1. INTRODUCTION

Traditional remedies based on natural products could be traced back over five millennia to written documents of the early civilizations, for example, Ayurveda in India, Pen Ts’ao in China, Kampo in Japan and Unani system of medicine in Near East. Plant compositions continue to be the mainstay for health care even to this day in their respective countries of origin, mostly in the tropical and developing regions of the world. In fact, according to WHO, 80% of the world’s population still continue to rely on traditional medicines, and certain guidelines for assessment and standardization of such products have been recommended. Thus, the role of phytochemical analysis has attained a new dimension in addition to its well-acknowledged input in finding pharmacologically active ingredients as ‘leads’ for drug development. Furthermore, a major impetus was generated towards improving the techniques of separation and analysis of plants of commercial importance for their standardization in terms of these recognized molecular entities. It was also important to adapt these techniques to the requirements of pharmacokinetic estimation of biological fluids in order to establish the validity of the clinical usage of herbal products. (Hazra et al., 2004) Again, by this time, tissue culture techniques have started large-scale production of some useful plant metabolites, which have to be analyzed from the culture media. In 1985, Farnsworth et al. had reported the application of at least 119 compounds, obtained from 90 plant species, as constituent of medicines in one or more countries, and more than 70% of these were derived from plants used in traditional practices. Thus, plants are the repositories for bioactive organic molecules among which quinones represent a class of ubiquitous secondary metabolites. Some of them are components of the respiratory system of the plant cells playing important roles in the biochemistry of energy production.

Quinones and quinonoids, being one of them, serve as vital links in the electron transport chains in the metabolic pathway by virtue of their capacity to undergo facile redox reactions. This facility also leads to the inherent cytotoxicity of quinones, some of which might defend their hosts from invading pathogens, e.g. bacteria, fungi or parasites. Quinones are ubiquitous in nature which occurs predominantly in flowering plants, fungi including lichens and in small numbers they are widely scattered in most forms of life.
Naturally occurring quinones have captured human attention for thousands of years, initially by reason of their bright colors with possible uses as dyes and drugs (Abraham et al, 2011). No wonder that quinones today form one of the largest classes of anti-cancer drugs, viz. the anthracycline antibiotics, for clinical use. In fact, the first compound tested for anti-tumour activity in 1955 by the National Cancer Institute, USA, was a simple quinone, 2-methyl-\(p\)-benzoquinone. However, plant-derived quinoids, despite their obvious usefulness as potential pharmacophores for drug design, have not so far been a much sought-after category as compared to alkaloids, flavones or terpenoids. Nevertheless, it transpires from a preliminary survey that a number of quinoid compounds are present as the ‘marker’ constituents in some of the plants used in popular herbal preparations. Naturally occurring quinonoids can be classified into benzoquinonoids, naphthoquinonoides, anthraquinonoids, phenanthraquinonoids (Fig 1.1).

**Figure 1.1. Structures of naturally occurring quinones.**
**Role in Plants:**

- They form the component of respiratory system in plants.
- Quinones serve as vital links in the electron transport chain in metabolic pathway by virtue of their capacity to undergo facile redox reactions.