Natural sources have provided us with an excellent hunting ground for discovering newer therapeutically active moieties and plant kingdom is one of these sources for giving us natural drugs having potential to treat different diseases. If we dwell for a moment on our hoary past, the *Rigveda* (5000 BC), one of the oldest repositories of human knowledge, mentions the use of 67 plants for therapeutic use, the *Yajurveda* enlist 81 plants whereas the *Atharveda* written during 1200 BC describes 290 plants with medicinal value. *Charak Samhita* written during 990 BC describes 341 medicinal plants. The landmark in Ayurveda was *Sushrut Samhita* written during 600 BC mentioned 395 medicinal plants. *Dhanwantari Nighantu* mentions 750 medicinal plants, 450 are mentioned in the *Bhavaprakash*, 480 in *Madanapala Nighantu* and 450 in the *Kaiyadeva Nighantu* (Aggarwal and Paridhavi, 2007). India unquestionably occupies the top position in the use of herbal drugs (Jayasree *et al.*, 2011). It is one of the foremost countries exporting plant drugs and their derivatives. It also excels in home consumption. It is not at all surprising that herbal drugs are so prevalent in India given the great biodiversity and abundance of flora and the variety of geographical condition which allows the most exotic medicinal plants to be grown here (Aggarwal and Paridhavi, 2007).

The estimate number of plant species found on earth is up to 500 thousand species (Arif *et al.*, 2009). From this number, about 10 thousands are reported to have medicinal usages and only 150 - 200 are commercially used. Thus the plant kingdom is really a potential source of medicinal properties (McChesney *et al.*, 2007). Chemical constituents of plants may be acted as defence agents against predator (for example cardiac glycosides from leaves of *Nerium oleander* protects the plant from herbivorous animals) or for protection (flavonoids act as UV protector of leaves) or for attraction (sesquiterpenoids with aromatic smell attract pollinators and dispersal organisms) (Harborne, 2001). Most of those chemical compounds also have therapeutic value for
human. Various screening approaches can be selected and are depending on the target diseases as well as on the available information about the plants. Plants with ethnobotanical backgrounds are usually used for single-goal screening (using a specific bioassay technique) (Atta-ur-Rahman et al., 2001). Ethnobotany refers to the study of plants used by human that associated with the traditional beliefs and cultural practices. The term includes the use of medicinal plants for treatment of diseases (Heinrich et al., 2004). For example turmeric (Curcuma longa) has long been recognized to possess antimicrobial activity such as in Indian Ayurveda practices (Goel et al., 2008). Based on ethnobotanical data, curcumin was isolated from turmeric and possesses antimicrobial activity against Staphylococcus aureus, Staphylococcus albus, Bacillus cereus, Bacillus subtilis, Escherichia coli and Pseudomonas aeruginosa (Jayaprakasha et al., 2005).

Plant species within one particular taxa are usually assumed to have similar chemical properties (Bindseil et al., 2001). For examples, biological activities of seven plants from Licania genus (Braca et al., 2003), While biological activities of Tanacetum genus (Goren et al., 2002). Certain plant species found in literature can also be used as source for discovery of plant derived drugs. Orthosiphon stamineus (daun misai kucing) has inspired to isolate active compounds responsible for the diuretic activity (Englert and Harnischfeger, 1992; Olah et al., 2003). The last method used in drug discovery is by random or blind collection. This method is useful when dealing with potential biodiversity in unstudied area. The discovery of vinblastine and vincristine from Catharanthus roseus was through random sampling method (Farnsworth et al., 1968; Svoboda and Blake, 1975).

