ACCEPTED ABSTRACTS JOURNAL OF NUTRITION & FOOD SCIENCES 2019, VOLUME 9 | DOI: 10.4172/2155-9600-C3-096

A novel isothermal nucleic acid rapid detection technology and its application in food safety analysis

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Denaturation bubble-mediated strand exchange amplification (SEA) was independently developed by our team in response to the demand for point-of-care testing based on the nucleic acid, which is considered to be the world's leading and the simplest nucleic acid isothermal amplification technology by far. SEA method integrates three innovative R&D achievements of RNA/DNA targets, isothermal amplification, and rapid identification together. Notably, the resulting readout can be realized in 30min by fluorescence or colorimetric method. These features greatly simplified the operating procedure, making SEA method be potential for developing point-of-care testing (POCT) and lab-on-a-chip devices to detect foodborne and clinical pathogens. Moreover, culture fluids and bacteria colony could be directly detected without any pretreatment and the method displayed good specificity and strong anti-jamming capacity, which is easier than the usual method of bacteria culture and greatly reduced the contaminant compared LAMP method. Beyond that, the colorimetric SEA method can be visualized by the naked eyes so that water bath pot or metal bath would be the only equipment needed. Thus SEA has promising potential for screening various numbers of foodborne and clinical pathogens in the field or instrument-free conditions. More than 20 foodborne pathogen detection and species identification kits based on SEA have been successfully developed, such as *Listeria monocytogenes* detection kit and beef detection kit.

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