4. Scope and Plan of work

With the intake of plant materials, epidemiological studies support that the chemopreventive effects in which phytochemicals exhibit genotoxic/mutagenic effect by themselves or by potentiating the effect of other xenobiotics. To investigate the circumstance under which phytochemicals used in traditional medicine as potential prophylactic agents either exhibit beneficial or harmful effects is very much important. The presence of phytophenolic components including tannins, catechin, flavonones, isoflavones are responsible for the possible genotoxic effects of plant extracts. Genotoxicity might be related to hydrogen peroxide formation arising from autooxidation of phenolic molecules. Flavonoids inhibit topoisomerase I and II enzyme which will interfere with the replication and transcription process, inhibiting the relegation of DNA double strand breaks and enhancing the formation of cleavable DNA- enzyme complexes. Phenolic rich extracts could lead to accumulated DNA breaks and mutation, thus contributing significantly to genotoxicity. The extract which exhibit potent antioxidant and free radical scavenging properties ascribed to its polyphenolic richness more particularly to its flavonoid content.

Through scientific research, there have been many validations of traditional medicines. Direct use of isolated bioactive compounds in medicine, ethno medical information’s has contributed to health care worldwide. In the literature, the adverse effects of widely used plants are not well documented. One might expect that plants used in traditional medicine to have low toxicity based on their long term use. In *in-vitro* assay, recent
investigations have revealed that many plants used as food or in traditional medicine have mutagenic effects. Long term use of plants risen concern about the potential mutagenic hazard (Esameldin et al., 2003). When compared to the individual chemical constituents, the genotoxic information obtained from studies using a whole herbal or multi-component herb product is relatively lacking. Therefore, it is important to determine the antioxidant activity and also to evaluate the genotoxic properties of the plant extracts.

FDA has approved curcumin as a food supplement for the cancer patients. Most of the anticancer drugs are also mutagenic in nature. In many literatures, it has been reported that curcumin has both genotoxic and mutagenic activity. In this case it is very much essential to get thorough information about the curcumin genotoxicity. Therefore this research is designed to carry out the antioxidant and genotoxicity of curcumin. In this thesis, antioxidant and genotoxicity of curcumin and for the plants that belongs to curcuma species such as Curcuma aromatica salisb and Curcuma zedoaria (Christm.) Roscoe has been focused.

Plan of work

1. Selection, collection, authentication, drying and powdering of the plant materials

2. Extraction of plant materials

3. Qualitative and quantitative phytochemical analysis
   Estimation of total phenolic and flavonol content in the extracts.
4. **Antioxidant activity**
   - Diphenyl picryl hydrazyl (DPPH) radical Scavenging Method
   - Nitric oxide radical inhibition activity
   - Scavenging of hydroxyl radical by deoxyribose method
   - Reducing power assay
   - Total antioxidant capacity
   - Lipid peroxidation assay (LPO assay)

5. **Genotoxicity studies using different models.**
   - Ames reversion assay
   - Potato disc assay
   - SOS Chromotest
   - DNA sugar damage assay
   - Plasmid nicking assay
   - Chromosomal aberration assay
   - Micronucleus test
   - Comet assay
   - Sequential analysis

6. **Compilation of data.**