



imagene

Sustainable preservation and biobanking

A novel and rapid process for ambient temperature preservation of microorganisms

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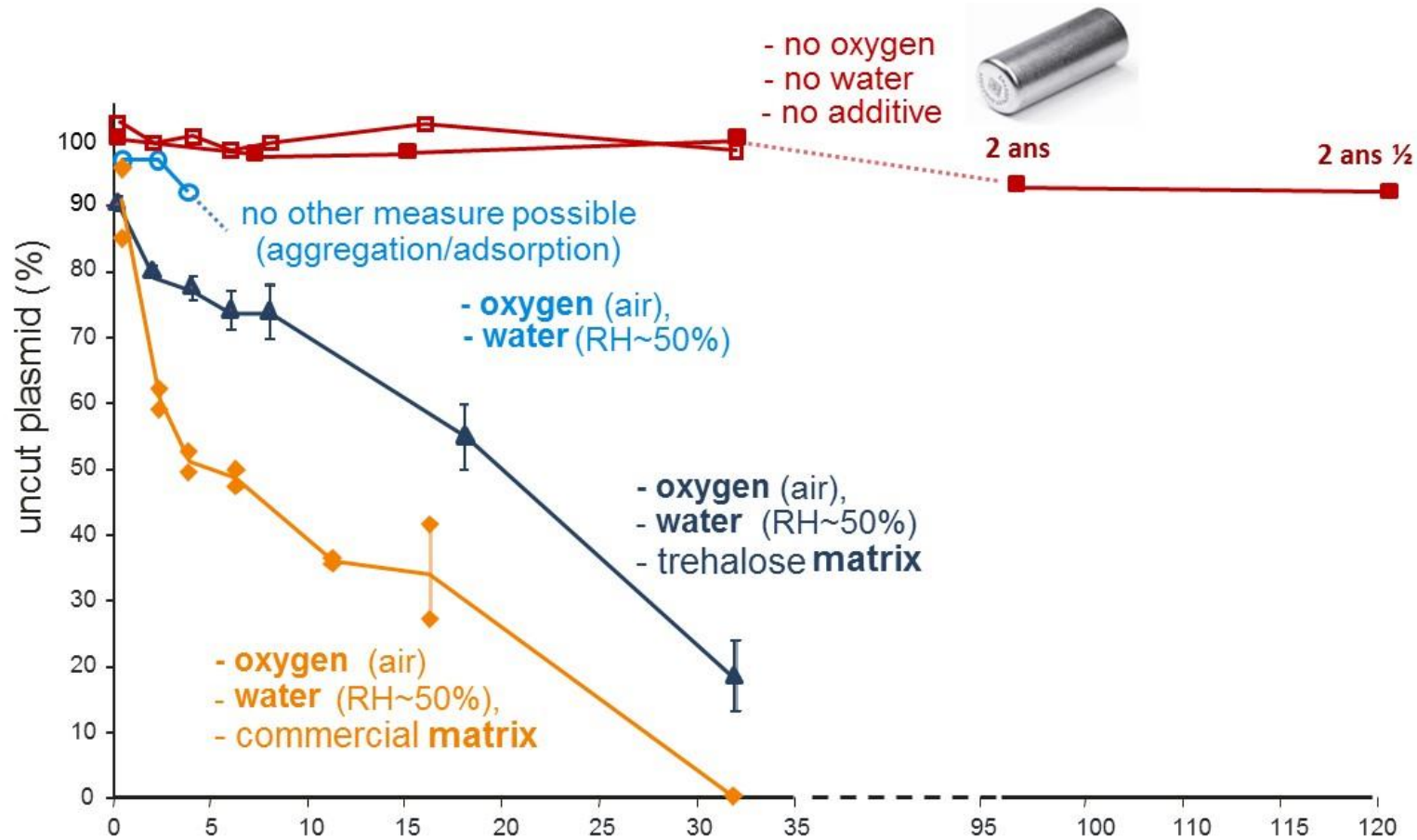
Imagene

- Imagene is a french biotech company
- Imagene has developed a new technology for preservation of biological samples at **ambient temperature**.
 - Dedicated to **long term storage** (years), and in particular to Biobanking
 - Offers an alternative to the constraints of cold storage
- The technology is already **validated for DNA and RNA**



What is behind Imagene technology ?

