# Physicochemical stability of vancomycin hydrochloride solutions in elastomeric devices at 37.5 mg/mL in 0.9% sodium chloride and dextrose 5% in water

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Virtual Congress
March 2021
N° 3PC-060
ATC code : J01

## Introduction

In some severe infections, the dose of **vancomycin** may be 60 mg/kg/day. To allow a **home care service** and a **better quality of life** for the patient after hospitalization, administration of **concentrated vancomycin solutions** in elastomeric devices should be considered.

➔ Stability of **concentrated** vancomycin solutions in 0,9% NaCl and D5W in elastomeric devices is **unknow**.

## Objective

To study the stability of vancomycin solutions at **37.5 mg/mL** diluted in **0.9% NaCl** and in **D5W**, stored in **elastomeric devices**, **protected** from light, at **37°C** after a **48-hour storage**.

0.9% NaCl : 0.9% sodium chloride  D5W : Dextrose 5% in water

## Materials and Method

### Chemical stability

**① RP-HPLC with DAD detector at 220 nm**

- **Column**: C18 LiChrospher® 12.5 cm, Ø = 4 mm, particle size = 5 µm at 30°C
- **Mobile phase**: 92% of phase A and 8% of acetonitrile

**Phase A :** Monopotassium phosphate ($KH_2PO_4$) buffer at 0.1 M, adjusted at pH 3.5 with orthophosphoric acid 85%

- **Flow rate** at 1.5 mL/min
- **Injection volume**: 10 µL

**② Validation of the method as recommended by ICH Q2(R1)**

- **Forced degradation**

| Acidic degradation | Alkaline degradation | Heat degradation |
|---|---|---|
| HCl - 1 M - 16 h | NaOH - 1 M - 1 h | 80°C - 4 h |

- **Linearity :** standard curve with 5 points : 50-150 µg/mL
- **Repeatability and intermediate precision :** 3-point measurement (50, 100, 150 µg/mL)

**③ pH measurements** (Bioblock Scientific pH meter)

**3 devices for each condition (D1 – D2 – D3)**

**Analysis times : 0, 24 and 48 hours**

### Physical stability

- **Visual examination** : change of colour, precipitation, gaz formation
- **Subvisual examination** : turbidimetry by spectrophotometry at 350, 410 and 550 nm (Safas Monaco UV m²)

## Results

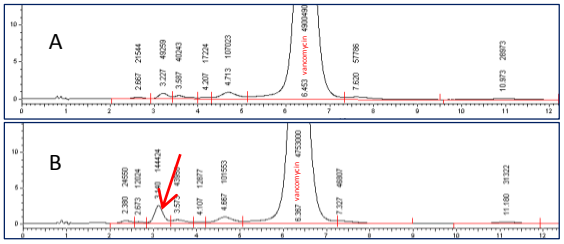
### Chemical stability

**① Validation of the method : RP-HPLC method**

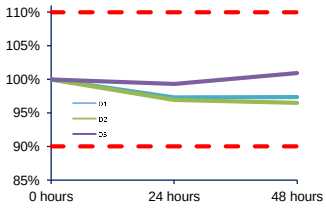
- **Linearity** : $R^2 > 0.999$
- **Repeatability** : [0.03 % - 1.65 %], **Intermediate precision** : [1.70 % - 2.48 %]
- **Retention time of vancomycin** : 6,40 min

**③ HPLC Results**

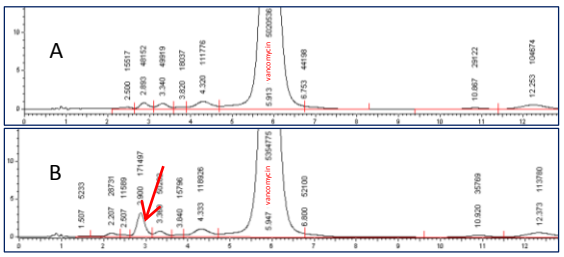
**0.9% NaCl**



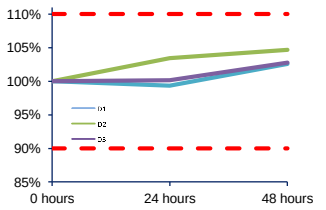

Chromatograms of solutions 37.5 mg/mL vancomycin in 0.9% NaCl after preparation (A) and after 48 hours (B) with degradation products.



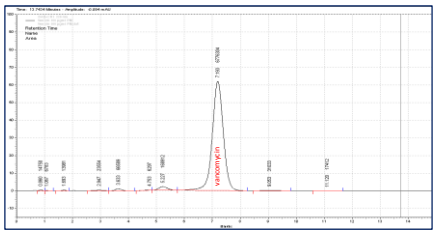

**D5W**



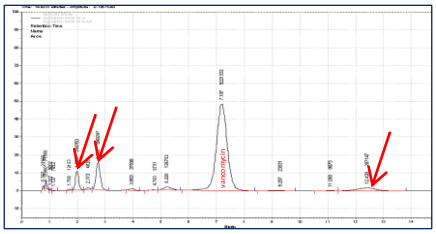

Chromatograms of 37.5 mg/mL vancomycin solutions in D5W after preparation (A) and after 48 hours (B) with degradation products.




**② Stability indicating capacity**



Chromatogram of 100 µg/mL vancomycin without stressed conditions.



Chromatogram of 100 µg/mL vancomycin after alkaline stressed conditions (NaOH 1.0 M, 1h) with degradation products.

**④ pH measurement : no modification**

### Physical stability

**Sub-visual aspect :** no significant difference

**Visual aspect :** No colour change was observed

## Conclusion

Vancomycin solutions at 37.5 mg/mL in 0.9% NaCl and D5W in elastomeric devices at 37°C, protected from light, are **stable for 48 hours**.