

Portable and Smart devices for On-Site detection of Foodborne Pathogens

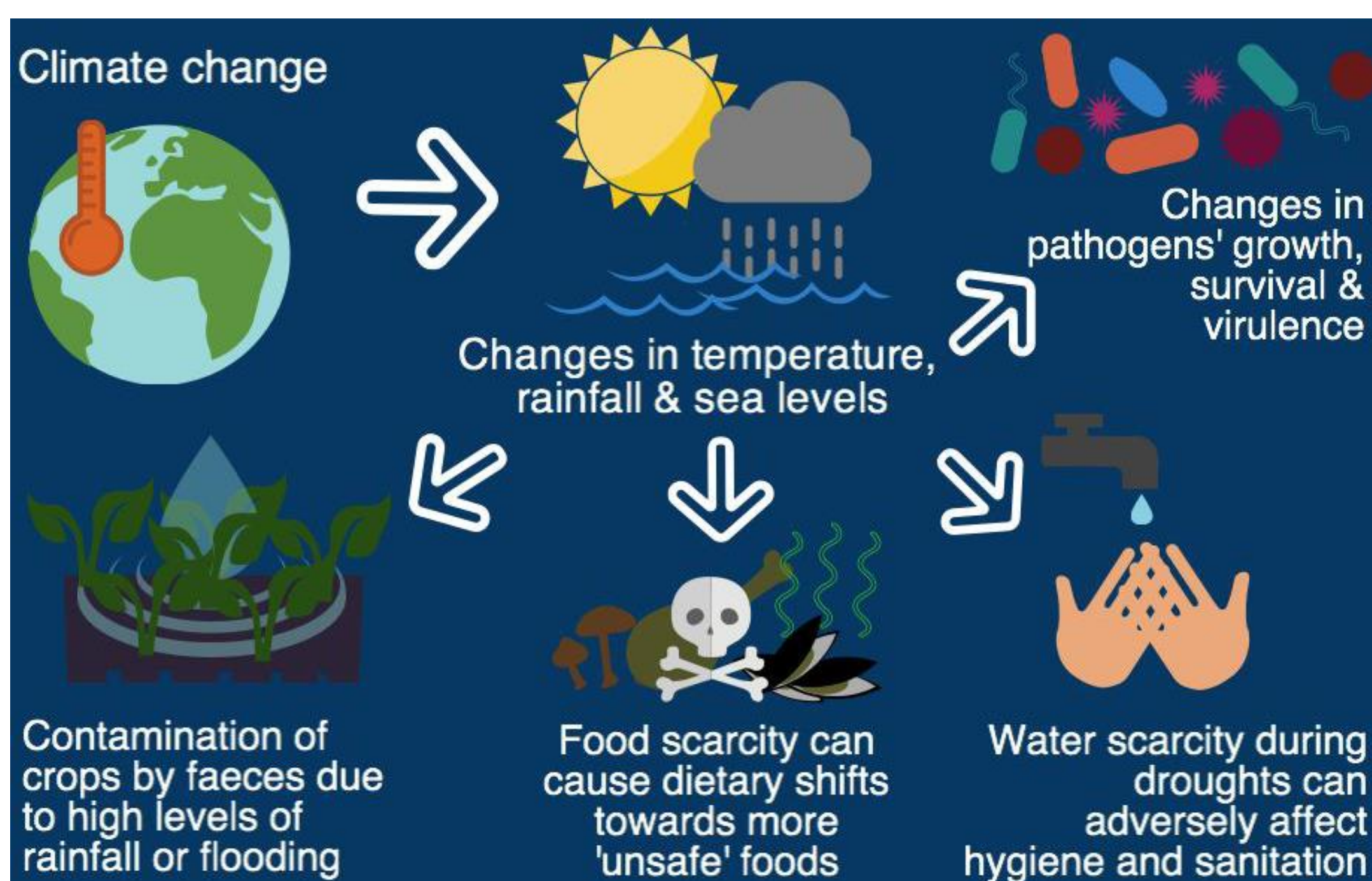
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Issue

How does climate change affect food safety

- Climate warming causes big changes in precipitation and the reproduction of pathogens, which are closely related to foodborne diseases.
- The global burden of foodborne diseases is about \$110 billion annually worldwide.
- It is essential for people around the world to have access to water and foods free of pathogens.



