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MUXIMA BIO

Accessing bioactive potential of cave bacterial extracts

Algarve cave bacteria: antimicrobial activity

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BACKGROUND

The search for novel antimicrobial compounds is mandatory due to current drug resistance problem. In this way, extreme environments revealed to be good sources to find new bioactive compounds, namely antibiotics. Caves are considered extreme environments for occurrence of life forms. The reunion of severe abiotic conditions such as total darkness, constant temperature and high humidity (98-100%) result in an absence of primary producers and consequently starvation conditions (Tomczyk-Żak & Zielenkiewicz 2015). The adverse conditions constitute a perfect habitat for highly specialized microorganisms (Mulec 2008). Furthermore, bacteria from caves revealed to be a good source for antimicrobial compounds and useful secondary metabolites (Cheeham et al. 2013).

OBJECTIVES

- Isolate cultivable bacteria from three caves in Southern Portugal (Algarve): Senhora, Vale do Telheiro and Ibne Ammar (Fig.1).
- Access the antimicrobial activity of the bacterial isolates against six test agents: *Escherichia coli*, *Staphylococcus aureus*, *Enterococcus faecalis*, *Pseudomonas aeruginosa*, *Bacillus cereus* and *Aeromonas salmonicida*.

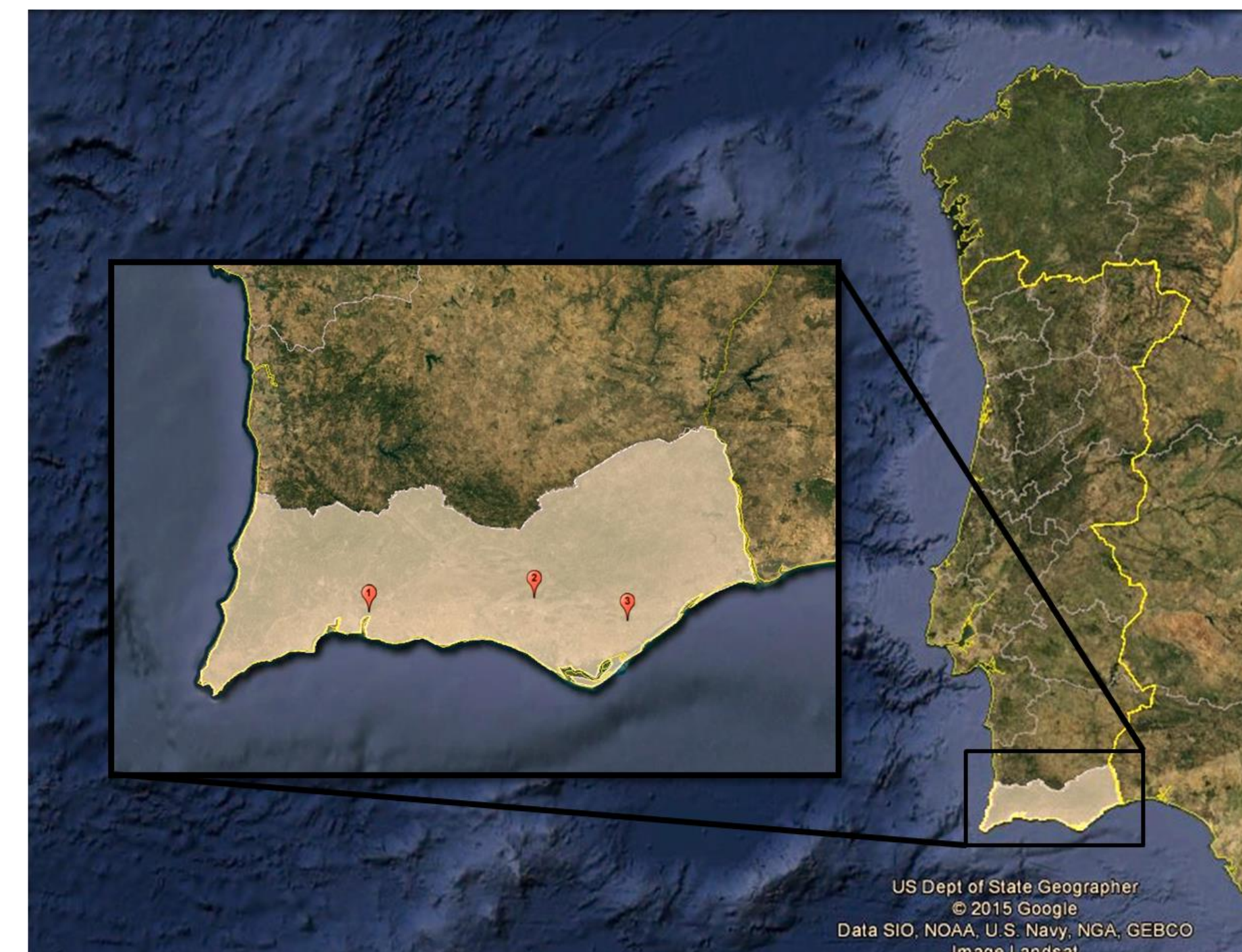
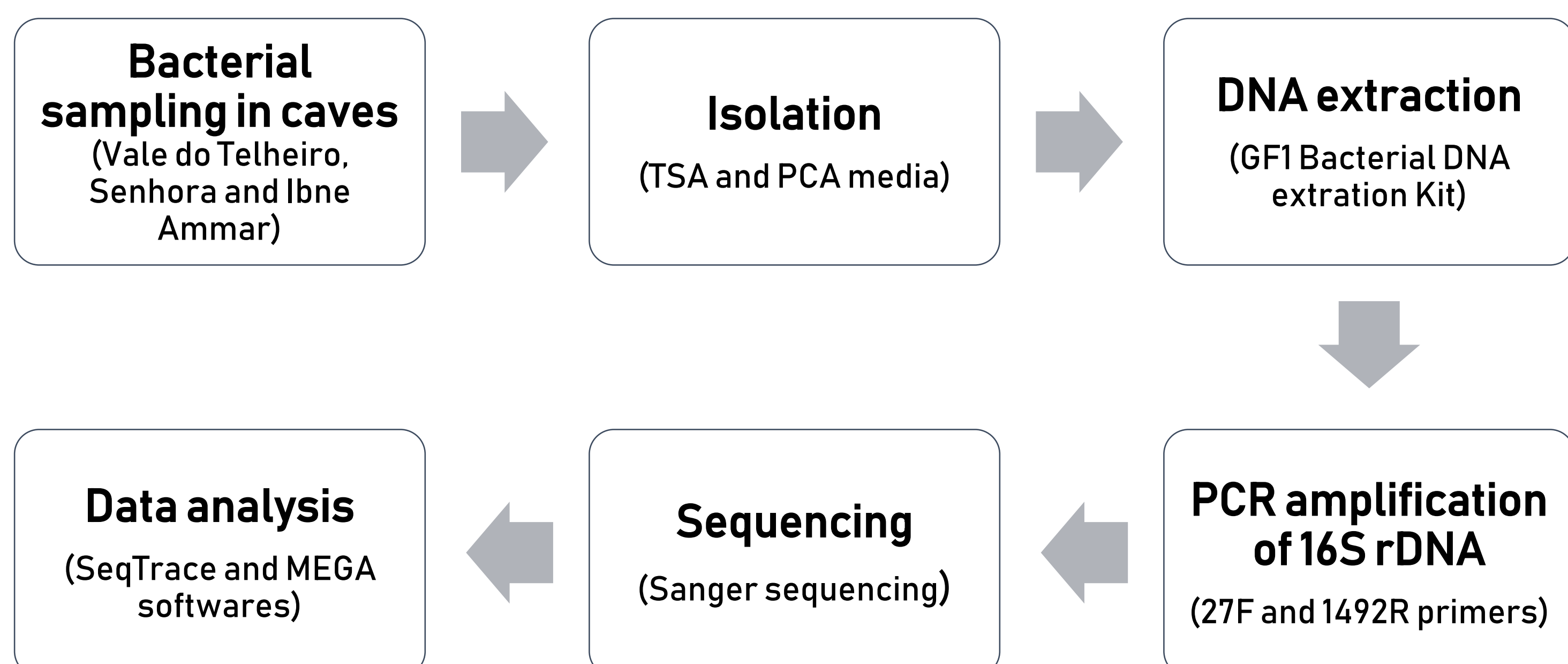


