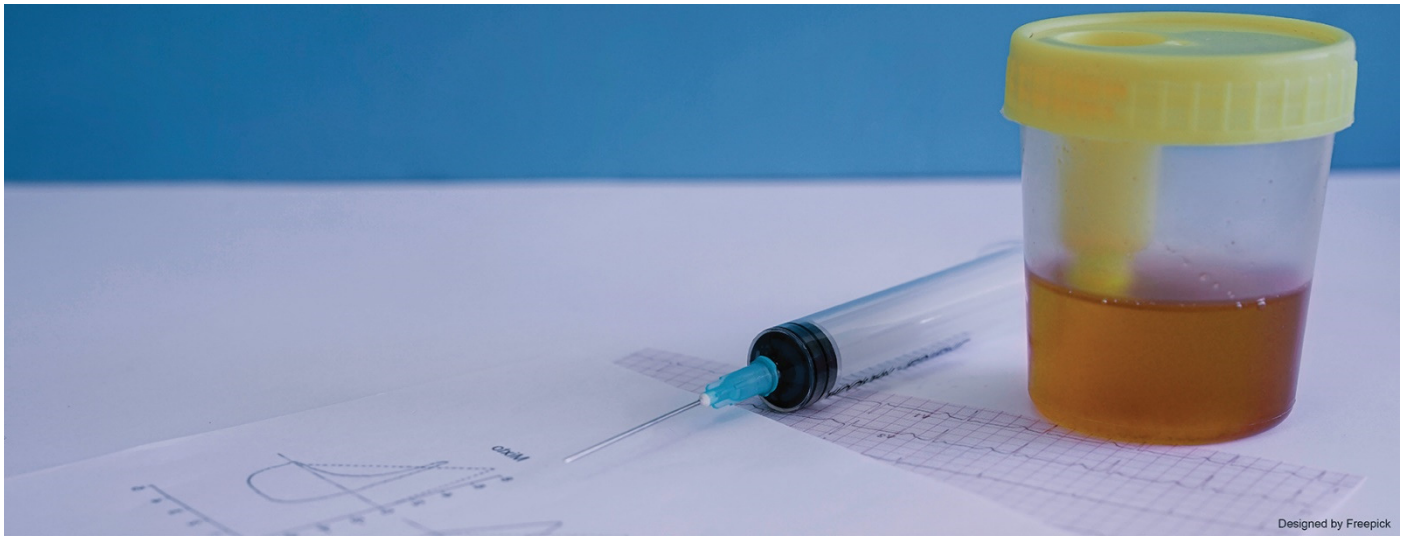
PSA PURIFICATION AND CONCENTRATION FROM URINE SAMPLES FOR NON-INVASIVE EARLY STAGE DIAGNOSIS OF PROSTATE CANCER



TECHNOLOGY SUMMARY

New method for the pretreatment of human urine samples, comprising the simultaneous extraction, concentration and purification of the prostate-specific antigen (PSA), a prostate cancer biomarker.

In this technology, aqueous biphasic systems composed of ionic liquids and salts are used. These systems allow the selective extraction of PSA and to obtain high concentration/enrichment factors, enabling the quantification of PSA using less sophisticated, cheaper and more affordable equipment.

BENEFITS

NON-INVASIVE: this technology allows the use of urine as sample for PSA quantification.

SELECTIVE AND EFFECTIVE EXTRACTION, PURIFICATION AND CONCENTRATION OF PSA AND ITS ISOFORMS, allowing the use of urine for primary or complementary prostate cancer diagnosis and evaluation.

CHEAPER AND SIMPLER ANALYTIC TECHNIQUES: as high concentration factors are obtained, it is possible to quantify PSA with simpler analytical techniques, and requiring less laborious pre-treatment techniques.

POTENTIALLY HIGHER PREDICTIVE VALUE thanks to PSA and respective isoforms specific extraction.

CONTEXT

The PSA (tumor biomarker) quantification in serum is currently used for the early stage diagnosis of prostate cancer (PCa). However, most of the available techniques for PSA quantification require extensive sample processing and expensive analysis (e.g. ELISA) that are mostly unavailable in low-income countries in which the mortality associated to PCa is higher. Furthermore, blood is an invasive matrix that requires certified personnel for collection. PSA is also present and can be detected in urine, a less invasive matrix. However, the current methods for its quantification in urine are highly expensive and cumbersome.

The developed cost-effective technology allows the simultaneous specific extraction, concentration and purification of PSA from urine samples using aqueous biphasic systems (ABS) composed of ionic liquids and salts. This technology allows a lossless and contaminant-free extraction and high concentrated factors in a single-step.

APPLICATIONS

QUANTIFICATION OF PSA AND ITS ISOFORMS IN URINE

EARLY STAGE DIAGNOSTICS AND ASSESSMENT OF PROSTATE CANCER TREATMENT EVOLUTION AND EFFICIENCY

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IP RIGHTS

Provisional patent application filed in Portugal (priority date: 29-10-2018).

DEVELOPMENT STAGE

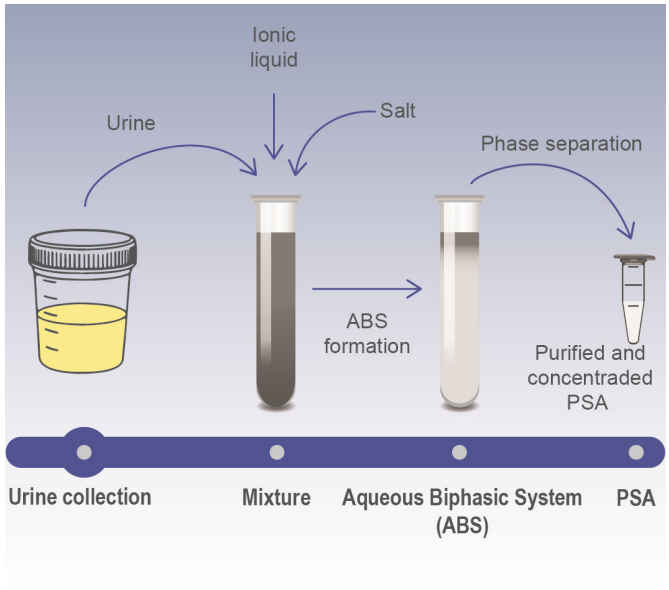
TRL 4: small-scale laboratory prototype.

The method was tested in real urine samples from healthy individuals, to which PSA was added into known concentrations. A study with samples from patients in different prostate cancer stages, with known blood PSA levels is ongoing. The required minimum urine sample volume is 25mL.

It is expectable that with the appropriate support from partners, 10 months will be sufficient to scale-up and to introduce de technology in the market.

KEYWORDS

PROSTATE SPECIFIC ANTIGEN (PSA)
URINE
IONIC LIQUIDS
PRETREATMENT
AQUEOUS BIPHASIC SYSTEMS (ABS)



DEVELOPED BY

Researchers from Aveiro Institute of Materials (CICECO) from the University of Aveiro.

BUSINESS OPPORTUNITY

Licensing agreement.

PARTNERSHIP

The University of Aveiro seeks industrial partners within health area, with interest in the development and/or commercialization of new diagnostic/prognostic tests or of clinical analysis.

CONTACT

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Technology #CI18012

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