

# Long-term survival of *Acinetobacter baumannii* in water

Svjetlana Dekić<sup>1</sup>, Jasna Hrenović<sup>1</sup>, Ivana Goić-Barišić<sup>2</sup>

<sup>1</sup> Department of Biology, Faculty of Science, University of Zagreb, 10 000 Zagreb, Croatia

<sup>2</sup> Department of Clinical Microbiology, University Hospital of Split and University of Split School of Medicine, 21000 Split, Croatia

## INTRODUCTION

*Acinetobacter baumannii* is a notorious hospital opportunistic pathogen that causes life-threatening infections worldwide. Its occurrence in intensive care units and operating rooms is extremely concerning due to its resistance to multiple disinfectants and antibiotics. Furthermore, *A. baumannii* has been proven to survive in adverse environmental conditions such as starvation, desiccation, lack of oxygen, extreme temperatures and pH regimes. The aim was to investigate *A. baumannii* long-term survival capability in order to predict the behaviour of this emerging pathogen in the environment.

## MATERIALS AND METHODS

One environmental (EF7) and one clinical (OB4138) *A. baumannii* isolate were used in the study. EF7 was recovered from effluent of the wastewater treatment plant in Zagreb, Croatia and OB4138 was isolated from bronchial aspirate of a patient suffering from hospital-acquired pneumonia at the Special Hospital for Pulmonary Diseases in Zagreb. Both isolates were carbapenem resistant. The survival of both isolates was monitored for the period of one year in commercially available spring water (SW) and diluted (1:100) nutrient broth (DNB). Isolates were incubated at 22 and 4°C at moderate oxygen saturation of 56%. Periodically, subsamples were serially diluted and inoculated onto Mueller-Hinton agar and incubated at 42°C/24h. Initial bacterial abundance was  $6.8 \pm 0.1$  log CFU/mL.

## RESULTS

Both *A. baumannii* isolates performed similar and survived for one year in tested conditions. Survival was slightly better in DNB than in SW, but without statistical significance (Fig. 1, 2). After one-year exposure to 22°C the average final abundance was  $5.0 \pm 0.2$  log CFU/mL, while at 4°C the final abundance was  $1.2 \pm 0.3$  log CFU/mL. Small translucent colony variants together with normal opaque colonies were recorded as the response to unfavourable temperature of 4°C (Fig. 3).

