Steam-mediated Isothermal Amplification and Flocculation-based Detection Platform

for Electricity-Free Nucleic Acid Detection at the Point-of-Care

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Supporting Information
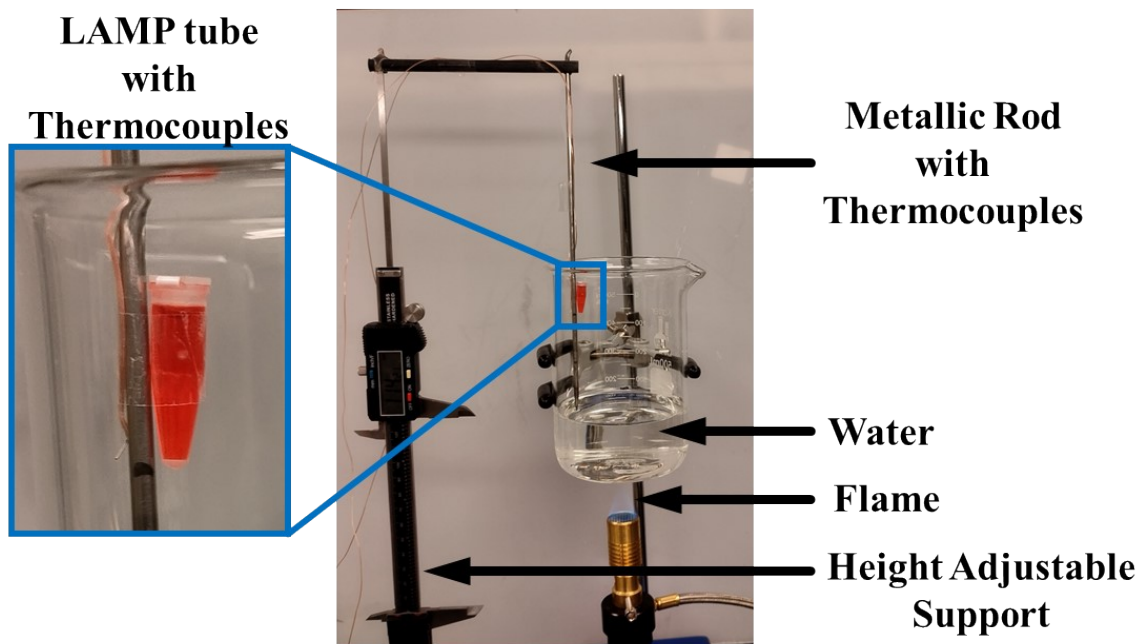
Total number of pages: 6

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SFigure 1. Steam-mediated isothermal heating setup: A borosilicate glass beaker generates steam by boiling water with a butane gas burner. PCR tubes are suspended in the steam wake region using a height-adjustable stainless-steel holder. Type K thermocouples monitor internal and external temperatures, ensuring precise control for isothermal amplification. The LAMP tube is filled with red coloring dye for visualization purposes.

STable 1: Primers used in loop-mediated isothermal amplification assays in the current study.

Target/Type Sequence 5′ > 3′ *lipL32*

Outer forward	CGCCTGTTGGGGAAATCATAC
Outer reverse	GCGATTTGGTCAGGCATA
Inner forward	AGCGTCGCTTACTAAGTCTCCTCGCTGAAATGGGAGTTC
Inner reverse	GCGGCTACCCCAGAAGAAAAACGACATTCTTTCTACACGGA
Loop forward	CGCCTGTTGGGGAAATCATAC
Loop reverse	ATGCCACATTGGTTTGATACTTGG