Imagene has demonstrated with DNA that storage at room temperature is feasible over long period of time if the samples are **protected from degradation factors, mainly Oxygen and Moisture:**



Redrawn from Colotte et al. *Biopreservation and Biobanking* 2011

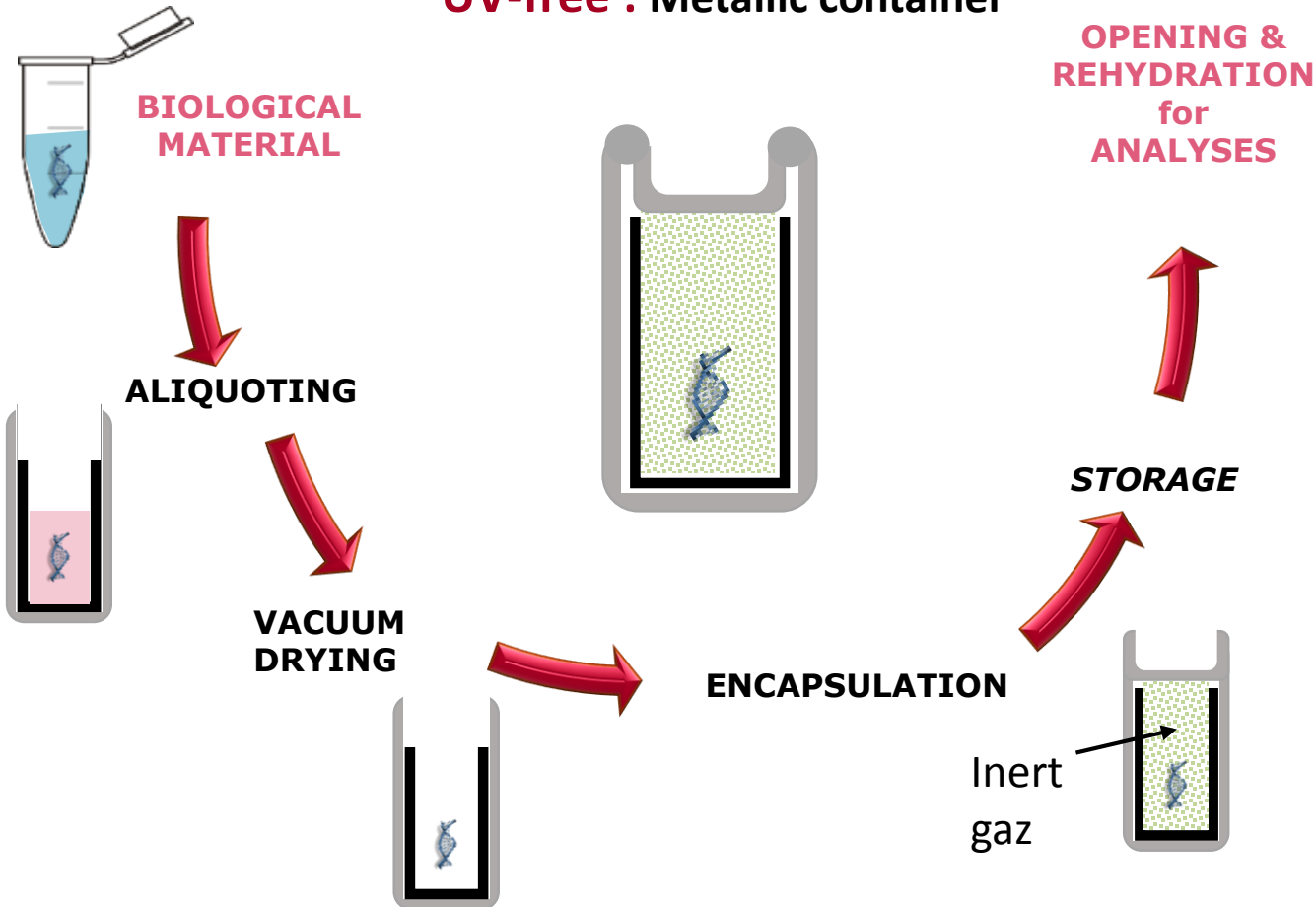
The **imagene** process

Imagene solution : Storage of biospecimens in a patented container: paperclip-size, airtight **minicapsules**, away from all degradation factors.

H₂O-free : Drying and sealing

O₂-free : Inerting and sealing

UV-free : Metallic container



Storage in SBS standard racks

Tracking using 2D codes

Main Advantages of Imagene Technology

- Long term stability demonstrated for DNA and RNA

1 cut / 10 000 nucleotides / century for DNA and 1 cut / 700 nucleotides / century for RNA

(Estimated from accelerated aging studies)

- Compared to cold storage:

- Substantial reduction of required storage space (up to 200 000 minicapsules in 6 m³)
- Substantial reduction of storage cost (no electric consumption, no maintenance...)

- Compared to freeze-drying

- Faster process and easier to automate
- Metallic container : no risk of breakage during transport

The Anvbis³ project

- Project started in 2013.
- Objectives:
 - Evaluate the potential of the Imagene's process to be used for room temperature long term preservation of bacterial strains.
 - Aim is to preserve enough viable bacteria to allow culture growth after several years of room temperature storage.
- Methodology
 - Use of 2 model bacteria: *Pantoea dispersa* (freeze drying resistant) & *Aeromonas salmonicida* (freeze drying sensitive)
 - Performance criteria : Viability Rate VR expressed as:

$$VR (\%) = \frac{\text{Log (viable concentration after processing)}}{\text{Log (viable concentration before processing)}} \times 100$$

