

Chapter 1

Introduction

1. Research background

Sangyod rice is a native rice in Southern Thailand. It was originally grown around the Songkla Lake area. Most Sangyod rice is grown in Phatthalung province. Sangyod has excellent taste and color characteristics. The brown rice grain is red and the coarse rice is pink and white. Sangyod rice has been a protected rice variety under the law of geographical indications (GI) since 2006. Analysis of the nutrient volume has found that Sangyod rice has high nutritional value, namely, iron, vitamin B and niacin. Sangyod rice is a nutraceutical food because it contains antioxidants such as vitamin E, gamma oryzanol and anthocyanins. These compounds are effective free radical scavengers with anti-inflammatory and anti-cancer activities.

The increasing rate in incidences of chronic diseases such as cancer and cardiovascular disease is alarming and reactive cell-damaging free radicals are implicated in these diseases. This is a major reason for the heightened interest in antioxidants that are found in Sangyod rice. The production of Sangyod rice in Phatthalung province is approximately 10,000 tons per year, and 400 tons of Sangyod rice bran are the by-product from the rice mill factory. Most of rice bran is sold for animal feed.

Mechanical extraction of vegetable oil (cold-press procedure) is becoming an interesting substitute for conventional practices because of consumers' desire for natural and safe food products. Over the last few years, increased interest in cold-pressed plant oils has been observed as these oils have better nutritive properties than those after refining. Cold pressing is simple, ecological and does not require much energy. Gamma oryzanol (phytosterol) from rice bran oil comprises advantageous antioxidant properties and solves health problems such as: reducing plasma cholesterol, increasing testosterone levels, and treating menopausal disorders. Our

preliminary test found that Sangyod rice had a high antioxidant activity. The mechanical extracted (cold-press procedure) Sangyod rice bran oil contained 1.64% (16,400 ppm) of gamma oryzanol. However, normal rice bran oil contained 400-1000 ppm of gamma oryzanol. Therefore, it is possible to value-add Sangyod rice by using mechanical extraction to produce commercial Sangyod rice bran oil and it could be used in functional food, supplements, pharmaceuticals and the cosmetic industry. In the food industry, phytosterols were originally added to high-fat foods where solubilization and dispersion are relatively simple. For phytosterols to be introduced into aqueous-based foods, they need to be either suspended or emulsified. Emulsion technology is currently available for the encapsulation of bioactive lipid and applications in functional food.

Although numerous studies have been conducted on the various stabilization methods and solvent extraction systems to extract the maximum amount of this high-value antioxidant from rice bran, only few studies have been done for locally produced rice bran oil by use of mechanical extraction. The purposes of this work are to study the effect of mechanical extraction on the chemical, physical and antioxidant activities of Sangyod rice bran oil and produce the stable emulsion for application in functional food products.

2. Objectives

1. To study the effect of mechanical extraction on chemical, physical, and antioxidants properties of SRBO.
2. To investigate yield and chemical properties of solvent extracted and cold-pressed rice bran oil.
3. To study the emulsion properties of cold-pressed rice bran oil nano-emulsion stabilized by glyceryl monostearate (GMS).