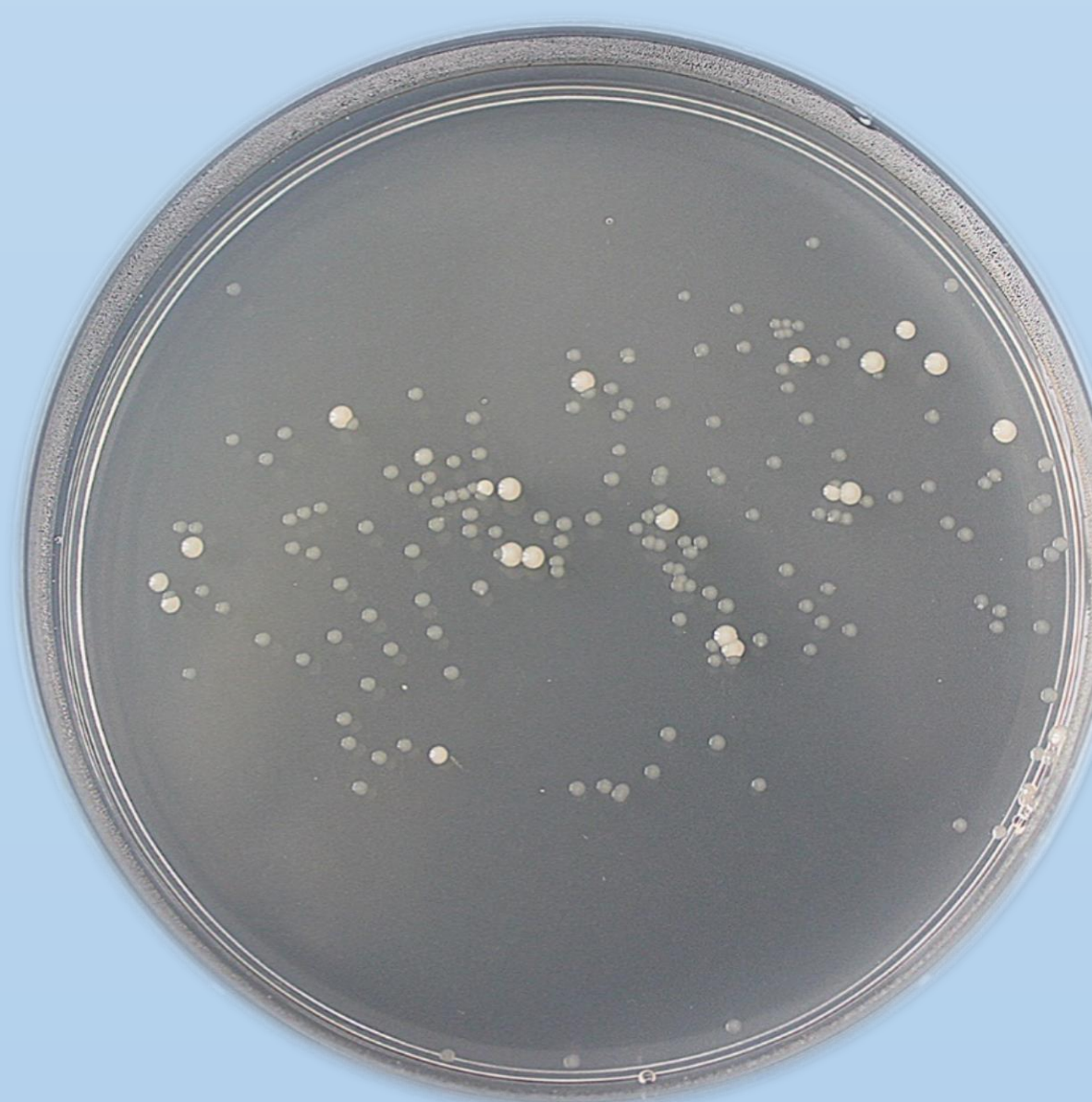


Figure 3.

Normal opaque and small translucent colonies of *A. baumannii* after the exposure to 4 °C grown on Mueller-Hinton agar

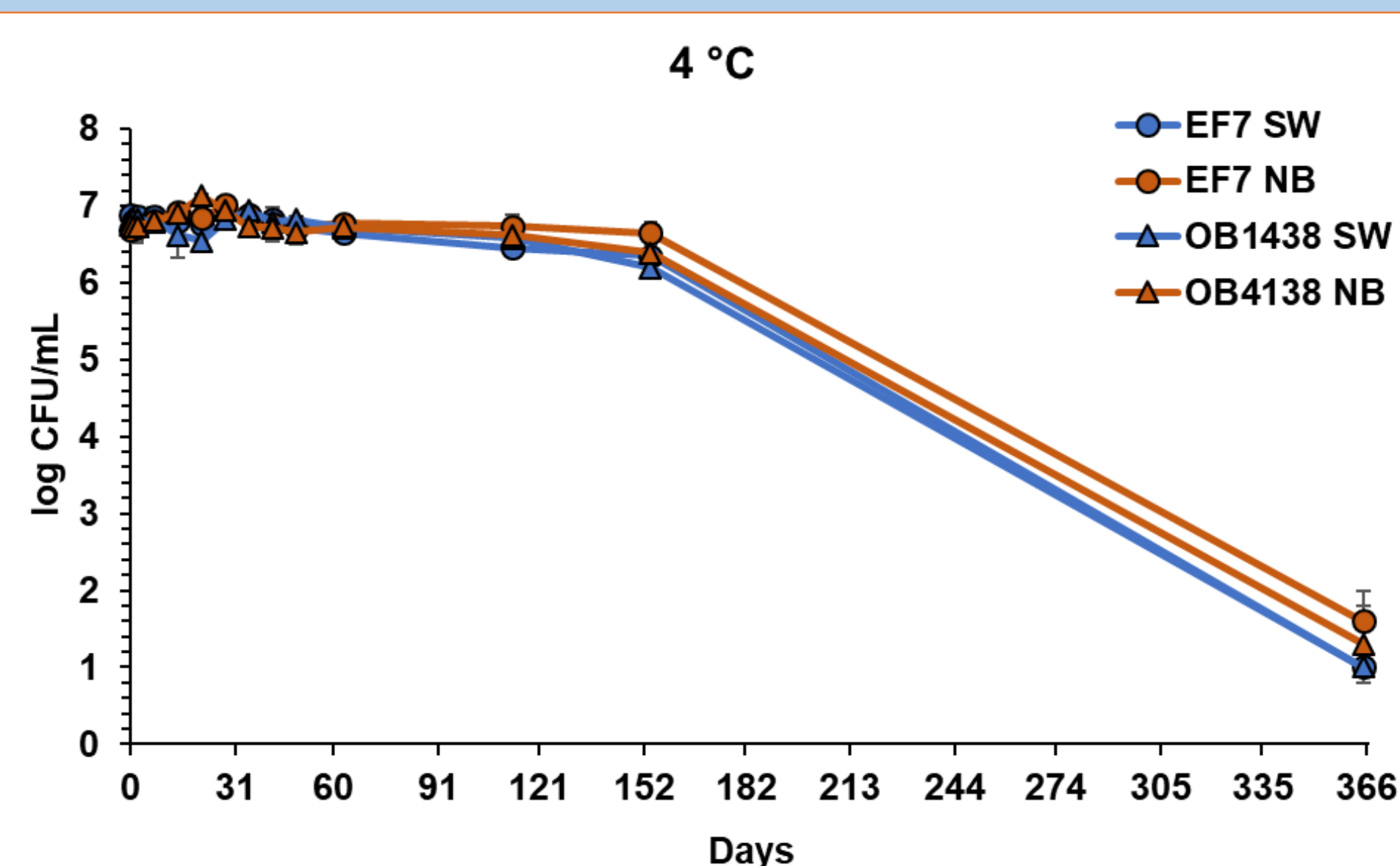


Figure 1.

