Speeding up DNA purification for gold nanoprobe-based detection assays

Miguel Larguinho[a,b], Gonçalo Doria[a], José Luis Capelo[b] and Pedro Viana Baptista[a*]

[a] CIGMH/DCV, Faculdade de Ciências e Tecnologia, Universidade Nova de Lisboa, Campus da Caparica, 2829-516 Caparica, Portugal, Tel/Fax: +351 212 948 530;

[b] BIOSCOPE Group, Faculty of Science, Physical-Chemistry Department, Campus Ourense, University of Vigo, 32004, Ourense, Spain;

E-mail: *pmvb@fct.unl.pt*

We have previously reported on a gold nanoprobe assay based on colorimetric differentiation between samples, after salt addition: DNA samples harbouring a complementary sequence to the nanoprobe prevent aggregation and the solution retains its original red colour; the absence of a complementary sequence does not stabilise the nanoprobe and aggregation occurs, with subsequent colour change from red to blue[1,2].

Sample pre-treatment is a crucial step in most biomolecular recognition assays. Current isolation and purification procedures often require enzyme digestion steps and organic solvent extractions in order to refine the sample for biosensing assays. Ultrasonic energy has already proven to be a viable and fast option in generating fragments from purified DNA samples[3]. We report an inexpensive, fast and simple methodology for nucleic acids extraction for improvement of the subsequent detection using a gold nanoprobe-based colorimetric assay. This work uses an ultrasonic platform as a means for simultaneous cell disruption and biomolecules fragmentation. Afterwards, a quick enzyme-free procedure for further DNA purification is used, in order to remove some contaminants which may hamper the detection step. By using the sonoreactor for simultaneous cell bursting and DNA fragmentation, this protocol saves time and enhances the target availability for hybridisation with the nanoprobes.

References

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