The use of plant compounds to treat infections is an age-old practice in a large part of the world, especially in developing countries, where there is dependence on traditional and folk medicine for the treatment of various infectious diseases (Shiba et al., 2005; Gangoue, 2006). In India,
large segments of the population still rely on folk medicine to treat serious diseases including infections, cancers and different types of inflammations. In recent years, human pathogenic microorganisms have developed resistance in response to the indiscriminate use of commercial antimicrobial drugs commonly employed in the treatment of infectious diseases (Shahidi-Bonjar, 2004). These drug resistant candidates are more pathogenic with high mortality rate and become a great challenge in the pharmaceutical and healthcare industry. To overcome microbial drug resistant, scientists are looking forward for the development of alternative and novel drugs. This situation, has forced scientists to look for new antimicrobial substances from various sources, such as medicinal plants, algae and animals provides an array of natural medicinal compounds for the treatment of various infectious diseases (Gaurav et al., 2010). The antimicrobial compounds produced by plants are active against plant and human pathogenic microorganisms (Lee et al., 1998). The substances that can either inhibit the growth of pathogens or kill them and have no or least toxicity to host cells are considered candidates for developing new antimicrobial drugs. It is expected that plant extracts showing target sites other than those used by antibiotics will be active against drug resistant microbial pathogens. However, very little information is available on such activity of medicinal plants (Kapoor et al., 1969; Hasegawa et al., 1995). The screening of plant extracts and plant products for antimicrobial activity has shown that plants represent a potential source of new antiinfective agents (Amani et al., 1998; Salvat et al., 2001). Oxidation process occurs naturally in human body and defined as electron transfer from one to another. Since oxygen is the ultimate electron acceptor in the electron flow system that produces energy in the form of ATP. But the problem may arise when electrons flow from oxidation process become unpaired and then subsequently generates free radicals, known as Reactive Oxygen Species (ROS), such as superoxide (O$_2^-$), peroxyl (ROO$^\cdot$), alkoxyl (RO$^\cdot$), hydroxyl (HO$^\cdot$).
and nitric oxide (NO) (Pietta, 1999). Free radicals are very reactive and rapidly attack molecules in nearby cells (Pietta, 2000). Eventhough positive impact of ROS was also recorded such as involvement in phagocytosis, regulation of cell growth and intercellular signaling and synthesis of biologically important compounds but their negative influences also received special attention (Halliwell, 1997). Reactive oxygen species acts in damaging cell membranes, attacking proteins and DNA in tissues. Carcinogenesis may also be initiated through oxidatively induced DNA damage. Repeated damage caused by ROS throughout the span of human life increases with time, and is a major cause of age-related cancers and other oxidatively-induced diseases (Reynertson, 2007). Antioxidants are substances those when present in foods or body at low concentrations compared with that of an oxidizable substrate significantly delay or prevent the oxidation of that substrate (Saha et al., 2004). Antioxidants will help to minimize oxidative damage as the most important approaches to the primary prevention of age-related diseases, since antioxidants terminate direct ROS attacks and radical-mediated oxidative reactions (Tepe and Sokmen, 2007). Antioxidants also can be described as acidic compounds (including phenols) that are used as preservative in foods, cosmetics and pharmaceutical preparations which can donate an electron or hydrogen atom to a peroxyl or alkoxyl radical and terminate lipid peroxidation and chain reaction (Aruoma, 2003). Human defense systems include antioxidants produced naturally in the body (endogenous) to protect themselves against free radicals. However, despite this defense antioxidant system, some ROS are still escaped to cause oxidative damage. Therefore, dietary antioxidants are needed to protect the harmful action of ROS. Well established antioxidants derived from diet are vitamins A, C, E, polyphenols and carotenoids (Pietta, 1999 & 2000). Current antioxidant research of free radicals also has confirmed that food with rich
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Antioxidants play an essential role on the prevention of disease caused by oxidative stress. Therefore, plant derived antioxidants now receiving a special attention (Tepe et al., 2005).

Historical literatures reveal that knowledge regarding diabetes existed since Brahmic period as this was mentioned in Ayurvedic text books - Sushruta samhita. In this ancient text, two forms of diabetes were described: one genetically based and the other as a result of dietary indiscretion (Dahanukar and Thatte, 1989). Defects in carbohydrate metabolizing machinery and consistent efforts of the physiological systems to correct the imbalance in carbohydrate metabolism place an over exertion on the endocrine system, which leads to the deterioration of endocrine control. Continuing deterioration of endocrine control exacerbates the metabolic disturbances and leads primarily to hyperglycemia. Although biomedical science has unraveled substantially the pathologically processes involved in causing/fostering diabetes and has designed therapeutic agents with a range of action to fight hyperglycemia. The efficacy of these therapeutic agents is compromised in several ways. Individual agents act only on part of the pathogenic process and only to a partial extent. The Indian ancient pharmacopoeia mentioned specific treatments for the type-2 diabetes including dietary modifications, medicinal plant remedies and minerals.

