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Ethanol Determination of Some Indonesian Medicines, Beverages and Various Tape Products by Enzymatic Assay

Ethanol Determination of Some Indonesian Medicines, Beverages and Various Tape Products by Enzymatic Assay

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ABSTRACT

Ethanol can be found in various medicines, beverages and also foods products. Enzymatic assay based on oxidation reaction of ethanol catalyzed by alcohol dehydrogenase is among the methods used for ethanol determination. The present study was intended to utilize this enzymatic assay to determine the ethanol content of some liquid medicines, beverages and also various tape products at different fermentation time points. The results of the present study indicate that ethanol content of the liquid medicines and beverages examined in this study were mainly in agreement with the information provided by manufacturer. Furthermore, in this study, the ethanol content of three *tape* types (black sticky rice, white sticky rice and cassava tuber) during seven days of fermentation were investigated. The ethanol content increased rapidly for the black and white sticky rice *tape* up to 5 days of fermentation, reached 9.5 and 8.1% (v/v), respectively. The ethanol content of black sticky rice *tape* remains constant up to the seventh day. However, the ethanol content of white sticky rice *tape* decreased at the sixth day of fermentation. While for cassava tuber *tape*, the ethanol content increased slowly during the first three days of fermentation and increased rapidly at the fourth day, followed by decrease of the ethanol content at the fifth day. The highest ethanol content of the cassava tuber *tape* was 4.5% (v/v) at the third day of fermentation.

Keywords: alcohol dehydrogenase, tape, alcoholic beverage, ethanol, liquid medicine

INTRODUCTION

Ethanol is one of important constituents in many everyday products including medicines, beverages and foods. Information of ethanol content provided in the label of particular products is sometimes not necessarily correct, and therefore need to be confirmed. Ethanol content of a product can be determined using volumetric titration (Friedmann and Klaas 1936), spectrophotometry (Magrí *et al.* 1997; Zanon *et al.* 2007), high performance liquid chromatography (HPLC) (Kudoh *et al.* 1984; Ishmayana 2011), gas chromatography (GC) (Penton 1985; Tangerman 1997) and Fourier transform infrared (FTIR) (Garrigues *et al.* 1997; Lachenmeier *et al.* 2010). Determination of ethanol content based on oxidation of ethanol by alcohol dehydrogenase was proposed by several authors (Bernt and Gutmann 1974; Ough and