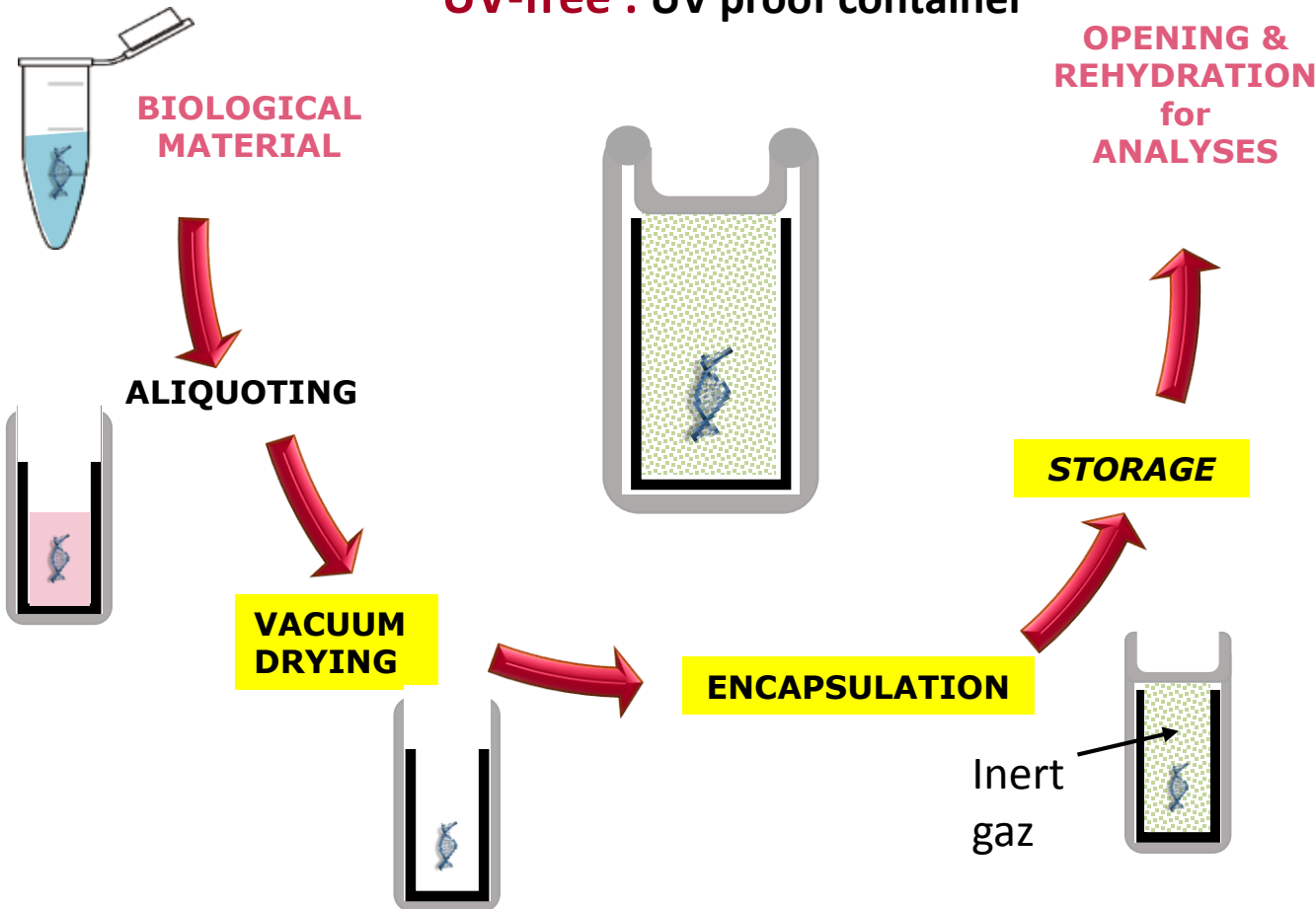
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H₂O-free : drying and inerting

