

Development of sarcosine quantification in urine based on enzyme-coupled colorimetric method for prostate cancer diagnosis

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Vichanan Yamkamon

Department of Clinical Microscopy, Faculty of Medical Technology, Mahidol University, Bangkok 10700, Thailand

Benjarong Phakdee

Department of Clinical Microbiology and Applied Technology, Faculty of Medical Technology, Mahidol University, Bangkok 10700, Thailand

Sakda Yainoy

Department of Clinical Microbiology and Applied Technology, Faculty of Medical Technology, Mahidol University, Bangkok 10700, Thailand

Thummaruk Suksrichawalit

Center of Data Mining and Biomedical Informatics, Faculty of Medical Technology, Mahidol University, Bangkok 10700, Thailand

Tararat Tatanandana

Department of Clinical Chemistry, Faculty of Medical Technology, Mahidol University, Bangkok 10700, Thailand

Premasant Sangkum

Department of Surgery, Faculty of Medicine Ramathibodi Hospital, Mahidol University, Bangkok 10400, Thailand

Warawan Eiamphungporn

Department of Clinical Microbiology and Applied Technology, Faculty of Medical Technology, Mahidol University, Bangkok 10700, Thailand

Abstract

An enzyme-coupled colorimetric assay for quantification of urinary sarcosine was developed. The proposed method is a specific reaction based on hydrogen peroxide (H₂O₂) formation via sarcosine oxidase (SOX). The liberated H₂O₂ reacts with Amplex Red in the presence of horseradish peroxidase (HRP) to produce the red-fluorescent oxidation product, resorufin, which can be measured spectrophotometrically (OD570). The method was performed in the 96-well microtiter plate. Reaction conditions, such as pH and reaction time were optimized. At the optimum conditions, the limit of detection (LOD) and quantification (LOQ) were found to be 0.7 and 1 μM, respectively. A good linearity was revealed with a coefficient of 0.990. The assay showed no significant interference from ascorbic acid, glucose and bilirubin. In addition, it is extremely specific for sarcosine rather than other amino acids. The determination of sarcosine in human urine displayed high accuracy and good reproducibility. This method is promising to differentiate prostate cancer patients from healthy subjects according to urinary sarcosine level. Altogether, this study provides a rapid, simple and specific tool to determine urinary sarcosine which could be useful for prostate cancer diagnosis.

How to Cite

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