Stability of Imipenem in Mueller-Hinton Agar Stored at 4°C

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Received 19 June 1985/Accepted 15 August 1985

The purpose of the present study was to measure the stability of imipenem in Mueller-Hinton agar stored at 4°C over time. MICs for Staphylococcus aureus ATCC 25923, Streptococcus faecalis ATCC 29212, Escherichia coli ATCC 25922, and Pseudomonas aeruginosa ATCC 27853 were determined in triplicate daily for up to 15 days. The calculated mean time to observe a shift of one dilution in MIC endpoints was 4.33 ± 1.25 days. For routine work, imipenem agar dilution plates should be prepared within 48 to 72 h of the test.

Imipenem, a beta-lactam antimicrobial agent, has been reported to be very active against most aerobic and anaerobes (2-4). It has been found by Baron and Hindler (1) to retain 100% bioactivity for at least 3 weeks in Mueller-Hinton agar at 4°C. Nickolai et al. (6) noted that imipenem was stable at -70°C but far less stable at -10 and 4°C in microdilution MIC test trays. We report the results of a study on the stability of imipenem in Mueller-Hinton agar stored at 4°C for 2 weeks. The total concentrations of Mg²⁺ and Ca²⁺ as measured by atomic adsorption, in agar were 32 and 69 μg/ml, respectively.

Imipenem was reconstituted in 0.1 M phosphate buffer (pH 7.0) from laboratory reference standard powder (kindly provided by G. Boisvert, Merck Frosst Canada Inc., Pointe-Claire, Québec, Canada) to a final concentration of 400 μg/ml. Mueller-Hinton agar dilution plates containing imipenem at concentrations of 16, 8, 4, 2, 1, 0.5, 0.25, 0.12, 0.06, 0.03, 0.0015, and 0.007 μg/ml were prepared in a single batch. Immediately after preparation, one set was used, and the others were stored at 4°C. Every day for the next 14 days, MICs of imipenem were determined in triplicate for Escherichia coli ATCC 25922, Staphylococcus aureus ATCC 25923, Streptococcus faecalis ATCC 29212, and Pseudomonas aeruginosa ATCC 27853. The susceptibility testing was in accordance with the recommendations of the National Committee for Clinical Laboratory Standards (5). Colonies from 16- to 18-h cultures were suspended in Mueller-Hinton broth and incubated at 35°C to obtain a turbidity equivalent to one-half of the no. 1 McFarland standard and further diluted to 1:10. The plates were then inoculated with a Steers replicator (7) and incubated overnight.

The modal (MICs) are as shown in Fig. 1; the MICs of imipenem increased regularly over the 15-day period for all four tested organisms. By the end of day 14, the biological activity in each plate was sufficient to explain a shift of three dilutions in MIC endpoints. The calculated mean time to observe a shift of one dilution was 4.33 ± 1.25 days. From our data, we conclude that imipenem is unstable in Mueller-Hinton agar stored at 4°C. For routine work, imipenem agar dilution plates should be prepared within 48 to 72 h of the test.

This work was supported by a grant from Merck Frosst Canada Inc.

LITERATURE CITED

