

Next-generation seed diagnostics: reliable SE-qPCR for rapid pathogen detection in treated seeds

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Background



Bacteria such as *Clavibacter michiganensis* (Cm) and *Xanthomonas* species (Xvepg¹) affecting tomato and pepper production. These bacteria can be transmitted by seeds. Accurate seed health assessment using reliable and standardized methods is crucial to control the spread of these pathogens.

On the other hand, improving seed quality often involves various treatments on seeds. However, these treatments can compromise the reliability of pest detection methods.

The seed extract qPCR method (SE-qPCR), developed by the International Seed Health Initiative (ISHI) of the International Seed Federation (ISF) for the detection of Cm on tomato seeds, is a promising detection tool. Unfortunately, sensitivity decrease when applied to seeds treated with sodium hypochlorite (NaOCl).

This project aims to adapt the SE-qPCR method for application on disinfected seeds.

¹Xvepg : vesicatoria, euvesicatoria, perforans, and gardneri

SE-qPCR method

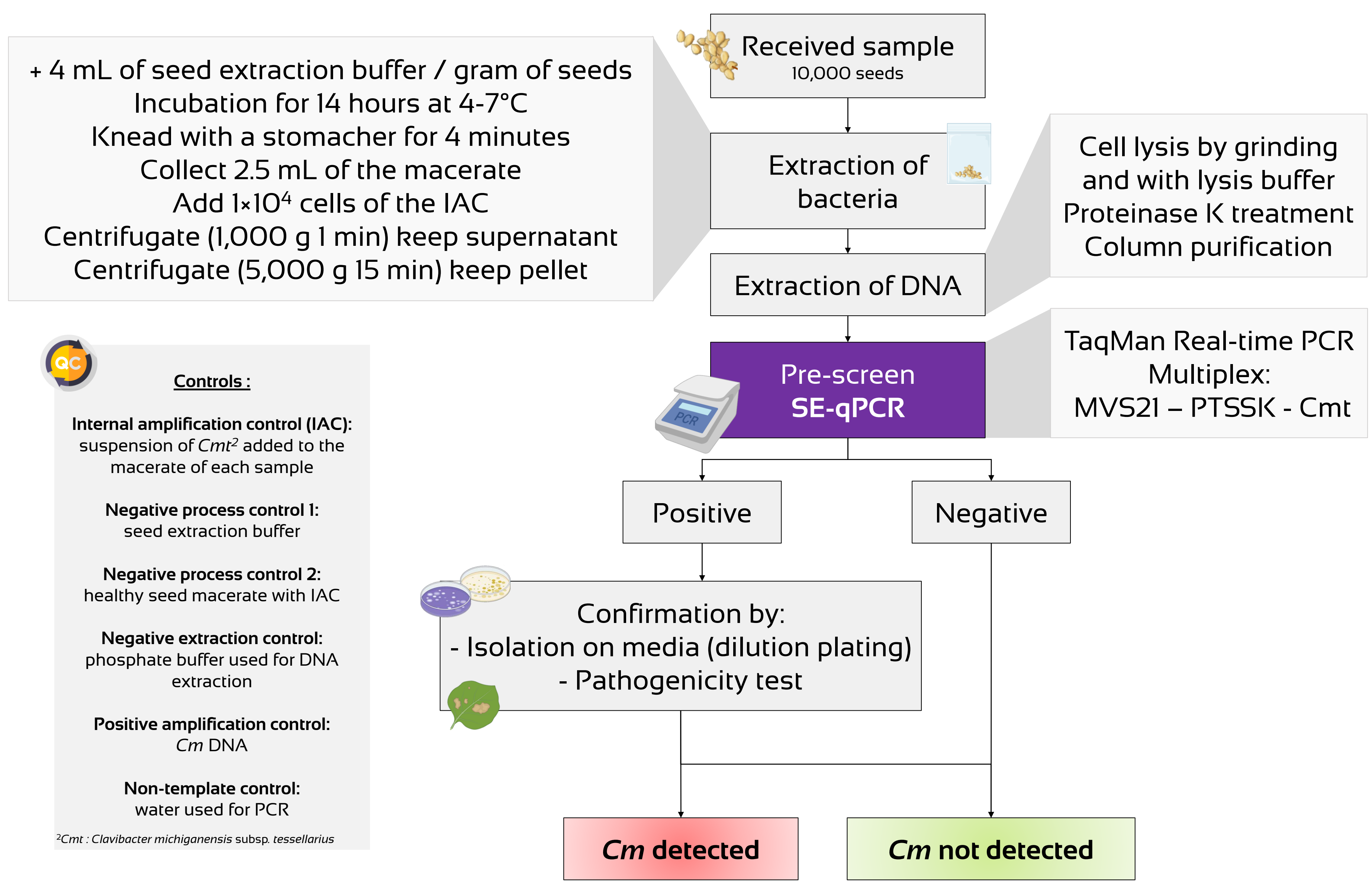
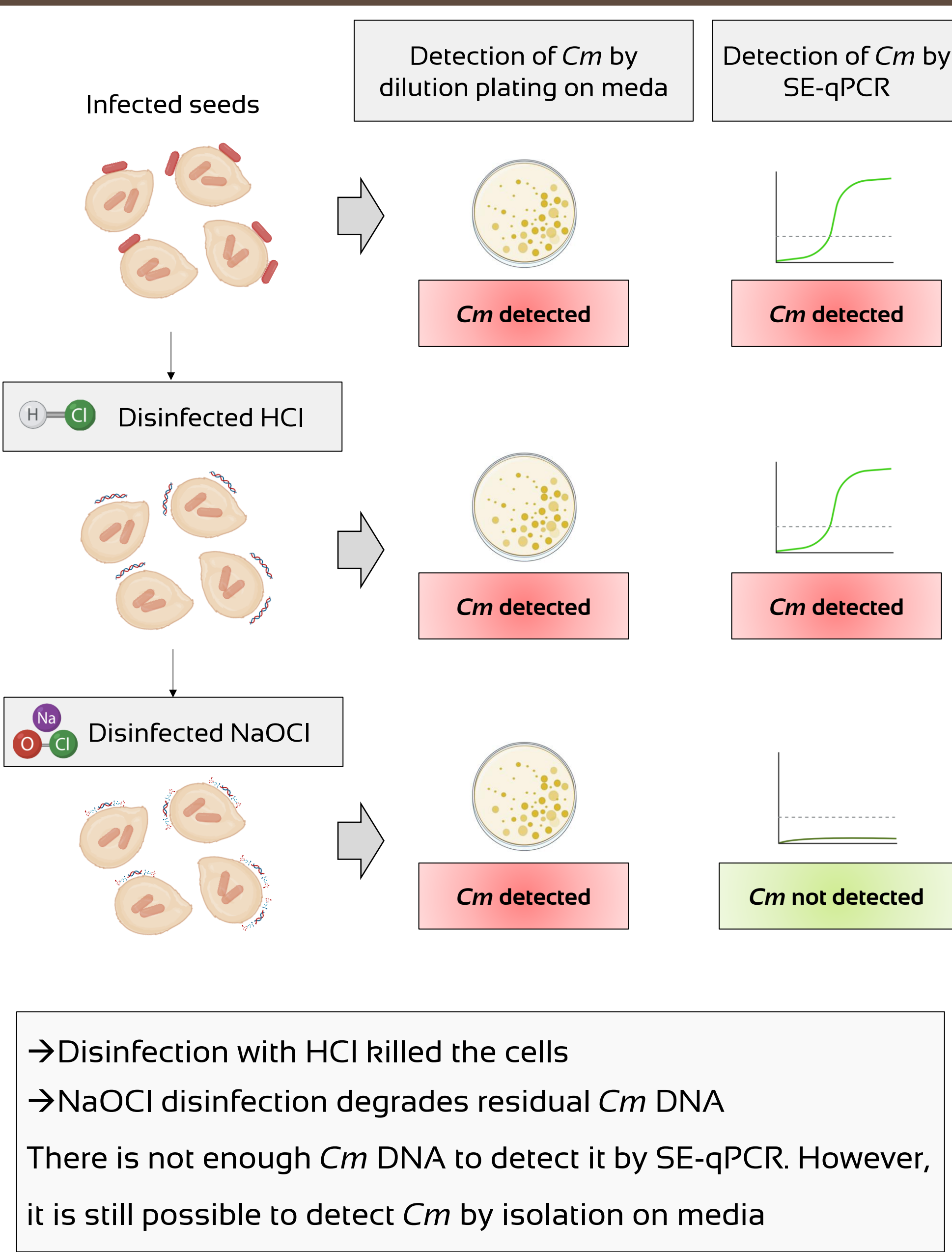


Figure 1 – Process diagram of the Cm detection method on tomato seeds. ISHI-ISF method.

