

## CHAPTER I

### INTRODUCTION

Nowadays, natural products from plants that can promote health benefit and disease prevention are of interest. These green medicines possess advantages over pharmacological treatments or medical drugs in terms of less adverse effects, cost effectiveness and availability. Recently, epidemiological studies have suggested that consumption of plants with natural antioxidants can potentially prevent oxidative stress related diseases such as cardiovascular disease, Alzheimer's disease (AD) and some types of cancers [1]. The beneficial effects of fruits and vegetables have attributed three major groups of antioxidants, including phenolics, vitamins and carotenoids [2]. Other than being strong antioxidants, some bioactive compounds have been previously reported to possess biological functions against some non-communicable disease *via* inhibition of some key enzymes [3].

Pandan (*Pandanus amaryllifolius* Roxb.) is classified into the family of Pandanaceae. This plant is easily populated and cultivated in tropical and sub-tropical regions. Its leaves are widely used as food ingredients and flavoring. Moreover, pandan leaves are used for aromatherapy and medical industry [4] due to abundant availability of essential oil, carotenoid, vitamin E and other bioactive compounds [5]. The key essential volatile compound in pandan leaves is 2-acetyl-1-pyrroline, which used for aromatherapy to improve respiratory tract and relaxing [6, 7]. Leaves extract of pandan is also used as anti-bacterial and anti-viral agent [8, 9, 10]. Moreover, it contains phytosterol, stigmasterols and bioactive phytochemicals that can prevent occurrence of cancer through multiple pathways, including apoptosis and signal transduction in modulation [3].

Our preliminary study suggested that tea from pandan leaves could control AD occurrence through cholinesterase inhibition. The data also showed that cholinesterase inhibitory activities of pandan tea were even greater than those of ginger tea, which was previously reported to improve clinical status in AD patient

[11]. Other researches in AD also focused on cholinergic hypothesis and  $\beta$ -amyloid formation of rhizome and root of ginger, ginseng and turmeric [12]. Therefore, it would be of great interest whether pandan leaves can control AD development through termination of physiological role of cholinergic synapses,  $\beta$ -amyloid formation and oxidative stress induction.

This research was focused on pandan leaves and anti-AD in attempt to provide alternative pathway for potential AD prevention. The experiment was initiated by collecting pandan leaves from 6 regions in Thailand, since different environments such as quality of soil, humidity and sun light exposure may affect bioactive compounds in pandan leaves. Then, the optimum extraction conditions of bioactive compounds from pandan leaves were investigated, and the phytochemicals from pandan leaves were analyzed. Since pandan leaves are normally consumed as tea and juice, the effect of cooking processes on pandan leaves was, as well, examined regarding anti-AD properties. In the future, it is of great interest to promote these indigenous drinks as alternative pathway for potential AD prevention.