SFigure 2: Impact of wind and wind shielding on LAMP tube temperatures.
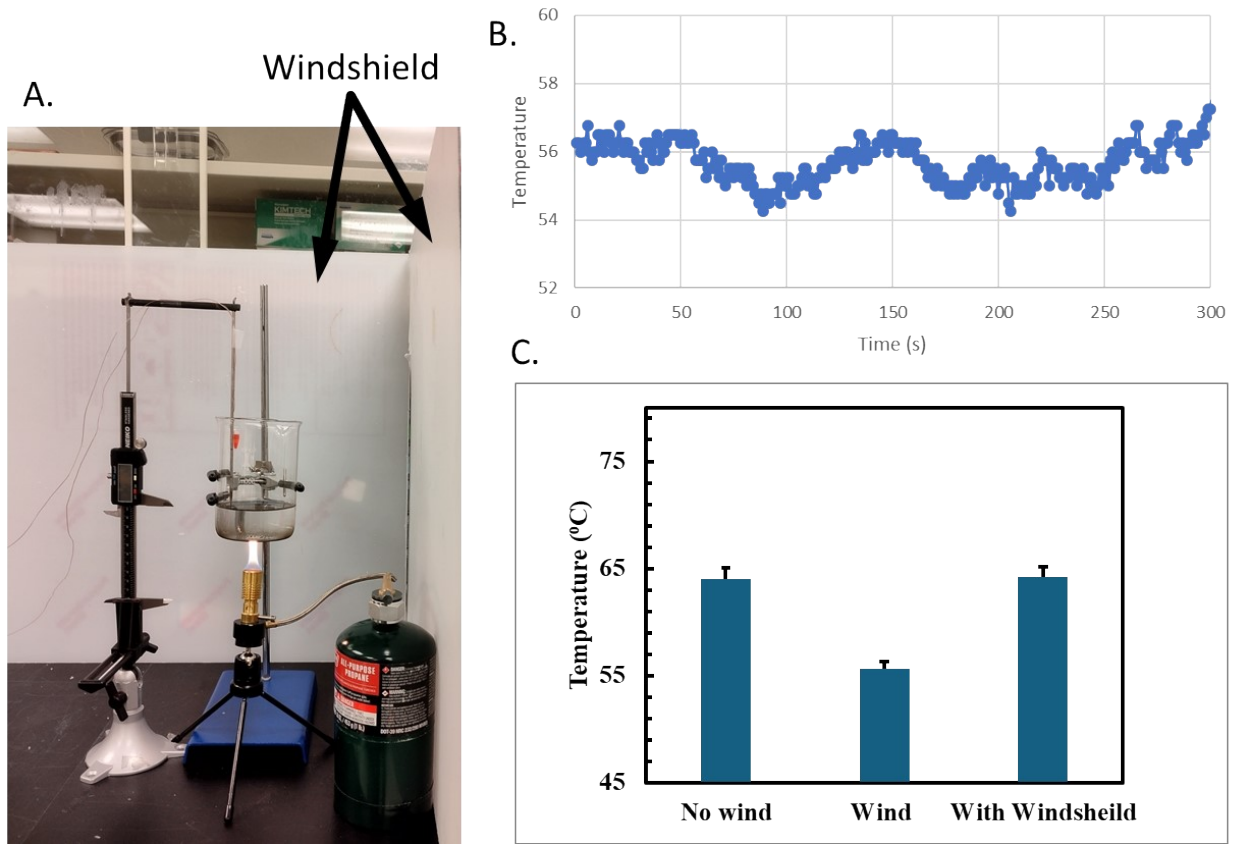
SFigure 2: Impact of wind and wind shielding on LAMP tube temperatures. A. Steam heating setup with the windshield. B. Temperature variation inside the LAMP vial with the wind (simulated by a fan). C. Average temperatures within LAMP tubes were measured under three conditions: no wind, simulated ambient wind of ~4 m/s using a table fan, and simulated wind with a windshield in place. The simulated wind caused a significant drop in tube temperatures, while the addition of a windshield restored temperature stability to levels comparable to the no-wind condition, demonstrating the shield's effectiveness in maintaining consistent thermal environments. Bar plots represent the average temperature over a 5-minute period (n = 300) with standard deviation as error bars.