O₂-free : inerting

UV-free : UV proof container

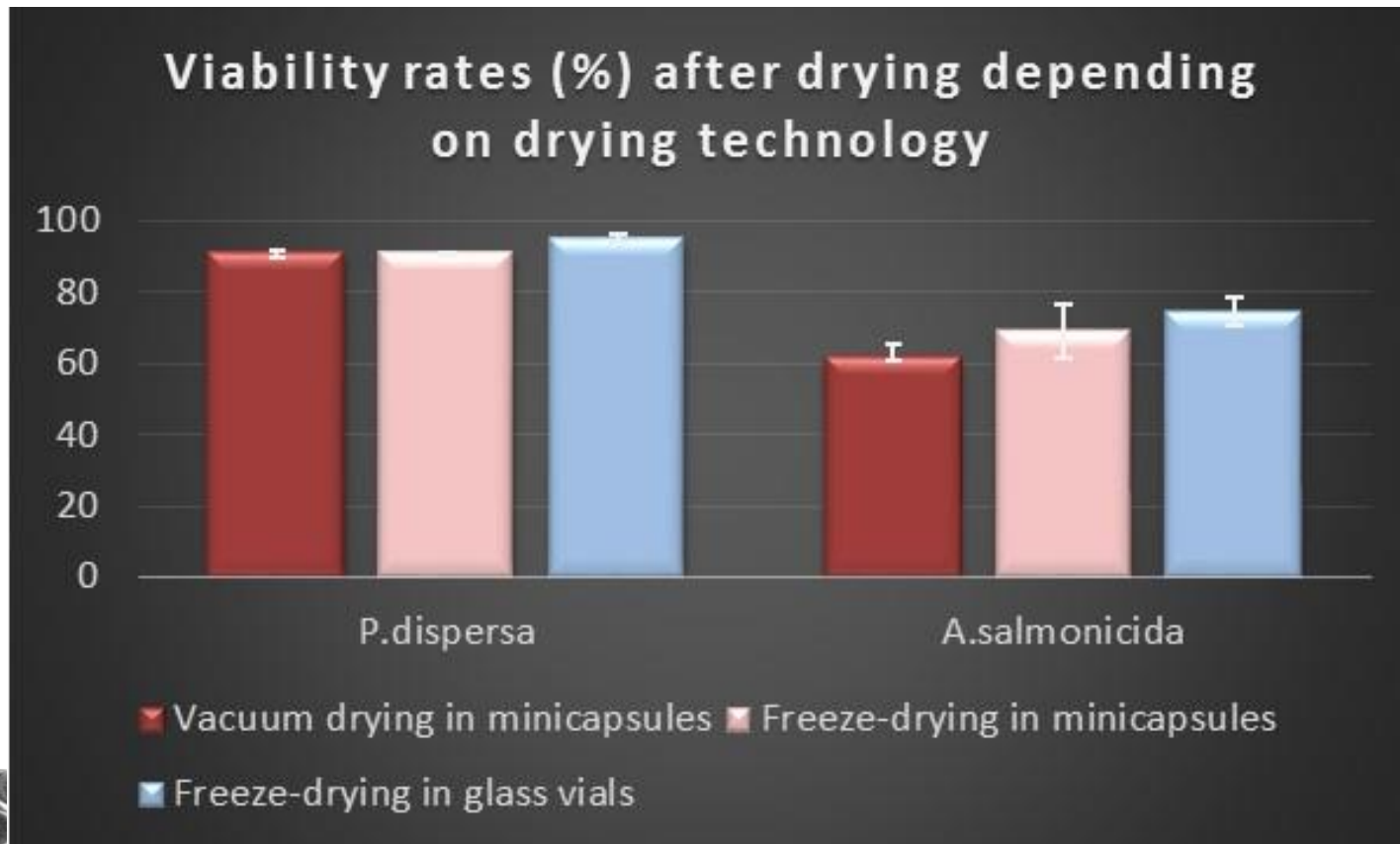


Storage in SBS standard racks

Tracking using 2D codes

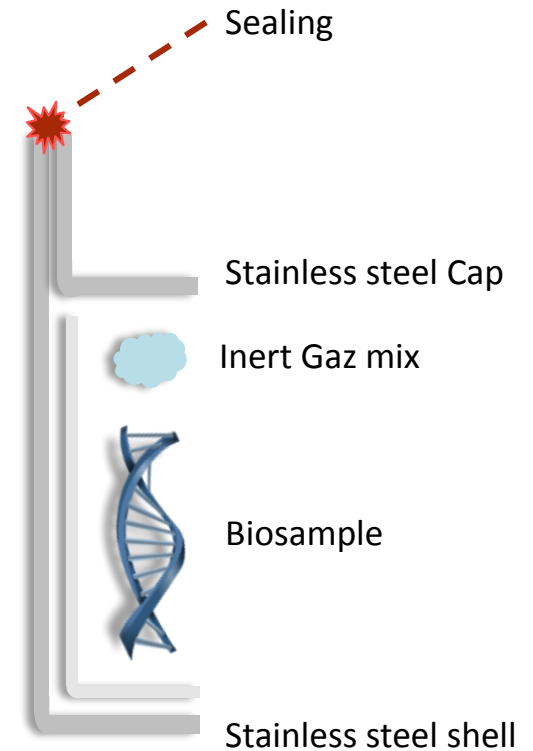
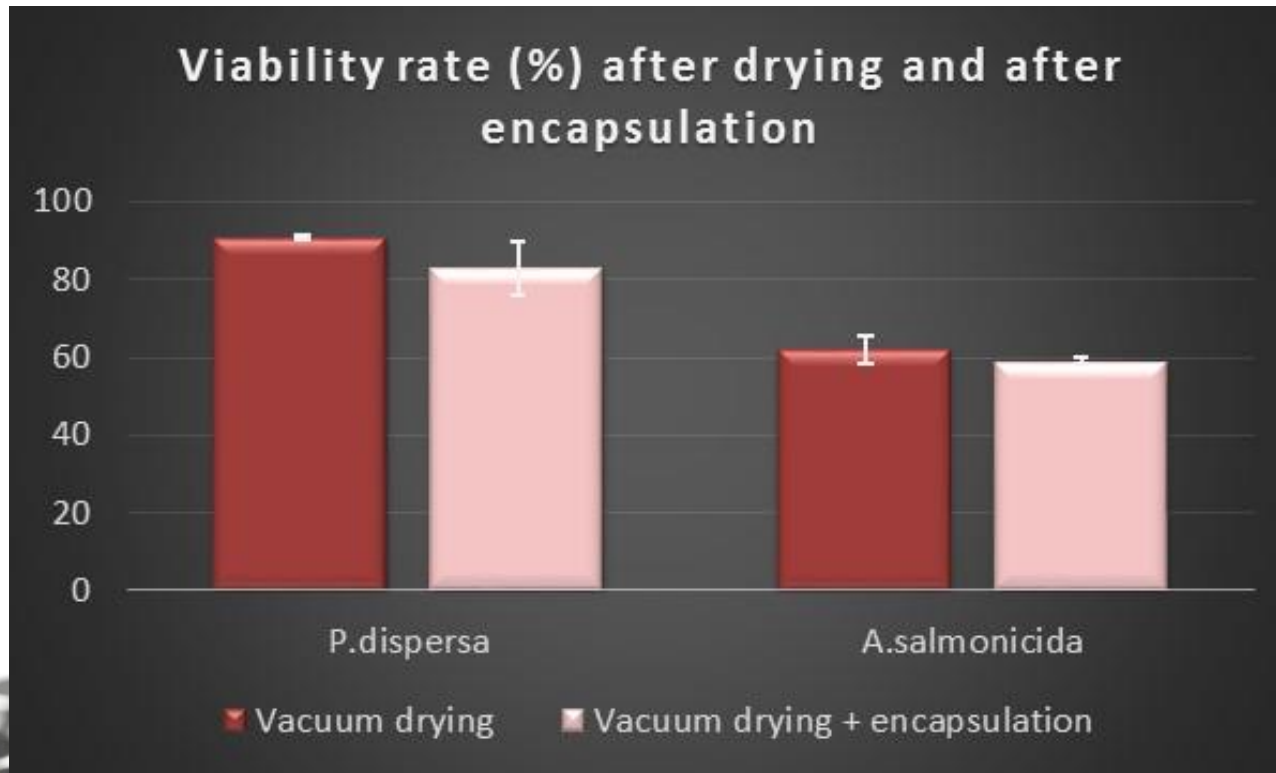
The Anvbis³ project – drying step

- Different Vacuum drying conditions were tested (product formulation, drying parameters...)
- Best conditions for the two strains were compared with a standard freeze-drying protocol, performed both in glass vials and in minicapsules :