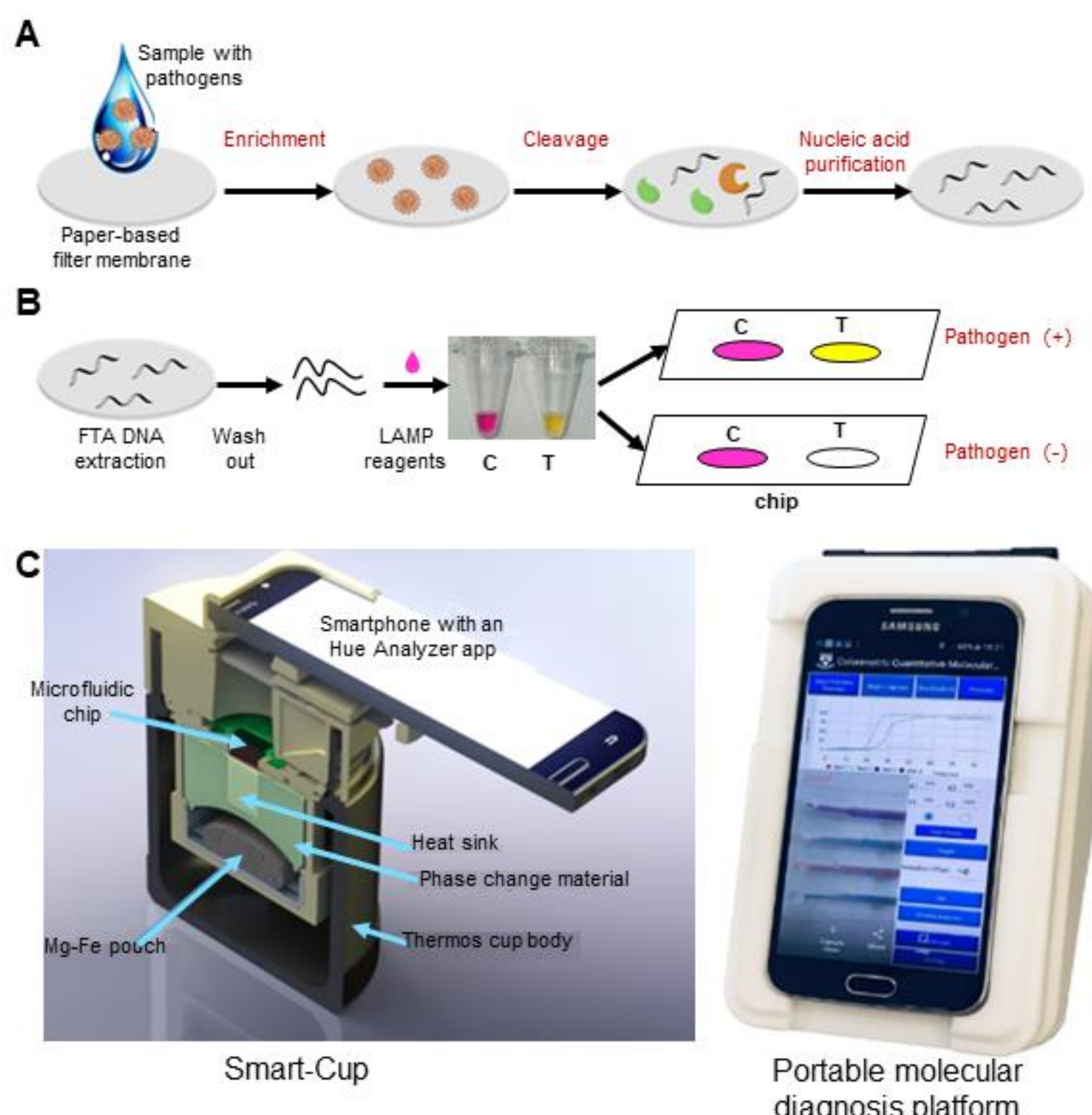
Aims

- Developing a portable, low-cost and simple monitoring platform for on-site detection of pathogens in water and foods, to provide novel strategies in reducing the burden of foodborne diseases caused by climate change and inequity.

Solution

- Design the loop-mediated isothermal amplification (LAMP) colorimetric method for rapid detection of foodborne pathogens
- The method will then be integrated in a portable device to build an intelligent monitoring platform for on-site monitoring of pathogens

- Collection of contaminated food and water samples
- Enrichment, cleavage and nucleic acid purification of samples with pathogens using flinders technology associates (FTA) membranes
- Extraction, wash out of nucleic acid from FTA membranes
- Construction and optimization of LAMP colorimetric method
- Design and construction of microfluidic or paper-based chip
- Construction and verification of mobile an intelligent monitoring platform



The unfairness of surveillance, prevention and control of foodborne diseases in developed and developing countries

- Unfairness of enough foods, clean water, infrastructures, and surveillance systems in developed and developing countries.
- Unfairness is also reflected between people and animals.