Traditional plant remedies have been used for centuries in the treatment of the diabetes (Akhtar and Ali, 1984) but only a few have been scientifically evaluated. Moreover, the researchers conducted over last several decades has shown plant and plant based therapies have a potential to control and treat diabetes (Oliver and Zahnd, 1979; Bailey and Day, 1989; Ivorra et al., 1989; Marles and Farnsworth, 1995) and its complications (Grover et al., 2001). Role of Indian medicinal plants as antidiabetic has also been reviewed by Grover et al. (2002). Oxidative stress is caused by a relative overload of oxidants, i.e., reactive oxygen species. This impairs cellular functions and contributes to the pathophysiology of many diseases. Evidence has
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accumulated suggesting that diabetic patients are under oxidative stress and that complications of diabetes seem to be partially mediated by oxidative stress (Hayoz et al., 1998; Rosen et al., 1998; Szaleczky et al., 1999). Thus, it has been shown that oxygenated free radicals are able to alter vascular function and to disturb cellular homeostasis, especially by inhibiting synthesis and action of nitric oxide (NO•) and by activating NFκB in endothelial cells. Moreover, tight interrelations have been demonstrated between oxygenated free radicals and advanced protein glycation, since advanced glycation endproducts (AGEs) are themselves able to produce free radicals and to be involved in diabetes complications. Indeed, recent evidence supports the fact that AGEs induce endothelial dysfunction via a receptor specific pathway (Wautier et al., 1994). Free radicals and AGEs are thus likely to be involved in some complications of diabetes, especially in the pathogenesis of diabetic nephropathy. Recent investigation demonstrated that glycoxidation products (N-(carboxymethyl) lysine, pentosidine), a subclass of AGEs which requires both glycation and oxidative stress for their formation, accumulate in expanded mesangial and nodular lesions in diabetic nephropathy (Suzuki et al., 1999a & 1999b; Horie et al., 1997; Schleicher et al., 1997). The diabetic retinopathy risk also correlates with intracellular concentrations of the glycoxidation product N-(carboxymethyl) lysine (Hammes, et al., 1999).

Several studies examined the tissue levels of the enzymatic antioxidant defenses in diabetes with varying results. In experimental diabetes the activity of catalase was increased in vascular tissues with absence of any significant changes in the activity of the other major antioxidant enzymes (superoxide dismutase and glutathione peroxidase) (Piper et al., 1995). In addition, increased activities of catalase (CAT) and superoxide dismutase (SOD) in the pancreas of diabetic rats, while the liver showed a generalized decrease in the activities of catalase, SOD and glutathione peroxidase (GSH-Px) (Wohaieb and Godin, 1987). In the previous study, the increase in the
activities of both CAT and SOD occurred in the tissue with the lowest antioxidant enzymatic activities (pancreas) before onset of diabetes, suggesting a compensatory response to an increase in endogenous antioxidant radicals in pancreas by diabetes. A decrease in the concentration of reduced glutathione (GSH) has been observed in erythrocytes from diabetic subjects, as a result of decreases in activities of the enzymes involved in GSH synthesis (such as \( \gamma \)-glutamylcystein synthetase) or in the transport rate of oxidized glutathione (GSSG) from erythrocytes (Murakami et al., 1989) and enhanced sorbitol pathway (Ciuchi et al., 1996). In addition, a decrease in the activity of glutathione reductase (GSSG -R) which acts to reduce GSSG to GSH, has also been reported (Tagami et al., 1992). GSSG -R activity decreased in erythrocyte hemolysates of streptozotocin diabetic rats and attributed this decrease to the enzyme glycation by the uncontrolled hyperglycemia (Jain and MeVie, 1994). A significant decrease of erythrocyte GSH-Px activity is reported in diabetic children and adolescents compared with control subjects (Jos et al., 1990; Dominguez et al., 1998). They attributed this decrease to a decline in blood glutathione content in those diabetics, since GSH is a substrate and cofactor for this enzyme. Therefore, low GSH content indicates low GSH-Px activity, which may produce increased oxidative stress propensity. Moreover, enzyme inactivation either through glycation process (Arai et al., 1987a) or under conditions of increased oxidative stress might also contribute to low GSH-Px activity (Lyons, 1991).

