CHAPTER I

INTRODUCTION

1.1 Introduction

Rice[1] *(Oryza sativa* L.) is the most important cereal crop cultivated in the world, which feeds more than half the world's population. According to FAO, the world rice production in the year 2000 was about 594 million tons. About 8% of this amount is the rice bran fraction—a by-product of rice processing, which is normally used as a high protein animal feed. Agricultural by-products are often treated as waste materials and therefore their high nutraceutical value is lost. In spite of that, special attention is being given to edible oil/food supplement production from food processing by-products in the last few years.

Rice bran oil (RBO) is a valuable cooking oil, consumed specially in east Asia [2] Approximately 80 thousand tons of RBO are consumed annually in Japan [3]. The oil has received attention because of its unique health benefits, due to the fact that it contains a large amount of bioactive nutraceutical compounds like oryzanol and tocotrienolen (Vitamin E). These have been showed to have several beneficial applications and effects including lowering blood plasma cholesterol levels. The commercial production of RBO in year 2000 was estimated to be about 783 thousand tons, and the usual process is extraction with hexane.

Rice, the nation's major crop, is one of the major agricultural row crops produced in Thailand. The raw agricultural product can also be used to produce additional products such as rice bran oil after the milling process. When these additional products are

produced, new by-products or wastes are also generated which don't have markets and therefore have no known added value. Rice wax is one such waste by product and the issue is can the value of this waste by-product be increased. Rice wax is a mixture of unknown composition and it was assumed by separating and characterizing the components that the value of this material could be better determined. Rice wax is difficult to resolve into its components by conventional methods, usually used vacuum distillations however, this method has high expense and large energy transfers.

1.2 Objectives of the research

1. To purify rice bran wax modified TREF and Crystaf technique.

2. To characterize physical properties of chemical properties of separated rice bran wax.

3. To use TREF and Crystaf techniques as an alternative method to purify rice bran wax.

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mostly about 1.0-2.0 °C /h, the crystallization time is time-consuming too. Not only is this time-consuming, but also energy intensive, wasting a lot of power on the gradual heat removal from the system.

The TREF, polymer separation technique, was applied to rice wax separation problem. This technique can divide into two stages. The first stage involves dissolving the polymer in a suitable solvent at high temperature and loading the resulting solution onto a column containing an inert support. The second stage is solvent flows through the column while the temperature is gradually increased; thus eluting the fractions sequentially precipitated in the first stage.

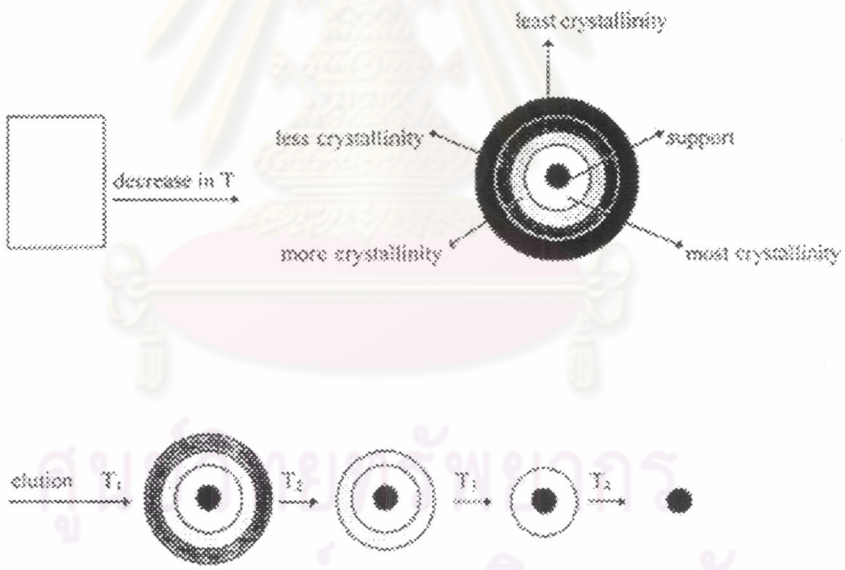

Figure 1: Mechanism of Temperature Rising Elution Fractionation