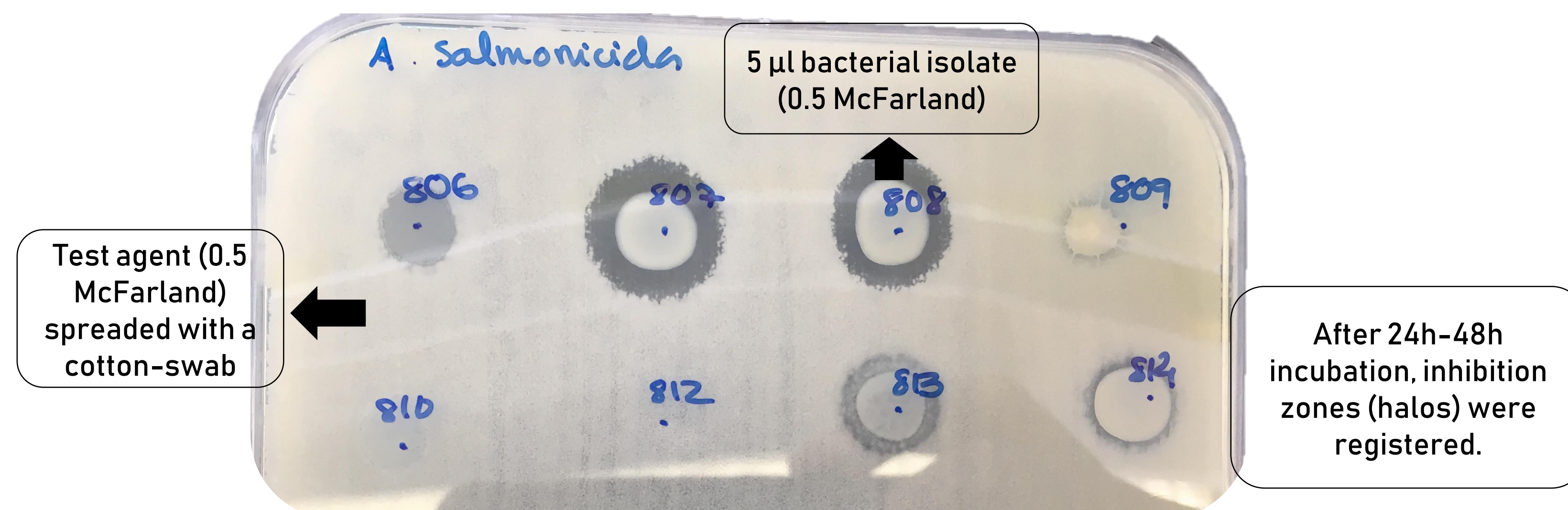
Fig. 1 - Location of Ibne Ammar, Senhora and Vale do Telheiro caves in Southern Portugal

METHODS – Identification of bacterial isolates



METHODS – Antimicrobial tests

All bacterial isolates were tested against six test agents: *E. coli*, *S. aureus*, *E. faecalis*, *P. aeruginosa*, *B. cereus* and *A. salmonicida*. Tests were conducted on triplicates



RESULTS AND DISCUSSION

- Preliminary results reveal that bacterial diversity included genus *Bacillus*, *Lysinibacillus*, *Pseudomonas* and *Serratia*.
- All genus showed antimicrobial activity against at least one test agent;
- 31% of all isolates with antimicrobial capacity showed activity against both Gram + and Gram - test agents. This suggests that the active compound has a broad spectrum antimicrobial action;
- This study demonstrates that cave environments are good sources for finding new antimicrobial compounds with (Fig.2 and 3), however it is necessary to complement it with highly effective extraction techniques that posteriorly allows identification of active compounds responsible for antimicrobial capacity of bacterial strains.

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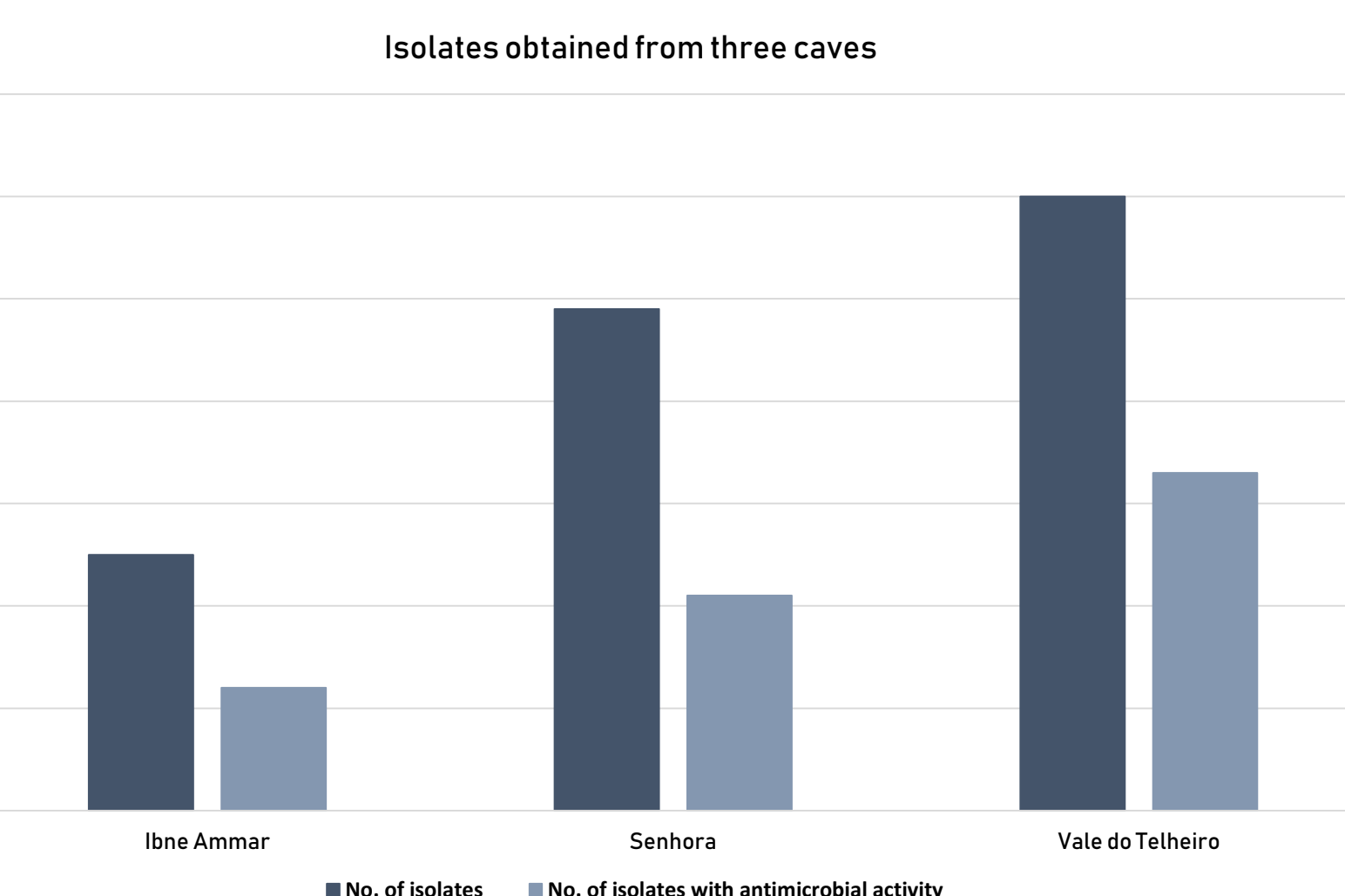