Developed countries



Developing countries



Evidence

- We used LAMP colorimetric method combined with portable equipment for on-site detection of foodborne pathogens

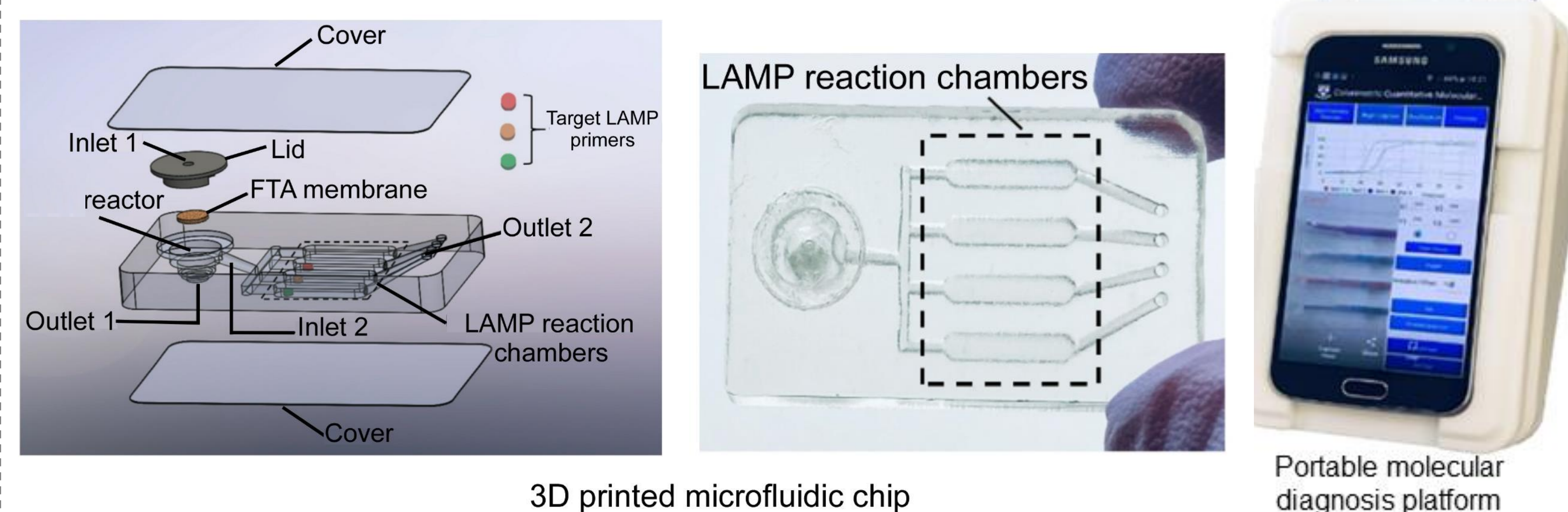
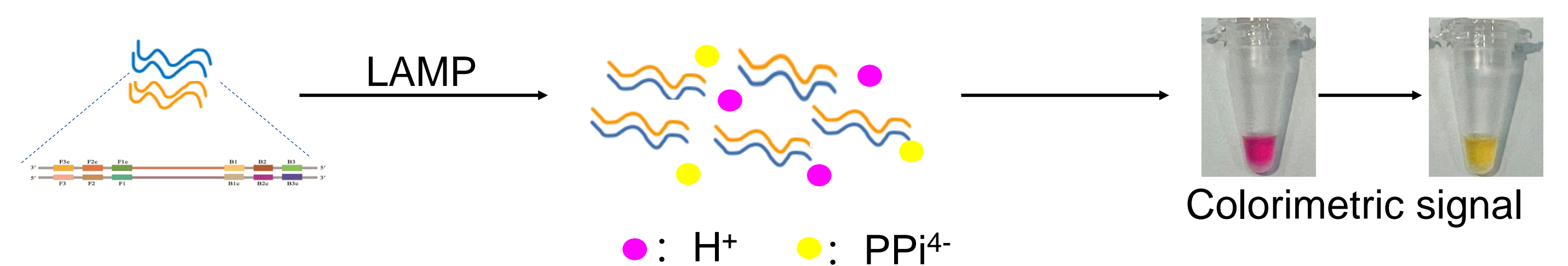


Table 1. Comparison between LAMP+POCT and golden standard qPCR.

Method	Applicable place	Bulky equipment	Cost	Detection time	Ref.
LAMP+POCT	Low resource settings	No	Low	0.5 h	[5-7]
qPCR	Laboratories	Yes	High	4 h	[8]

Summary

- Our strategy is practical and affordable for people especially in limited-resources area, to monitor foodborne pathogens. Which will effectively address the challenges of foodborne diseases and promote equitable access to the quality of healthcare worldwide

References

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