

## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 Background**

Since the fruits export are growing every year and mango is one of the fruits that has largest cultivated areas in Thailand. The production areas was increased steadily from 2,019,980 acres in 2011 to 2,046,280 acres in 2012, and 2,087,680 acres in 2013 respectively (Office of agricultural economics. Ministry of agriculture and cooperatives, 2013). 90% of mango production are consumed in the country and only some parts of mango pulp were consumed and other processes. Another parts of mango such as peels and seeds about 40-60% becomes waste without utilization. The wastes ratio are 12-15% peels, 5-10% fraction of mango flesh and 15-20% mango seeds. These create the tremendous amount of waste in agriculture and lead to the environmental problems (Inprakhon, 2009). There were many research which studied on mango seed kernels usage on foods, supplements, cosmetic components, medicines and animal feed (Masibo, 2008.) The research indicated that mango seed kernels contained various phenolic compounds and can be used as a good source of natural antioxidant compounds (Abdalla, 2007; Puravankara, 2000). The studies were on well-known mango varieties in Thailand such as Kaew, Namdokmai, Keawsawei, Pimsaen, Chokanan, Rad, Fahlun, Huachang, Munduankao, Okrong and Mahachanok. Their seeds weights were 20-60% of the whole mango fruits and their seed kernels were 45-75% of the seed weights. By the way, the highest seed weight was Chokanan variety (Maisuthisakul, 2009).

An oxidation synthesis in the body such as hydrolysis of protein and fat from the food ingested, air pollution, respiration, cigarette smoke, UV radiation, etc., all of these created free radicals and damaged our health. In addition, many studies indicated that antioxidant can be reduced risks of many diseases. Normally, the body can eliminate free radicals before the harm is done but if there are free radicals were generated faster than body capacity, free radicals will damage cells and tissues which

affected the health (Songchitsomboon, 2007). Therefore, the study of using extraction from agricultural residues, in this place is mango seed kernels to increase wastes value and generate income for the villagers and can reduce agricultural wastes arising from the mango seed.

In the present, antioxidant compounds are commonly used as a supplement. The most widely known was the grape seed extracts which quite expensive. The compounds in grape seed extracts were rich in various kinds of phenolic compounds as reported that the phenolic compounds can inhibit several activities such as anti-oxidation, inhibit inflammation, inhibit cancer, anti-microbial and so on (Lee, 2004). The comparison of quantity and quality of grape seed and mango seed kernel extraction indicate that how difference they are, possibility to be used as substitute. Moreover, the grape seeds in this study were from the residues of grape juices processed which was an agricultural waste.

This study will focus on reducing wastes from mango seeds and grape seeds which processed from a local industry to small scale industry by creating values for agricultural waste and using as a source of antioxidant compound. Because the wastes even from small scale if not suitable managed, it may cause environmental problems not less than the waste from industrial sectors. In addition to reduce waste, this study also enhance the knowledge of useful substances in mango seed kernels which can be used as an antioxidant compound via extraction method that are easy and effective.

## **1.2 Research objectives**

1) To study the antioxidant compounds extraction methods from mango seed kernels by such appropriate household methods as water, hot water, rice whisky (40% ethanol) to compare with standard extraction method (95% ethanol).

2) To determine and comparison the quantity and quality of antioxidant compounds from mango seed kernels of various varieties as Kaew, Mahachanok, Keaw Morakot and Black queen variety of grape seeds.

3) To study the possibility of applying the extraction methods that appropriate in the local industry.

## **1.3 The Scope of the study**

1) Mango seed kernels have been extracted by 95% ethanol, rice whisky (40% ethanol), water and hot water.

