In vitro antibacterial activity of the leaf extracts from Sida rhombifolia L.

Irma Ratna Kartika*, Muktiningsih, Suhartono, Fera Kurniadewi

Department of Chemistry, State University of Jakarta,
Jalan Pemuda 10 Jakarta 13220, Indonesia
*Corresponding author: irmaratna@unj.ac.id

Abstract

The research aim is to investigate in vitro antibacterial activity of the leaf extracts from Sidaguri (Sida rhombifolia L.) against Escherichia coli. The leaf extracts were derived from extraction method using various solvents such as n-hexane, ethyl acetate and water. Antibacterial assay was conducted by using agar disc diffusion method. The n-hexane extract from S. rhombifolia L leaf demonstrated moderate inhibition zones of in vitro antibacterial activity against E. coli with MIC of 400 ppm. The inhibition zones obtained from the extracts with MIC of 400 ppm were compared to commercial antibiotics such as chloramphenicol (30 µg), kanamycin (30 µg) dan erythromycin (30µg). The results indicated that the inhibition mechanism action of the extracts was assumed similar to erythromycin.

Keywords: antibacterial activity, Escherichia coli, Sida rhombifilia, Sidaguri, erythromycin

Introduction

E. coli (short for Escherichia coli) is a gram-negative bacterium that can produce a bloody diarrhea due to toxins it secretes when it infects human intestinal tracts. The symptoms of E. coli infection may include a low fever, nausea, vomiting, stomach cramps, and bloody diarrhea. Bacteremia, wound infections, urinary tract infection, and gastrointestinal infections are the diseases associated with E. coli and are often fatal in newborns (Patoli et al., 2010). An estimated 6810 cases are reported in DKI Jakarta (year 2004) and 7600 cases in year 2005 (Jakarta Dalam Angka, 2005). Food and water borne outbreaks of E. coli have been documented from a number of countries (Ogden et al., 2001).

The difficulties in the treatment of food and water associated gastrointestinal diseases due to E. coli have been reported. This problem is compounded by the continued emergence of antibiotic resistance to a growing number of antibiotics. Resistance was seen against Nalidixic Acid (92.6%), followed by Ampicillin (88.89%), Ceftriaxone (40.74%), Ciprofloxacin (37.04%), Ceftazidime (25.23%), Cefotaxime (18.52%), and Gentamicin (18.52%) (Patoli et al., 2010). Based on the above condition, nowadays, the scientists become interest in medicinal plants which reflects recognition of the validity of many traditional claims regarding the value of natural products in health care and the development of discovering the available antibiotics. This has led the authors to investigate the in vitro antibacterial activity of the leaf extracts from Sida rhombifolia L. (Sidaguri). This plant has been used in traditional medicine and several therapeutic activities. Islam et al. (2002) reported that the petroleum ether, chloroform and ethyl acetate extracts of the stem plant were found to be significant in vitro antibacterial activities against Bacillus subtilis, Sarcinia lutea and Shigella shiga.

Materials and Methods

Collection of Plant

Fresh leaves of plant were collected from Jl. Radio RT 11 / RW 05, Kelurahan Cipedak, Jagakarsa, Jakarta Selatan. Plants are identified and confirmed with the authentic. Fresh leaves were shade dried under room temperature and powder was used for further investigation.

Extraction

A soxhlet apparatus was used for the extraction of the leaves by using n-hexane. A maceration of the leaves powder used ethyl acetate for three days and 200 gram of powder was boiled with 2 L aquadest to get one fifth of the solution. The collected extracts were concentrated by evaporation under room temperature and used for antibacterial activity. The collected extracts were then chosen for antibacterial activity.