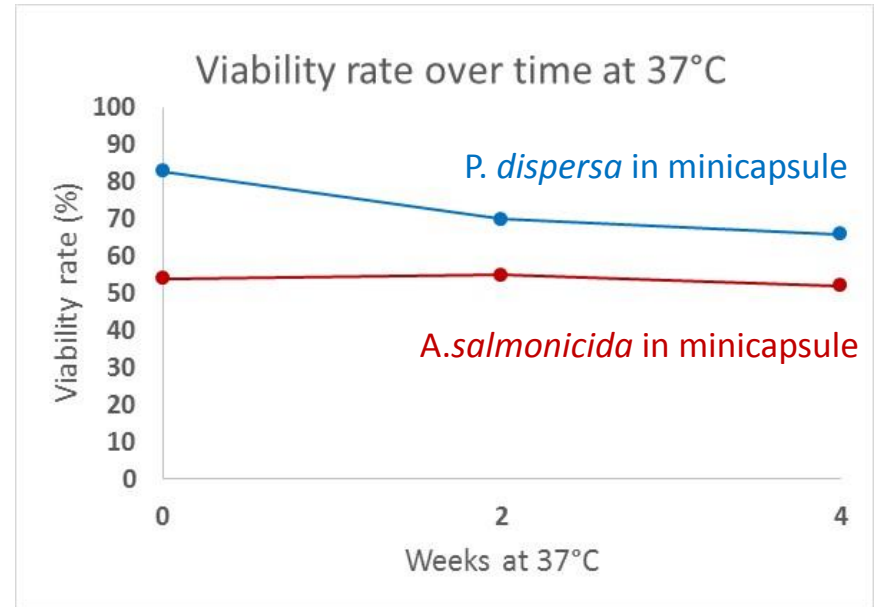
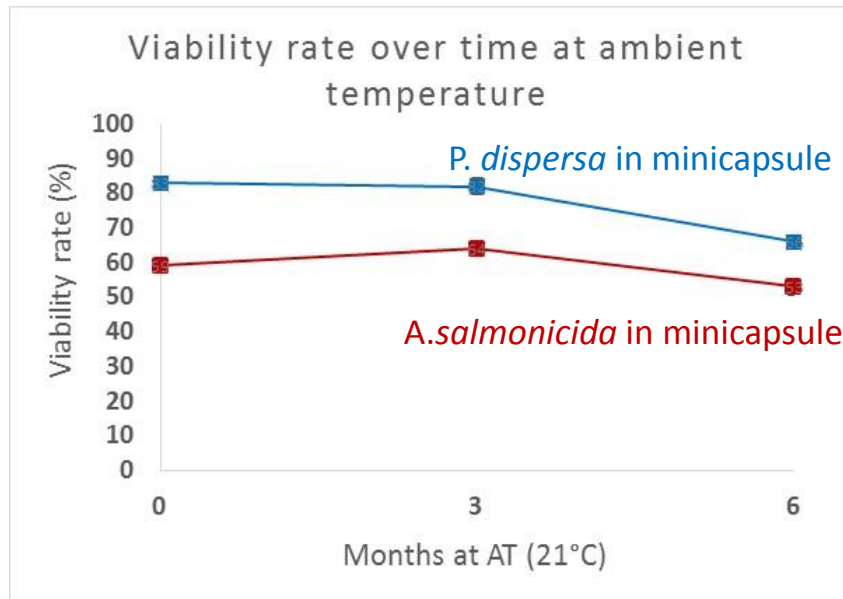
The Anvbis³ project – encapsulation step

- Encapsulation does not significantly alter the viability rate.



The Anvbis³ project – storage step

- Study of storage at room temperature and 37°C in minicapsules



- The study is on-going (RT).
- Accelerated aging modelling is an issue

The Anvbis³ project – preliminary conclusion

- Imagene's technology is compatible with the storage of bacterial strains.
- More optimizations and characterizations are needed
 - Long term measurement
 - Test of other strains
 - Control of other strain functions
 - Aging modelling
 - ...
- In parallel, development of a prototype platform for drying and encapsulation of class II & III bacterial and viral strains.

Anvbis³ encapsulation platform

- Platform for safe encapsulation of class II and III microorganisms.
- Include all the steps of the Imogene Process
- Semi automated
- Up to 100 samples per day

- Available for commercialization by 2017.





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- Pasteur Institute (partner)
- Genopole Evry



THANK YOU