For testing antidiabetic potential of plants, streptozotocin (STZ) induced hyperglycemia in rodents is considered to be a good preliminary screening model (Ivorra et al., 1989) and is widely used. STZ is well known for its selective pancreatic islet cell toxicity and has been extensively used in induced diabetes mellitus in animals. It is much used to induced diabetes rather than alloxan. Its diabetogenic effect is the direct result of irreversible damage to the
pancreatic beta cells, resulting in degranulation and loss of insulin secretion (Junod et al., 1969). STZ is taken up by the β-cells via the glucose transporter GLUT2 and causes alkylation of DNA (Delaney et al., 1995) and reduction of ATP and NAD+ content (Heller et al., 1994). Since with STZ there is no incidence of spontaneous revision and greater of islets resulting in more than 90% of rats becoming diabetic (Mitra et al., 1995). Insulin deficiency will lead to decreased activity of lipoprotein lipase and increased mobilisation of free fatty acids from peripheral fat depots. The STZ-induced diabetic animal is thus considered as an animal model of type 1 diabetes mellitus and hyperlipidemia (Suckling and Jackson, 1993). Besides alterations in the carbohydrate and lipid metabolism, rats treated with STZ have increased hepatic and renal thiobarbituric acid reactive substances (TBARS) levels and decreased levels of hepatic reduced glutathione (GSH) concentration, superoxide dismutase (SOD) and catalase (CAT) activities (Zhang and Tan, 2000). GSH, SOD and CAT are important anti-oxidant defenses of the body. It appears that the tissue anti-oxidant status may be an important factor in the development of diabetic complications.

Plant contribution to the medicinal field is largely owing to the activity of plant derived drugs. Plant derived drugs term can be defined as biological active substances which are isolated or purified from plants. The use of plants as medicine by human can be traced back to the early prehistoric times and for a long time together with mineral and animal products, were the main sources of drugs (Rates, 2001). But then, booming of the usage of synthetic compounds was started when urea incidentally synthesized in the laboratory by Wohler in 1828. Gradually, those synthesized compounds replaced the usages of plants as medicines. The discovery of antibiotic penicillin from Penicillium notatum mould then acted as the marking point of the rediscovery of plant derived drugs. Nowadays, 40% of all medicinal prescription in the United States (US)
contains at least one plant derived drugs and physician in Europe routinely recommended to their patients herbs.

Plants, especially used in Ayurveda can provide biologically active molecules and lead structures for the development of modified derivatives with enhanced activity and/or reduced toxicity. Today, at least 25% of commercial drugs are plant derived drugs, such as aspirin, atropine, quinine, morphine, vincristine, vinblastine, taxol, podophyllotoxin, camptothecin, digitoxigenin, gitoxigenin, digoxigenin, tubocurarine, codeine, pilocarpine, capsicicine, allicin, curcumin, artemisinin and ephedrine among others (Gilani and Attaur, 2005).

In some cases, the crude extract of medicinal plants may be used as medicaments. On the other hand, the isolation and identification of the active principles and elucidation of the mechanism of action of a drug is of paramount importance. Hence, works in both mixture of traditional medicine and single active compounds are very important. Where the active molecule cannot be synthesised economically, the product must be obtained from the cultivation of plant material. The scientific study of traditional medicines, derivation of drugs through bioprospecting and systematic conservation of the concerned medicinal plants are thus of great importance.