gradient elution mode, flow 0,4 mL/min
- Detection: spectrophotometer at 280 nm
- Stability-indicating method (forced degradation study)

➢ Measurement of pH and osmolarity

➢ Visual inspection

Results

✓ In the freezer and in the refrigerator, the vancomycin concentration remained above 95% of the initial value up to M6*.
At room temperature, the vancomycin concentration remained above 90% up to M1.

✓ The pH and osmolarity remained stable in freezer and refrigerator, varying between 3.23-3.37 for pH and 38 -39 mOsm/L for osmolarity, while slight increases from 3.26 to 3.63 for the pH and 39 to 42.3 mOsm/L for the osmolarity were observed at room temperature, while remaining within the clinical tolerance threshold.

✓ All solutions remained clear and colorless during the study.

Discussion

In hospital or outpatient practice, storage in the refrigerator seems the most suitable with demonstrated stability for up to 6 months. This work should be supplemented by a microbiological stability study also including the opening of the containers, simulating the real conditions of use.

**Poster updated with data from M6 in September 2020*