

CHAPTER 1

INTRODUCTION

1.1 Background

Candidiasis is a condition caused by the yeast like fungi, *Candida* causing infections of the skin and mucous membranes which are usually due to the species, *Candida albicans*. *Candida albicans* is commonly found in vaginal infections in women and also cause mouth infections in individuals with impaired immunity or in those taking certain antibiotics. *Candida albicans* is found on most normal individuals but do not usually cause any problem to most of them. More severe cases of candidiasis are increasingly common in recent years mainly due to the overuse of antibiotics, the rise in the number of AIDS cases, the increase in organ transplantation and increased usage of invasive devices contribute to the increase in susceptibility to infection. (Scully, 2012; Lampert, 2006).

Candida species are opportunistic pathogens that enter to the circulation and deep tissues through modern technological advances. A *Candida* infestation can be divided into two different levels, *mucocutaneous* and *systemic candidiasis*. *Mucocutaneous candidiasis* consists of infections of the mucous membranes such as infections of the mouth and tongue known as *thrush* (oropharyngeal candidiasis), vagina, esophagus, and gastrointestinal tract which are considered more common and thought of as being more superficial or on the outer parts of

the body. The other level of infestation which is known to be much stronger is known as *disseminated (systemic) candidiasis*. This level involves *Candida* in the bloodstream and infecting the organs of the body which can be dangerous and even life-threatening, especially if it involves the non *C. albicans* types like *C. glabrata* and *C. tropicalis*. *Candida* which have infested a body for a longer time have a higher probability of entering the deeper levels of the body. (White, 2000; Hidalgo and Vazquez, 2010).

Candida species are the most common cause of fungal infections in immunocompromised persons mainly due to the fact that oropharyngeal colonization is found in 30-55% of healthy young adults and may make up 40-65% of normal fecal flora. Vulvovaginal candidiasis can occur at least once in the lifetime of three out of every four women worldwide. Individuals with HIV and are not receiving highly active antiretroviral therapy have been recorded to have oropharyngeal candidiasis in 90% of the population with 10% eventually developing oropharyngeal candidiasis at least once. The lack of reliable diagnostic methods and delays in diagnosis for detection of fungemia and *Candida* invasion of the body tissues have caused the management of serious and life-threatening invasive candidiasis to be severely hampered. (Hidalgo and Vazquez, 2010).

Herbal therapy has been gaining in popularity as an alternative therapy for diseases. Indigenous plants which are known as foods and medicine, have been used around the world for a long time as treatment for fungal infections in which the plants are known for their antifungal and antimicrobial properties. It is estimated by the WHO that there are about 80% of the world population that use herbal medicine for primary health care which include garlic, oregano oil, tea tree

oil, grapefruit seed extract, goldenseal and ivy leaf extract. Recent studies have confirmed the efficacy of many of these preparations, some of which are remarkably effective. Only those herbs that appear most effective are relatively non-toxic.

Annona muricata L., commonly known as soursop or *sirsak* in Indonesia, is a small, upright evergreen plant native to the lowlands of the Neotropic, probably to the Antilles or Mesoamerica and widely cultivated in the tropics for its delicious fruit which is yellow green in color with white flesh. Its bark and leaves have been shown in studies to have hypotensive, antispasmodic, anticonvulsive, and vasodilator activities while its leaves and stems have been found to be cytotoxic against cancer cells. The soursop plant also contains in vivo antitumor, anticancer, antimicrobial, antiparasitic, antifungal and anti malarial properties. (Family Content, 2006; EBL Greenhouse, 2012; McLaughlin, 2008)

The main phytochemicals of *Annona muricata* L. are annonaceous acetogenins which include annocatalin, annohexocin, annomonicin, annomuricatin A & B, annomuricin A thru E, annonacin and annonacinone. Other notable chemicals are gentisic acid and condensed tannins. (Taylor, 2002; Arthur *et al*, 2011)

Soursop leaf is chosen for this study because this plant is easily available in tropical countries and should be researched on to determines its antifungal effect in candidiasis patients.

1.2 Problem Formulation

On the basis of the background above, the research problem is formulated as follows:

- Does *Annona muricata* leaf have antifungal effect towards *Candida albicans* in vitro?

1.3 Objective of the Research

The objectives are divided into general objective and specific objectives.

1.3.1 General Objective

1. To know the antifungal effect of *Annona muricata* leaf extract on the growth of *Candida albicans* in vitro.

1.3.2 Specific Objectives

1. To find out the effect of different concentrations of soursop leaf extract on the growth of *Candida albicans* in vitro.
2. To find out the minimum inhibitory concentration (MIC) and minimum fungicidal concentration (MFC) of *Annona muricata* leaf extract on the growth of *Candida albicans* in vitro.

1.4 Significance of the Research

1. To learn about the inhibitory or fungicidal effects of *Annona muricata* leaf extract in *Candida albicans* colony.
2. To explore the benefits of *Annona muricata* leaf as an anti-fungal remedy.
3. To reduce the complications of pharmacotherapeutic treatment by using alternative treatment of natural resources rather than chemical substances.

4. To introduce the benefits and encouraging the usage of *Annona muricata* leaf in treating fungal infections.
5. To impart knowledge to the society about another alternative herbal way in treating candidiasis.

