Chapter 5

CONCLUSION

Antimutagenesis is affected many levels in mutagenesis (Hartman and Shankel, 1990), that are;

1. prevention of mutagen formation
2. trapping or elimination of mutagen via tissue and cellular organization
3. inactivation of mutagens by enzymes or by compounds present in the cell or in the surrounding fluid,
4. neutralization of premutagenic or mutagenic lesions by chemical compounds or by various DNA repair mechanisms and,
5. utilization of mechanisms that enhance induction of error-free DNA repair, block error-prone DNA repair or increase the metabolic inactivation of mutagens.

The chemical induction of mutation involves a series of events including some or all of the following processes; metabolic activation and/or detoxification, the formation of reactive electrophilic metabolites, the interaction of these metabolites with DNA, error-free and/or error-prone DNA repair, and altered cell selection. The term "antimutagen" was

used originally to describe those agents that reduce the frequency or rate of spontaneous or induced mutation independent of the mechanism involved (Novick and Szilard, 1952). An alternative means to decrease the rate of mutation, and subsequently to decrease the incidence of cancer, may be to identify effective antimutagens and increase our exposure to them (Ames, 1983; and Ramel, et al., 1986) especially through the diet (Hayatsu, et al., 1988).

This investigation have investigated antimutagenicity of Thai plant, lemon grass (Cymbopogon citratus, Stapt.) by short-term assay, Ames test. In order to assess the antimutagenicity of lemon grass, the various known mutagens were selected. They are indirect-acting mutagens which required metabolic activation, i.e., aflatoxin B_1 (AFB_1), benzo(a)pyrene [B(a)P], 7,12-dimethylbenzantracene (DMBA), and typical amino acid pyrolysates, Trp-P-1 and imidazolquinoline (IQ), direct-acting mutagens, i.e., N-methyl-N'-nitro-N-nitrosoguanidine (MNNG), sodium azide (NaN_3), 4-nitroquinoline oxide (4-NQO), and furylfuramide (AF-2).

It was found that lemon grass exerted antimutagenicity in the carcinogen-induced mutation in Salmonella model. The antimutagenicity of lemon grass was in the methanol and hexane extract. Antimutagenic

activity against AFB_1, B(a)P, DMBA, IQ, Trp-P-1, MNNG, 4-NQO and AF-2 has been shown.

The inhibitory effect could result from

1. inactivation of active mutagenic compound as in the case of MNNG and AFB_1. Lemon grass might contain sulfur-containing compound which can binded with MNNG and blocked its mutagenicity.
2. in the case of AFB_1, some compounds in lemon grass can trap the AFB_1 epoxide, or destroy AFB_1 by chemical reaction.
3. reduced metabolic activation of AFB_1 and other that required S9 mix and
4. inactivation metabolic pathway such as N-hydroxylation reaction as in the case of amino acid pyrolysates, IQ and Trp.P-1.

According to Kada and coworkers (Kada and Shimoi, 1987), antimutagens could be classified as desmutagens and bioantimutagens. The antimutagenicity of lemon grass was considered mainly to be due to desmutagenic factors. At least two desmutagenic substances were isolated from methanol extract of lemon grass. Further identification for their structures,and the extract inhibition mechanism should be futher

studied in more detail.

It is hoped that these results serve as useful source for further study and stimulates comparative and integrated research in one most important area of the field of antimutagenesis and anticarcinogenesis.