Working hypothesis



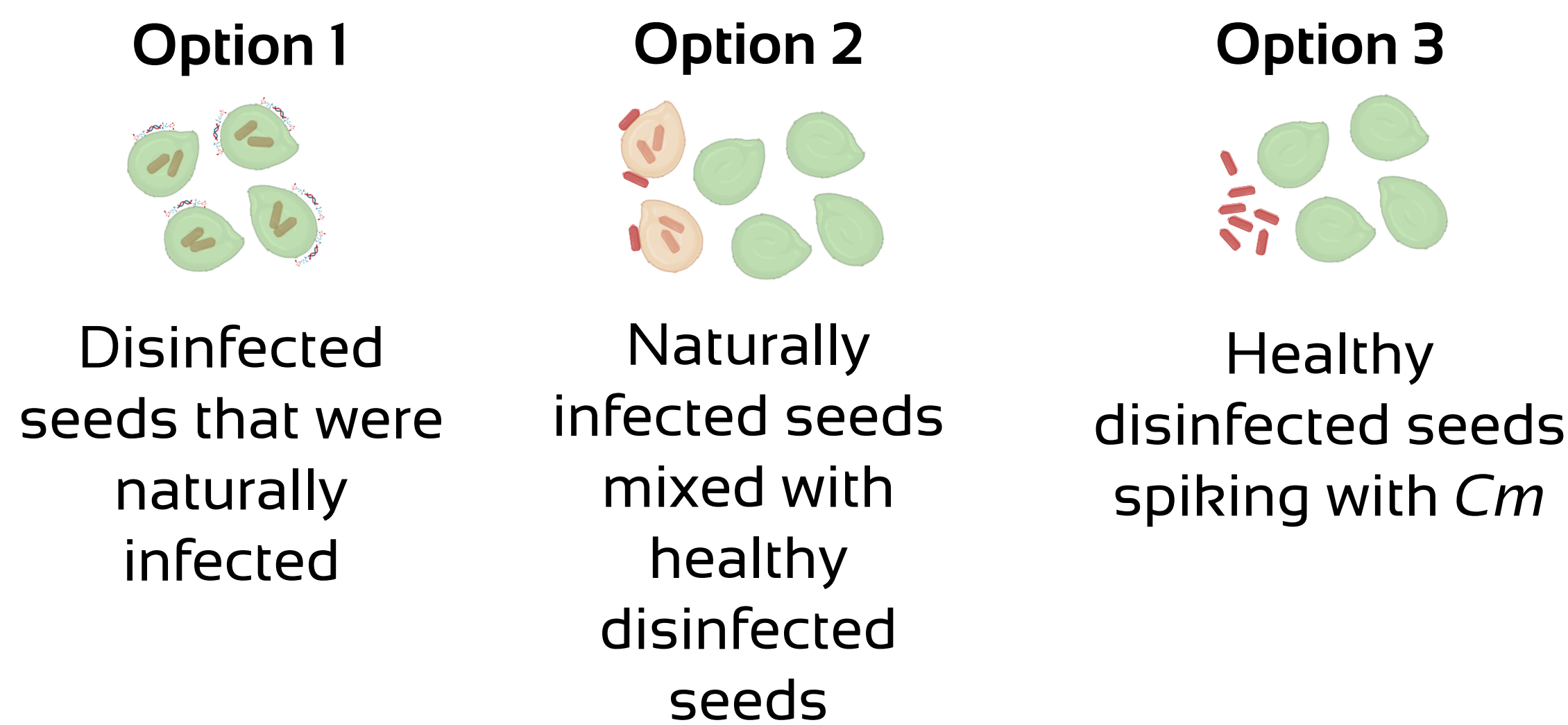
DesiClaviX project

Aim : improving the reliability of SE-qPCR by increasing the sensitivity

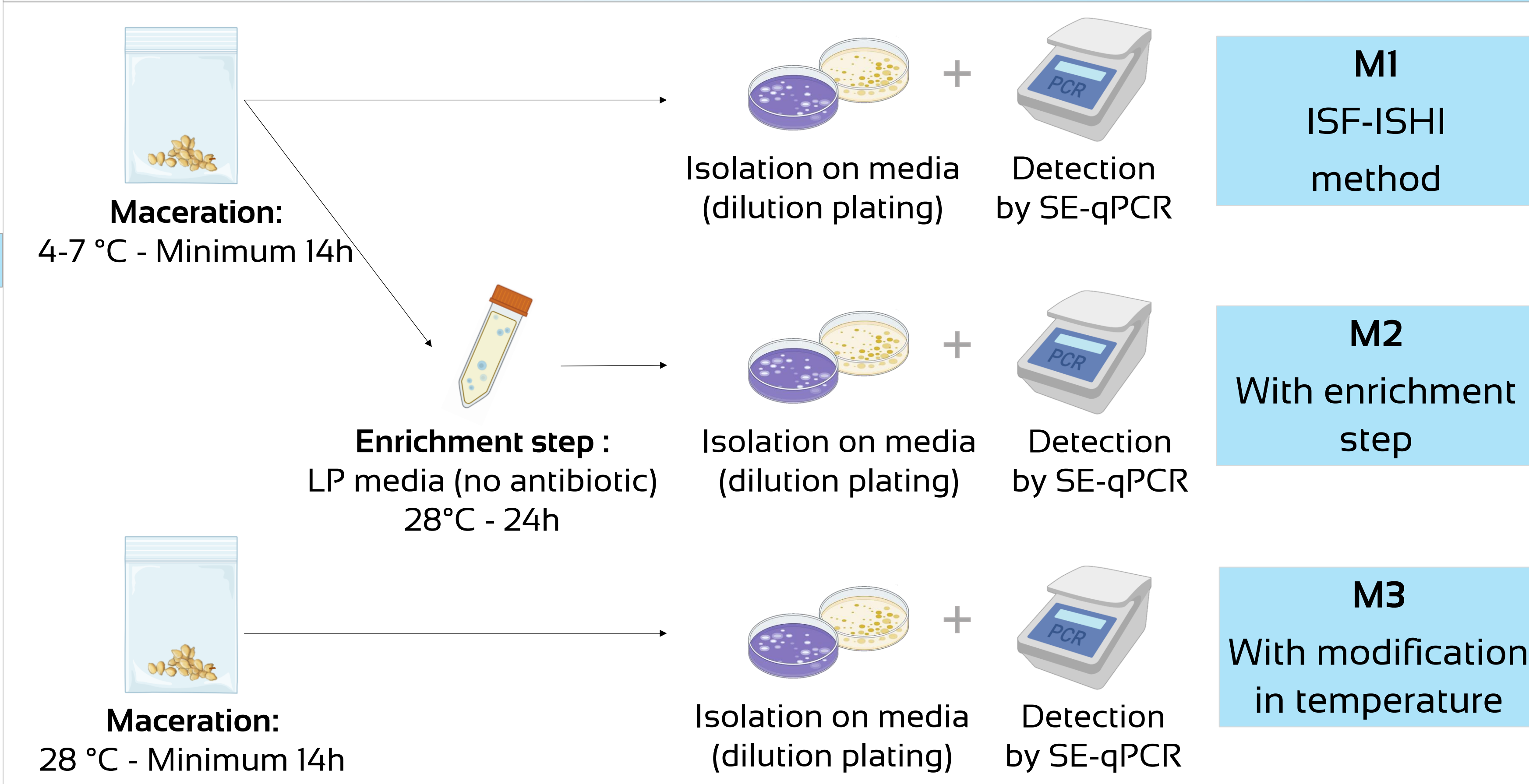
Lines of improvement identified:

- Add an enrichment step
- Modify the temperature of maceration

Samples for testing



Methods to be tested



Outlooks

Test the improved method for other pathogens on tomato and pepper seeds (*Xanthomonas* spp.): to be able to detect several bacteria on the same seed extract.
What about other types of treatment?

The main official missions of GEVES are:

- to conduct DUS and VCUS studies for the **Registration** of new varieties in the Official Catalogue
- to conduct DUS studies for the **Legal protection** of varieties (PBR)
- to evaluate the quality and the varietal identity of seed lots and for the **Certification** of seeds, for species requiring statutory certification.



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