

Chapter 1

INTRODUCTION

Mango has been being one of the most important economic fruit crop of Thailand since many decades. In the past time mango was produced mainly for the home consumption or only for local market. With the big advantage of drought tolerant habitat, mango has been introduced to the upland areas and in many cases mango become the main crop of the rainfed upland area. Through this development, mango cultivation in Thailand has been recently expanded in to every region of the country. Cultivation techniques have been steady developed, a lot of agricultural chemical has been used together with new agricultural practice like pruning, grafting. Mango now in Thailand is over production but still only as the fruit for some season. A high quality product is exported, and low quality saled in domestic market. Mango processing like mango juice, mango paste have been invested and products are exported. In harvesting year 1997 and 1998 Thailand produced 180 and 213 metrictons fresh mango with total value of 211 and 517 million Baht, respectively. From these products, about 10% were exported to international market i.e. in Asia (Malaysia, Singapore, Hongkong, Taiwan and Japan). European and American markets also grow bigger every year (Department of Agricultural Economics, 2002).

Export amount and value as mentioned above is however still relative too small when compared to the cultivating area of mango in Thailand. Main reason is the too low quality of the mango fruit. Most of the farmers are still lacking of production skill to manage the crop both preharvest and postharvest. One of the most serious problems farmers now facing are the appropriate management to control fruit rot disease and fruit fly, which seriously inhibit the expansion of mango market nowadays.

Among fruit rot diseases, anthracnose is the most serious one. The main fungi causing this disease is *Colletotrichum gloeosporioides* (Penz.) Sacc. (Visartthanon, 1984). At present mango exporter usually used Benzimidazole (organic synthetic fungicide) together with dipping in warm water temperature 52-55 °C for 5 min (Pongsuwan, 1993), which very successful and has long been using since more than 10 years up to now. However it was reported in some research finding that there are some chemical residue of Benzimidazole in mango and in the

environment (comes from the waste water from packing house) (Chaisombat, 1987;). Many official paper from health organizations in the United State are also making the announcement and recommendation of not use Benzimidazole as substance for fruit postharvest treatment due to its long time residue. That means in the near future this substance may be subjected to be included in the banned chemical list in the United State. If so, this substance may also be prohibit in many other international markets. This condition is really very dangerous for the mango export from Thailand.

One of the most effective way to solve this problem is the finding of new natural compound from plant or microbial biodiversity, which are very rich in our country, to replace Benomyl. So far there have been a lot of experiments already conducted to search for active substance from plant to control *Colletotrichum gloeosporioides* (Penz.) Sacc. According to the late references, galanga (*Alpinia galanga* Sw.) (Korpraditsakul *et al.* 1990; Sornsrikampol,1995; Lertuirasawat,1996), sweet flag (*Acorus calarnus* L.) (Korpraditsakul *et. al.*, 1991; Bhasabutra, 1997) and Tong Pan Chang (*Rhinacanthus nasutus* Kurz.) (Youngviset, 1993). are the three potential plants . The results from these studies are however still only the laboratory work and still very preliminary study on the effect of crude extract to control fungal growth in the potato dextrose agar (PDA) condition. Almost all of the papers are not concerned with the application directly on the mango fruit (not in the field application).

To apply this research results at the postharvest management level, there still requires a lot more information, eg. a proper concentration, mode of action, side- effect on fruit physiology, fruit quality and storage. Formulation to produce ready-to-use product is also the most important step to encourage practical use in packaging house for export.

In this study crude extract from galanga , sweet flag and Tong Pan Chang (*Rhinacanthus nasutus* Kurz.) will be studied. Purification, and if possible, chemical structure will be emphasized to find the possibility of using these substances to control anthracnose in mango fruit postharvest. End product in the form of formulation will also be developed.

Objective of the experiment

1. To confirm the fungicidal effectiveness of crude extracts from galanga, sweetflag , and *Rhinacanthus nasutus* (Kurz.) in inhibit growth of *colletotrichum gloeosporioides* (Penz.) Sacc.
2. To elucidation the chemical structure of active substances and their effects on fruit ripening as well as their mode of action in controlling fungal growth
3. To formulate the ready – to – use product from active ingredients from studied plants.