IIT MADRAS
Indian Institute of Technology Madras

Technology Transfer Office
TTO IPM Cell

Industrial Consultancy & Sponsored Research (IC&SR)

Method for Direct Quantification of Nucleic Acids in Real Time qPCR

IITM Technology Available for Licensing

Problem Statement

- Currently quantitative PCR (**qPCR**) is a robust technique, widely used in biological research for **studying mRNA expression, DNA copy number**, **allele variations** etc. It has revolutionized **diagnostics**, **offering fast, sensitive and specific detection of diseases**: Dengue, Influenza A & B, Zika etc.
- The **qPCR** uses two basic chemistries for quantification of amplicons of which one is cost effective but have **lower specificity** and the other involves **fluorescent probes (FP)** that use sequence-specific oligonucleotides making it **expensive** & successfully prevent **non-specific amplification of the target**.
- Hence, there is an **urgent need** of the present invention that discloses the method to **develop** an **economically feasible sequence specific probe** for **use** in **qPCR** for DNA amplification.

Technology Category / Market

Biotechnology & Genetic Engineering

Industry: Molecular Biology, Biomedical Engg.

Application: Diagnostic, Life science Research

Market: The Global qPCR Instruments Market value is expected to grow from **USD 898.98 million** in **2021** to **USD 1,394.75 million** in **2028** at **3.4% CAGR** from **2021** to **2028.**

Technology

The present patent technology aims to disclose a method for **quantifying nucleic acids** using an **Aptamer-based qPCR (Apt-qPCR) probe** in **real-time PCR**.

This method appears to involve **utilizing a light-up dye-aptamer system**, where the **fluorescence increases significantly** when the dye binds to its specific aptamer.

TRL (Technology Readiness Level)

TRL 3, Experimentally validated in lab.

Intellectual Property

IITM IDF No: **1619 |** IP No.: **393411** (Granted)
PCT No.: **PCT/IN2018/000054**
US Application No. **16/766,205**

Method

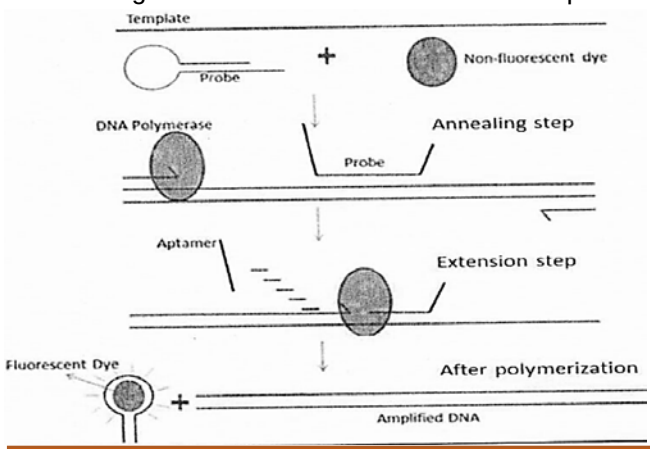
The method for direct quantification of nucleic acids in real-time qPCR, comprises:

using a simple and shorter Aptamer-based qPCR (Apt-qPCR) probe for quantification in real-time PCR wherein the probe uses a light-up dye-aptamer system in which the dye shows negligible fluorescence in the free state and its fluorescence increases manifold when it binds to its specific aptamer;

placing the aptamer 5' upstream of one of the primers wherein the primer initially in pre-annealed form shows fluorescence as aptamer is free and single-stranded & can bind to dye;

performing annealing and extension step to make the aptamer double-stranded & thereby loose its 3D structure to form a double helix wherein the double helix is not specific for the dye and do not bind, therefore reducing fluorescence of the solution corresponding to each cycle of the PCR reaction.

FIG. 1 illustrates a schematic representation of mechanism of action of quantification of nucleic acids using label free endonuclease based probes.



Key Features / Value Proposition

This technology presents an approachable, precise, and cost-effective method for quantifying DNA amplification in real-time PCR, offering benefits across user, technical, & industrial perspectives.

Research Lab

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