



CHAPTER I

INTRODUCTION

1.1 Background and Significance of the Study

The incidence of cancer of the proximal stomach has increased markedly over the past 20 years. Gastric cancer is the second most common cause of death from cancer in Asia (Leung *et al.*, 2008). While the responsible agents remain unidentified, it is likely that environmental factors, such as diet, play a role in the rising incidence of these cancers. Dietary factors have an important role in prevention and causation of gastric cancer (Catalano *et al.*, 2009). Numerous studies have shown that the phytochemicals in fruits, vegetables and cereal grains, including rice, are associated with reduced risk of developing chronic diseases such as cardiovascular disease, type 2 diabetes, and some cancers (Yokoyama, 2004; Liu, 2007; Yawadio *et al.*, 2007). Phytochemicals are the bioactive non nutrient compounds found in plant foods, such as phenolics, thiols, carotenoids, tocopherol and anthocyanins (Dragsted *et al.*, 1993; Liu, 2003).

Rice is the main staple in the diet and an important agricultural article of trade for many Asian countries, especially Thailand. There are many types of rice that are consumed in Thailand such as white rice, brown rice, and glutinous rice including black rice. Black rice has a number of nutritional advantages over common rice, such as higher protein, total essential amino acids, vitamin B₁ (Ha *et al.*, 1999), and minerals (Fe, Zn, Mn, and P) (Zhang *et al.*, 2004). Black rice possess many healthy properties such as antioxidant activity, free radical scavenging capacity (Zhang *et al.*, 2006; Choi *et al.*, 2007), inhibition on the invasion and motility of SKHep-1 cells, prevention DNA damage induced by reactive oxygen species, anti-inflammatory activities (Hu *et al.*, 2003) and atherosclerosis prevention in mouse model and human study (Xia *et al.*, 2006; Lu *et al.*, 2008). Thus, Hom Nil rice (*Oryza sativa* L.) and black glutinous rice (*Oryza sativa* L.) become popular among the consumers in Thailand because of their health benefits and tastes.

Therefore, this study aimed to investigate the effects of Hom Nil rice and black glutinous rice extracts on mutagenicity of nitrite-treated 1-aminopyrene and nitrite-treated chicken extract using the Ames test.

1.2 Objectives of the Study

1.2.1 To determine the direct mutagenicity of Hom Nil rice and black glutinous rice extracts either raw, cooked or fermented after being treated with sodium nitrite using Ames test

1.2.2 To determine the modification potential of each sample on the mutagenicity of nitrite-treated 1-aminopyrene and nitrite-treated chicken extract

1.3 Benefits of the Study

This study provides the information regarding to mutagenicity and mutagenicity modification potential on certain mutagens of Hom Nil rice and black glutinous rice extracts either raw, cooked or fermented. The information may be useful for consumers to make a decision for types of rice consuming and may be useful for development of dietary supplements.