

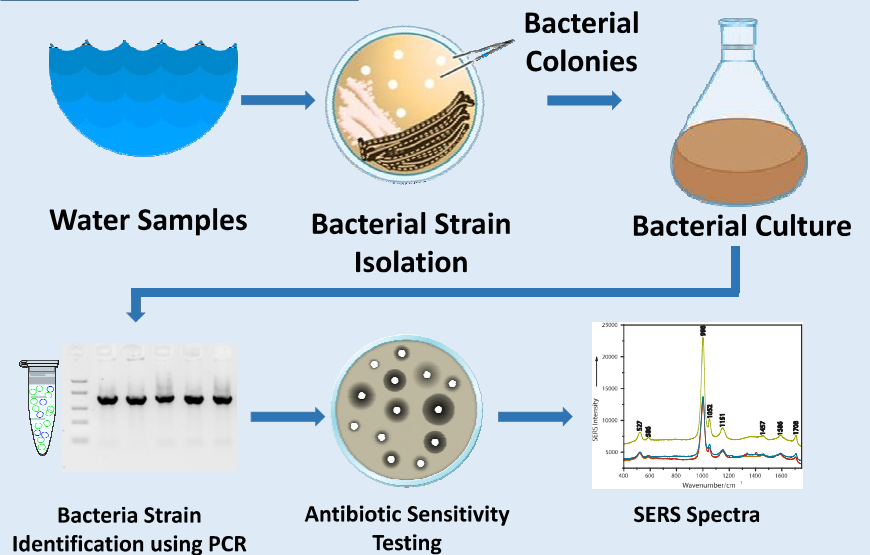
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1. Abstract

The *Aeromonas hydrophila* strain PAI-45 used in this study were isolated from surface water of Cluj County (Romania) and further identified based on 16S rRNA molecular markers, using 27FB-1492R primer pair. Antibiotic susceptibility was carried out by disk-diffusion assay using six antibiotics as follows: Ampicillin (Amp), Carbenicillin (Cb), Oxacillin (Oxa), Penicillin G (Pen), Azlocillin (Azl), and Tetracycline (Tet). The SERS fingerprinting focused on identification of specific marker bands of the same bacterial strain in antibiotic treated and untreated samples. Based on inhibition zone diameter, the selected antibiotics showed antibacterial activity with variable magnitudes. *A. hydrophila* strain PAI-45 was resistant to Amp, Cb, Ox and Pen, and exhibited susceptibility to Tet and Azl.

2. Materials and Methods



3. Results

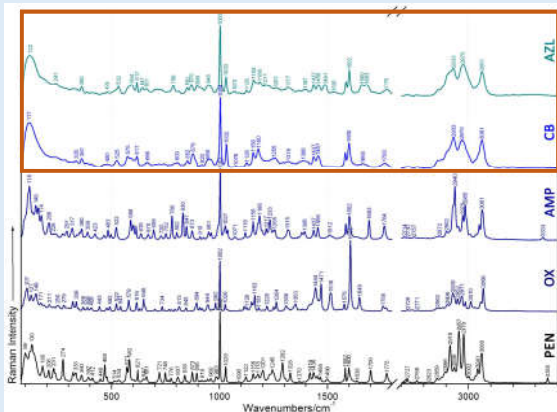


Fig. 1. Azlocillin (AZL), Carbenicillin (CB), Ampicillin (AMP), Oxacillin (OXA) and Penicillin-G (PEN) raw FT-Raman spectra.