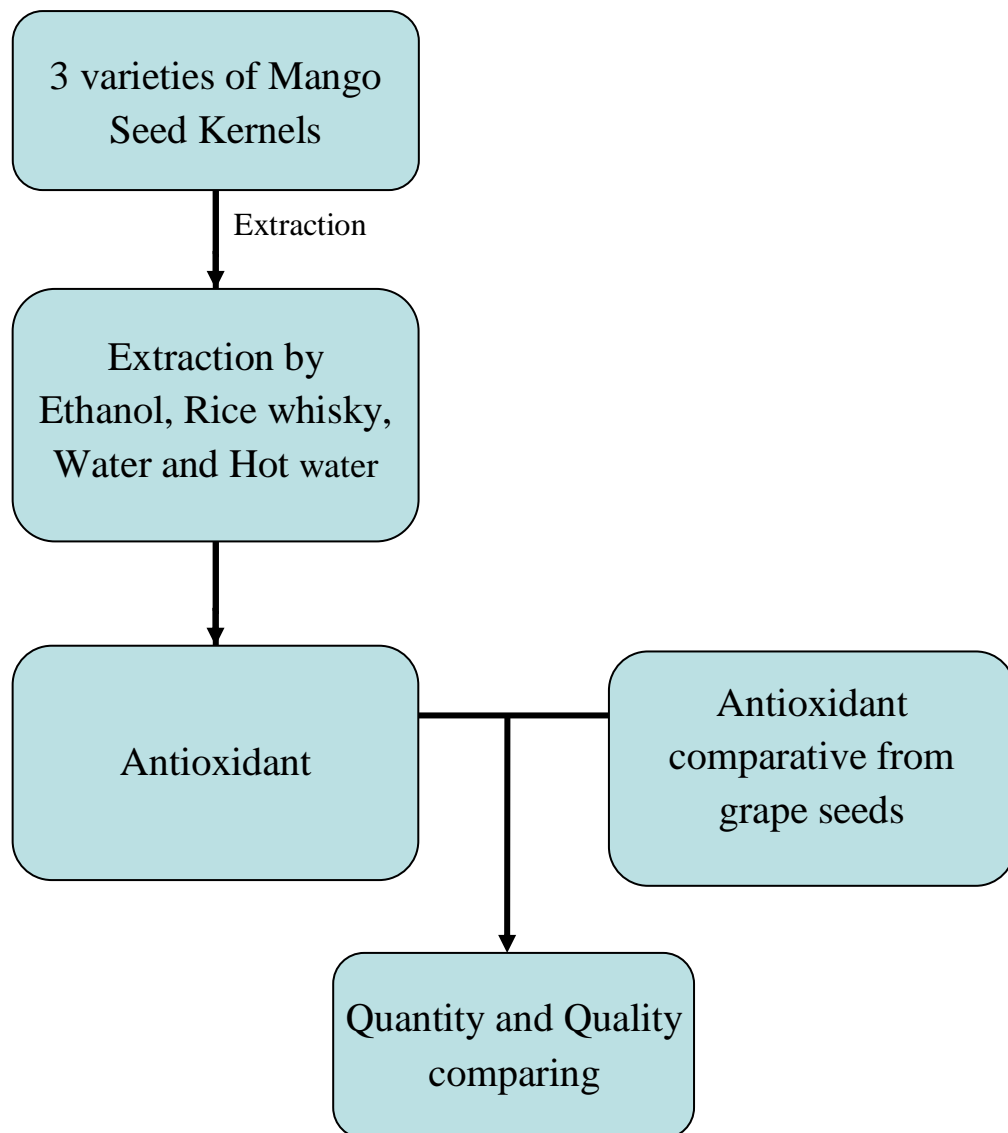
2) The varieties of mango seed kernels in this study are Kaew, Mahachanok and Keaw Morakot. And the grape seeds are Black queen variety.

## **1.4 Expected results**

1) Antioxidant extraction methods from the mango seed kernels are easy to use by villagers and the materials in processes can be locally obtained.

2) To add more the agriculture wastes values and can reduce the wastes arising from the mango processes.

## 1.5 Conceptual framework



**Figure 1.1** Conceptual Framework