

[0006] The (m x n) format in most quantitative polymerase chain reaction (qPCR) platforms is designed for sample-by-assay experiments, in which PCR results need to be addressable for post-run analysis. For dPCR, however, the specific position or well of each PCR result may be immaterial and only the number of positive and negative replicates per sample may be analyzed.

[0007] The read-out of dPCR, that is, the number of positive reactions and the number of negative reactions, is linearly proportional to the template concentration, while the read-out of qPCR (signal vs. cycle) is proportional to the log of the template concentration. For this reason, dPCR typically is constrained to a narrow dynamic range of template input. As a result of the log versus linear, the dPCR analysis offers better resolution for close fold changes than qPCR. Furthermore, the resolution remains approximately linear across the entire dynamic range that is supported.

[0008] However, to determine positive and negative counts for a dPCR result after thermal cycling, also known as endpoint reads, requires determining or setting a fluorescence threshold. Thus, it is a challenge to determine where a threshold should be set to accurately distinguish between negatives and positives because there may be no or low amplifications for each sample. Furthermore, it is also a challenge to determine whether a sample volume contains one copy or multiple copies, for example.

SUMMARY

[0009] In one exemplary embodiment, a computer-implemented method of generating a digital polymerase chain reaction (dPCR) result is provided. The method includes detecting a first set of emission data from a plurality of samples, each included in a sample region of a plurality of sample regions, at a first time during an amplification period. The method further includes determining a positive or negative amplification determination for each sample of the plurality of samples based in part on the first set of emission data. A dPCR result is generated based on the positive or negative amplification determinations for the plurality of samples.

[0009a] According to another exemplary embodiment, there is provided a computer-readable medium encoded with instructions, executable by a processor, the instructions comprising instructions for: detecting a first set of emission data from a plurality of samples, each included in a sample region of a plurality of sample regions, at a first time during an amplification period; detecting a second set of emission data from the plurality of samples at a second time during an amplification period, wherein the first and second set of emission data is included in amplification curve data for each of the plurality of samples; determining a positive or negative amplification determination for each sample of the plurality of samples based in part on the corresponding amplification curve data; and generating a dPCR result based on the positive or negative amplification determinations for the plurality of samples.

[0009b] According to another exemplary embodiment, there is provided system for generating a digital polymerase chain reaction result (dPCR), the system comprising: a thermal cycler for performing amplification on a plurality of samples; a processor; and a memory encoded with instructions for: detecting a first set of emission data from a plurality of samples, each included in a sample region of a plurality of sample regions, at a first time during an amplification period; detecting a second set of emission data from the plurality of samples at a second time during an amplification period, wherein the first and second set of emission data is included in amplification curve data for each of the plurality of samples; determining a positive or negative amplification determination for each sample of the plurality of samples based in part on the corresponding amplification curve data; and generating a dPCR result based on the positive or negative amplification determinations for the plurality of samples.

DESCRIPTION OF THE FIGURES

[0010] FIG. 1 is a block diagram that illustrates a computer system, upon which embodiments of the present teachings may be implemented;