

CHAPTER I

INTRODUCTION



Gastric cancer remains such a common neoplastic disease in many parts of the world (Kikuguwa and Nagao, 1990). Graham and co-workers (1990) found that high ingestion of nitrate or nitrite in processed meats and fishes, heated fats and starch may be directly correlated with cancer risk. The correlation between nitrite ingestion and mortality from gastric cancer was reported (Fine *et al.*, 1976).

Nitrate and nitrite have been used for centuries in curing and preserving meats and fish and in the manufacture of certain cheeses (Binkerd and Kolari, 1975). However, it is proposed that nitrate involves in formation of carcinogenic *N*-nitroso compounds via two distinct phases of gastric carcinogenesis. Firstly, after ingestion and absorption in the stomach, nitrate is secreted in the saliva in concentrated form. Oral bacteria can then reduce nitrate to nitrite (Spiegelhalder *et al.*, 1976; Forman, 1989). In the second phase, nitrite is converted in the stomach to nitrous acid and reacts with certain substrates (amines, amides) to form carcinogenic *N*-nitroso compounds (Correa *et al.*, 1983) which frequently demonstrated to be carcinogenic in animals (Choi *et al.*, 1987; Forman, 1989).

Many drugs are contain secondary and tertiary amines that can react with nitrite *in vivo* to form *N*-nitroso derivatives, many of which are carcinogens (Andrews *et al.*, 1980). Therefore, the formation of hazardous substances by drug-nitrite interaction is an

important problem in the evaluation of safety of drugs (Yasushi and Hiroko, 1982). In addition to the drugs used in modern drug, some traditional medicine can increase the risk for consumer concerning about mutagenic nitrosated products. Menstrual regulatory and haematinic traditional preparations are widely used in Thailand, especially in the limit-educated woman. They are claimed not only to regulate menstrual cycle but also to provide feminine characteristics as well as appetizers. These drugs have been shown to be mutagenic after being treated with sodium nitrite solution at pH 3.0-3.5 in the study using the *in vitro* Ames test (แก้ว กังสดาลอำไพ และ วรณี โรจนโพธิ์, 2531). Moreover, It was shown that Thai pregnant experienced in using these drugs had double risk in having congenital birth defect babies (อภรณ์ ไชยาคำ, 2526).

Ferguson (1994) suggested that the vegetables and herbs would be the most effective procedure for preventing human cancer. Thus, Increased consumption of fruits and vegetables might reduce the mutagenicity of nitrosated compounds and their related compounds.

Herbal drinks such as flower of *Hibiscus sabdariffa* Linn. (กระเจี๊ยบ), *Chrysanthemum morifolium* Hemsl. (เก๊กฮวย), *Carthamus tinctorius* Linn. (คำฝอย), fruit of *Aegle marmelos* (Linn.) Corr. (มะตูม), leaves of *Centella asiatica* (Linn.) Urban (บัวบก) and *Morus alba* Linn (ใบหม่อน) are very favorite products. Department of Health Promotion, Ministry of Public Health promotes them for health concerning Thai people because they are easy to prepare. Kruawan (2001) reported that hot water extracts from Thai herbs exhibited their modulating effects on mutagenesis induced by nitrosated

compounds. In addition, phenolic compounds in *Hibiscus sabdariffa* Linn. (กระเจี๊ยบ) were suspected to be compounds that counteracted on mutagenesis induced by 1-nitropyrene (Resendiz *et al.*, 2000). Therefore, it was of interest to investigate the antimutagenicity of some herbal drinks often consumed by Thai people. The information obtained in this research should be used in justification of a drink that will be most beneficial to consumer.

Experimental Objective

To investigate the effect of herbal drinks from some herbs on mutagenicity of nitrite treated menstrual regulatory and haematinic traditional preparations without metabolic activation on *Salmonella typhimurium* strains TA98 and TA100.