Fig. 2 – Bacterial isolates (total and antimicrobial activity) retrieved from each cave.

Antimicrobial activity of bacterial isolates

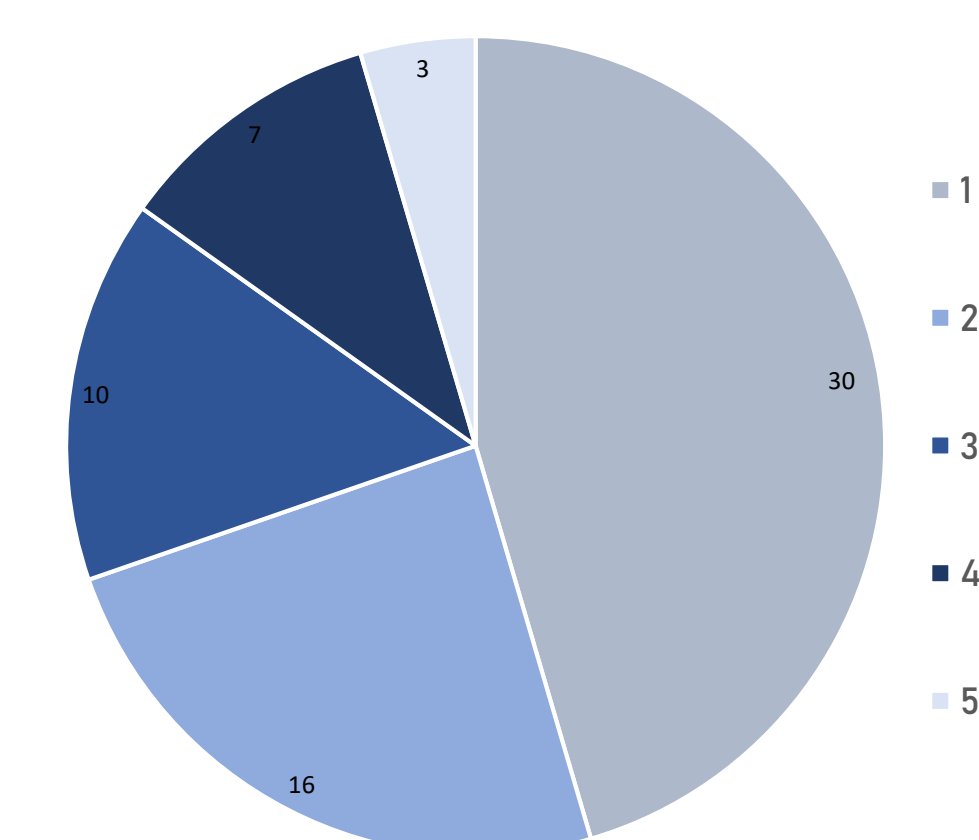


Fig. 3 – Number of bacterial isolates related with their ability to inhibit 1,2,3,4 or 5 test agents.

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