

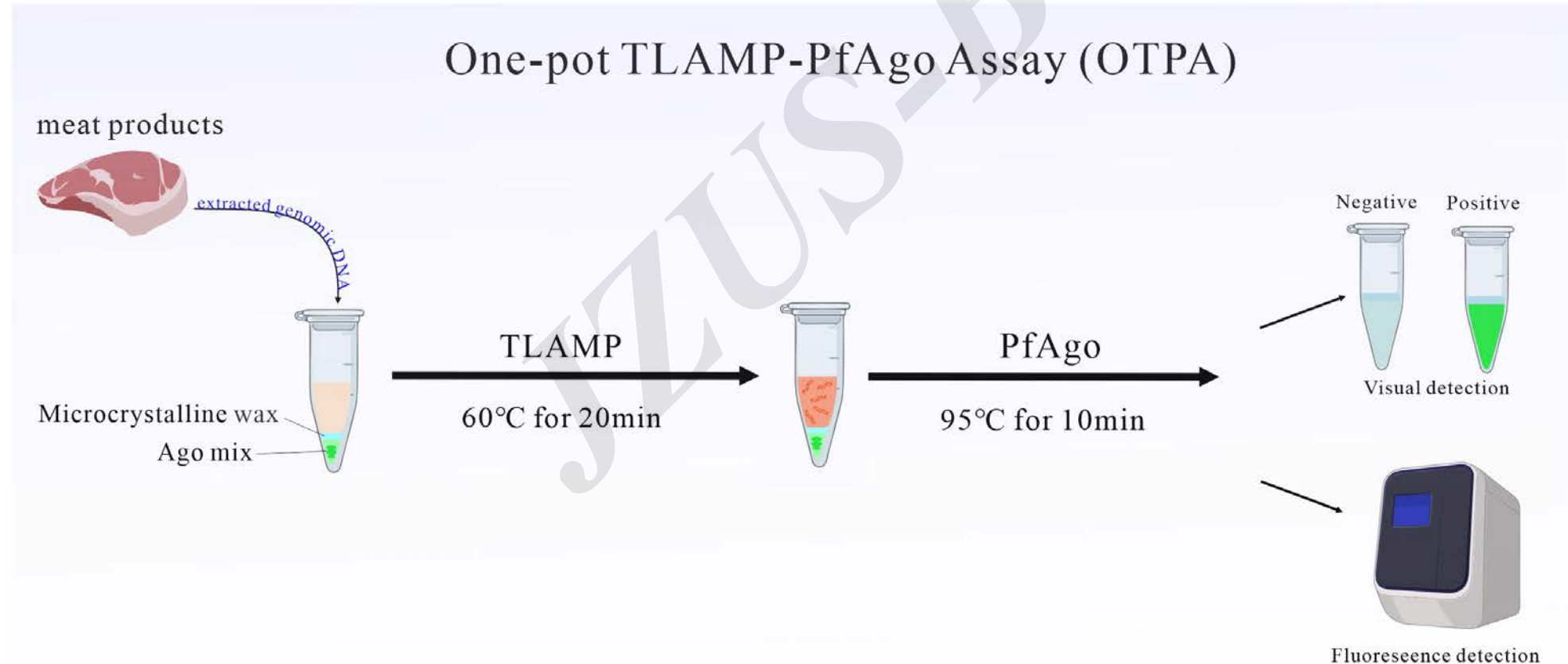
Cite this as: Sheng DING, Jing LI, Minglong YANG, Yujia SONG, Xiangke NIU, Mei LI, Yao LUO, 2026. DNA-based one-pot rapid biosensing platform integrating turn-back loop primer-accelerated LAMP and *Pyrococcus furiosus* Argonaute for meat visual authentication. Journal of Zhejiang University-SCIENCE B, 27(7):775-787. <https://doi.org/10.1631/jzus.B2500745>

DNA-based one-pot rapid biosensing platform integrating turn-back loop primer-accelerated LAMP and *Pyrococcus furiosus* Argonaute for meat visual authentication

Key words: Loop-mediated isothermal amplification (LAMP); Turn-back loop primer-accelerated LAMP (TLAMP); *Pyrococcus furiosus* Argonaute (PfAgo); Meat authentication; One-pot assay; Point-of-care testing (POCT)

Research Summary

In this study, we evaluated cellulose-producing endophytes (CPE) encapsulated in a cellulose-based seed coating for promoting wheat growth



Background & Challenges

Meat Adulteration: A Global Food Safety Issue

- High-value meats are often replaced with cheaper alternatives (e.g., horsemeat, pork)
- Limitations of conventional detection methods:
 - Morphology & chromatography: subjective, labor-intensive
 - Spectroscopy: matrix interference
 - Immunoassays: insufficient sensitivity
- DNA-based methods offer high specificity and sensitivity, but traditional PCR requires thermal cycling and laboratory settings

Urgent Need:

Rapid, portable, visualized, and on-site detection technologies for meat authentication

Innovation points

- OTPA: One-pot TLAMP + PfAgo Assay
- TLAMP: rapid isothermal amplification
- PfAgo: sequence-specific recognition to avoid non-specific signals
- Heat-activatable microcrystalline wax barrier: Physically separates amplification and detection reactions
- Prevents contamination by eliminating lid-opening steps
- Enables true "one-pot" closed-tube operation
- Limit of detection: Pork DNA: 3×10^{-4} ng/ μ L; Beef DNA: 2×10^{-4} ng/ μ L
- Specificity: No cross-reactivity with chicken, duck, rabbit, sheep, or horse
- Time-to-result: 30 minutes
- Visual readout: Direct observation under blue light