Survival of *A. baumannii* isolates in commercial spring water and diluted nutrient broth (1:100) at 4 °C.

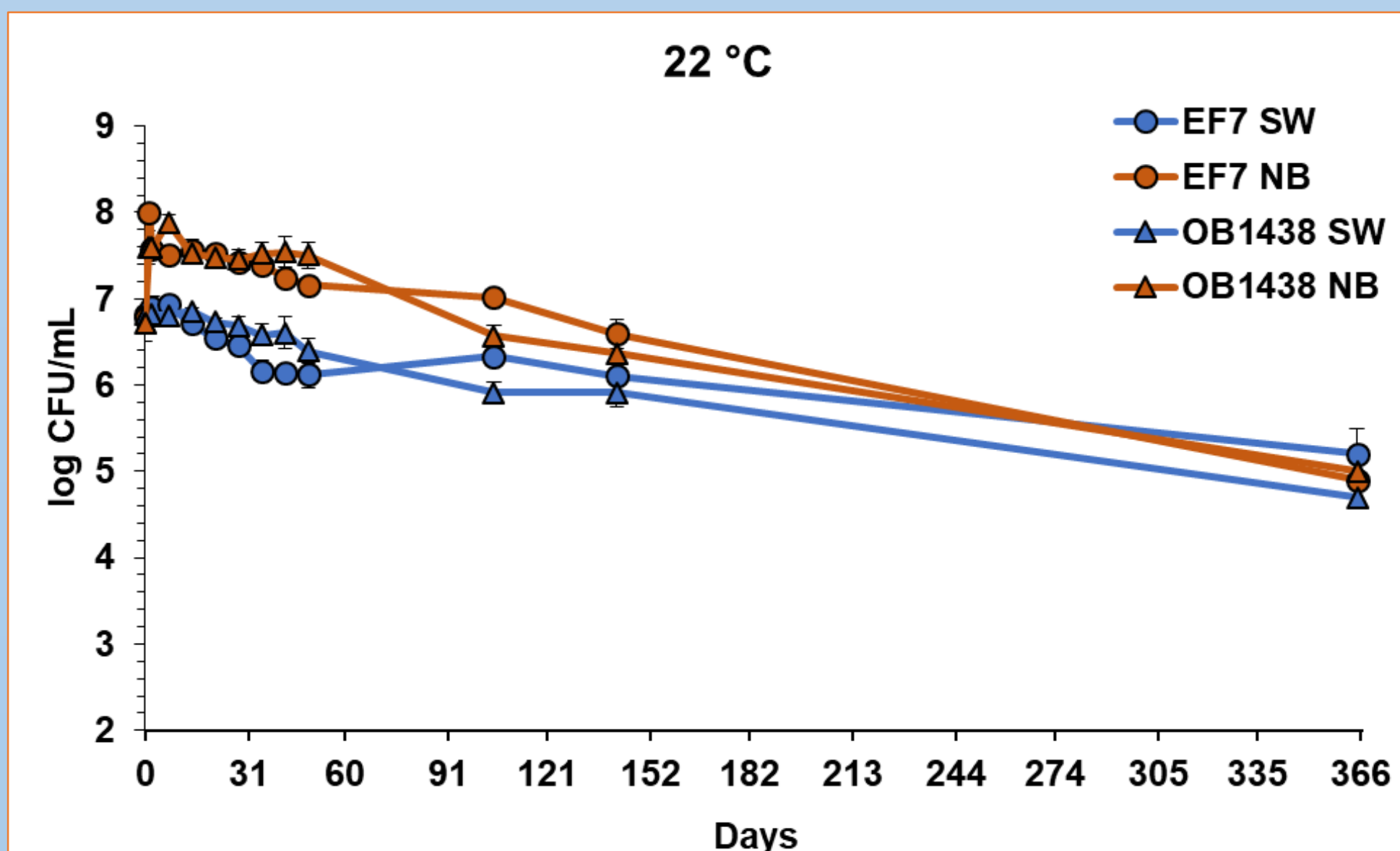


Figure 2.

Survival of *A. baumannii* isolates in commercial spring water and diluted nutrient broth (1:100) at 22 °C.

## CONCLUSION

*A. baumannii* can survive in refrigerators as well as in suspensions kept at room temperature for a long time, which is important for its persistence and possible transmission in the hospital environment.

## ACKNOWLEDGEMENTS

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