

PROCEEDING

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The editing of this proceeding has been carried out by **B. Kuswandi** with assisted by the Scientific Committee of **HALALSTECH+ 2012**.

Preface

The **HALALSTECH+ 2012**, 'International Conference On Halal Science & Technology: Current issues on Food, Pharmaceutical & Health Products 2012' took place in Sanur Paradise Plasa Hotel, Denpasar Bali Indonesia on 4-6 July 2012. This conference has been hosted by the Faculty of Pharmacy, University of Jember (UNEJ), Indonesia, in collaboration with the Faculty of Science & Technology Universiti Kebangsaan Malaysia (UKM), and the Faculty of Science & Technology, Universiti Sains Islam Malaysia (USIM).

This proceeding contains papers that have been presented at the **HALALSTECH+ 2012** as plenary lectures, keynote, oral and poster presentations. About 100 participants attended the conference, with 11 plenary lectures, 1 keynote lectures and 22 oral and 14 poster presentations. The proceeding of **HALALSTECH+ 2012** has been published in electronic form as *.pdf file for simple and easy publication and to avoid heavy book of proceeding. We hope that this publication can be easily read, handled and transferred to other form. Furthermore, this paperless proceeding can be fruitful for all participants of the conference.

My sincerely thanks go to all the members of Scientific Committee for their valuable help in the review of the submitted papers, and also to the authors for their collaborative attitude. A special mention must go to our organizing committee, who has put in a terrific amount of effort not only in general conference matter but also in the assembly of the papers for this proceeding. Finally, I congratulate the authors of all papers for producing the new and novel idea in areas of food, pharmaceutical and health products related to halal issues as well as other related fields.

Jember, July 2012



B. Kuswandi

Editor

HALALSTECH+ 2012 Proceeding



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Development of Paper Based Biosensor for Formaldehyde Detection in Food Samples

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Abstract

The abuse of formaldehyde as food preservative can cause toxicities in human body such as abdominal pain with vomiting, central nervous system depression and blood stream failure. The availability of formaldehyde in food & clinical samples can be determined conventionally by gas chromatography, high performance liquid chromatography and spectrophotometer. The disadvantage of the standard methods are less practical, expensive and require an analytical expert. In this regards, the development of new method with simple, easy and low-cost for formaldehyde analysis is important. In the present study, the biosensor was fabricated based on alcohol oxidase and tetramethylbenzidine on the patterned paper by screen printing technology. The presence of formaldehyde can be detected via the color change from pale blue into deep blue, which can be used for quantitative measurements using flatbed scanner. The pixel colors were calculated using ImageJ software and it can be found that 10 serials of standard formaldehyde solution (0.5-5.0 ppm) were linear with their blue pixel ($r = 0.995$). The biosensor has limit of detection and limit of quantification toward formaldehyde were 0.143 and 0.477 ppm respectively. The biosensor was applied on the noodle and meatball samples in Jember's local market. The biosensors show good reproducibility ($RSD < 1\%$) on formaldehyde detection in sample simulation and real food samples ($n=3$). The formaldehyde detection was not interfered by sugar and salt at 1:10 ratio respectively.

Keywords : Biosensor, formaldehyde, alcohol oxidase, tetramethylbenzidine, filter paper

Introduction

The Indonesian National Agency of Drug & Food Controlling (NADFC) has been recognizing the abuse of formaldehyde as food preservatives in many Indonesia's local market. From the investigation which has executed by NADFC in 2006, it was found that many food samples such as noodle, meat ball and fish were contaminated by formaldehyde. In 2007, many imported food products in Indonesia are banned by NADFC because of their formaldehyde content (NADFC, 2007). In addition,

NADFC also confiscated 700 kilograms of wet noodle which contain formaldehyde at Jogjakarta local market in 2010 (NADFC, 2010). The abuse of formaldehyde as food preservative can cause toxicities in human body such as abdominal pain with vomiting, central nervous system depression and blood stream failure (Saraswati *et al.*, 2009). The availability of formaldehyde in food & clinical samples can be determined conventionally by gas chromatography (Dalene *et al.*, 1992), high performance liquid chromatography (Tomkins *et al.*, 1989) and