

EXTRACTION AND PURIFICATION OF ANACARDIC ACID FROM CASHEW NUT SHELL

INTRODUCTION

The cashew tree, *Anacardium occidentale* Linn, is one of the economically important plants in Thailand, and is a multi-purpose plant. Many parts of the tree can be made use of such as root, core, leaves, cashew nut, cashew apple, liquid from nut shell, cashew testa and cashew kernel. Among these, two most important parts in commercial is the cashew nut for diet and the liquid from nut shell for various industrial and medical applications.

Cashew nut processing industry involves several steps such as pre-grading, drying, peeling, grading, and packaging. In the peeling stage, the shell is removed after putting out the kernels. The sheer volume of cashew nut produced annually poses a challenge for waste disposal of cashew nut shell generated along the production line. Research and development have shown that valuable chemicals can be extracted from the shell. Therefore, it is wise to extract as much of the cashew nut shell liquid (CNSL) prior to disposal. This will ultimately help reduce the environmental load for the residual portion of the shell.

CNSL is often considered as a good and cheap natural source of unsaturated phenols, which are excellent monomers for polymer production. Cardanol has numerous applications in polymer based-industries, such as friction linings, paints, vanishes, laminating resins, etc. Moreover, anacardic acid (6-pentadecylsalicylic acid), a major component of cashew nut shell liquid (CNSL), is obtained by solvent extraction of cashew nut shells. The presence of a long alkyl chain in anacardic acid is attributed to a variety of biological activities, such as antibacterial activity, antimicrobial activity, and tyrosinase inhibition. To explore the potentials of anacardic acid, it has been extensively derivatized to drug analogues by several researchers. Other CNSL constituents have also gained interest in many industrial applications.

Nowadays, cashew nut is one of the key elements in the international trading markets including Thailand. Unfortunately, little attentions have been paid to the utilization of abundantly available by-product of the industry. Raising public awareness is necessary for locals to take advantage of this natural resource, which is in part of supporting the sufficiency economy. This work focused on the development of a method for comprehensive isolation of major phenolic constituents from CNSL especially anacardic acid, which can be of importance in pharmaceutical application. However, the batch process developed should be further improved upon for continuous operation if mass production is considered.

OBJECTIVES

To investigate the effects of operating parameters including temperature, solvent-to-cashew nut shell ratio, type of organic solvent and method of extraction on the extraction performance towards anacardic acid.

Scope of Thesis

Laboratory-scale batch process of solvent extraction was performed for extraction of anacardic acid from cashew nut shell. Extraction experiments were carried out at 30°C and 50°C using n-hexane, methanol, and ethanol as solvent. The solvent-to-cashew nut shell ratio was varied from 40 ml: 10 g to 100 ml: 10 g.