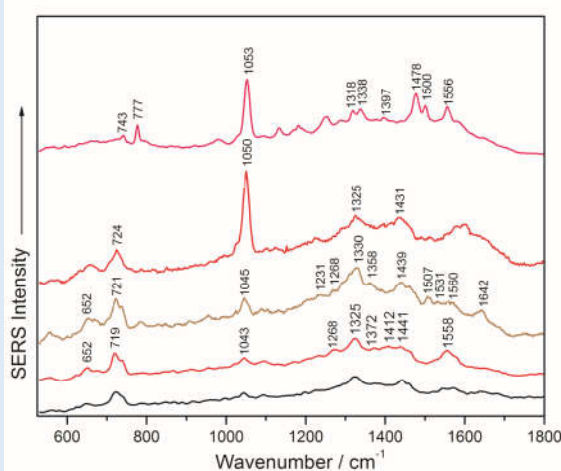


Fig. 2. Raw single-cell SERS spectra recorded on untreated *A. hydrophila* cells (control).

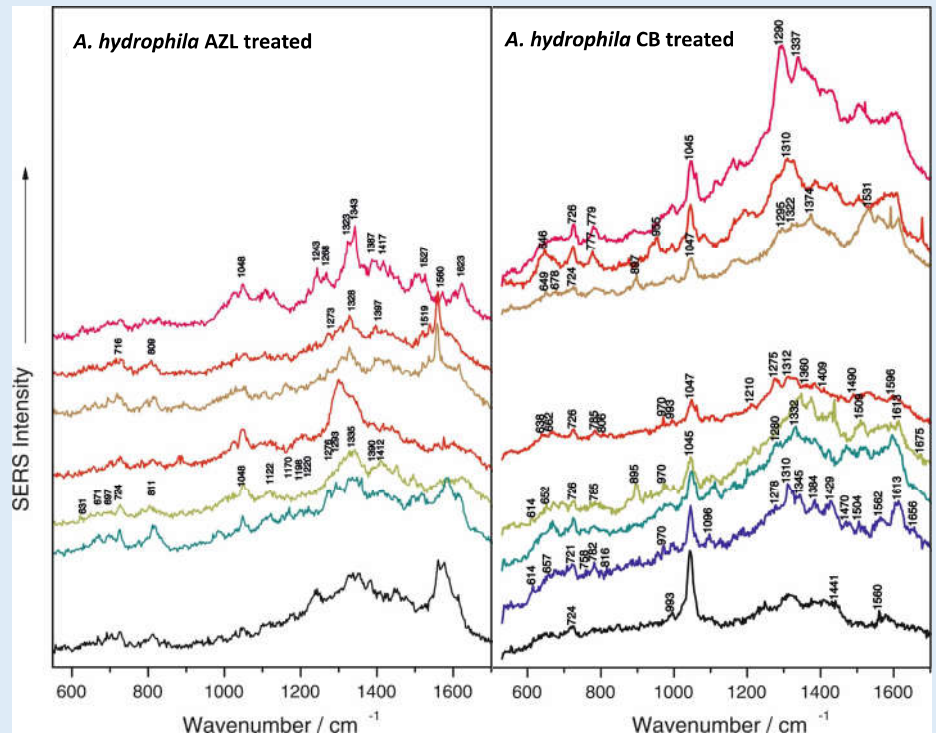


Fig. 3. Raw single-cell SERS spectra of *Aeromonas hydrophila* susceptible to Azlocillin (80µg/mL).

Fig. 4. Raw single-cell SERS spectra of *Aeromonas hydrophila* resistant to Carbenicillin (800µg/mL).

5. References

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 N.E. Dina, A. Colnita, T. Szöke-Nagy, A. S. Porav „A critical review on ultrasensitive, spectroscopic-based methods for high-throughput monitoring of bacteria during infection treatment”, Critical Reviews in Analytical Chemistry, 2017, doi: 10.1080/10408347.2017.1332974;

4. Conclusion

The SERS fingerprinting proved to be sensitive to the stressful growth conditions induced by the antibiotic treatment. Particularly, the SERS bands ascribed for the adenine derivatives (726 and 1325 cm^{-1}) found in the bacterial membrane are lower in intensity after antibiotic treatment or missing, suggesting that the cellular integrity and cell wall reconstruction ability is affected, according to the known mechanism of action of this class of penicillin.

6. Acknowledgement

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