1 INTRODUCTION

Herbal medicines are the oldest form of health care known to mankind and there are used by all cultures throughout history. The World Health Organization has estimated that for some 3.4 billion people in the developing world, the plants represent the primary source of medicine. This implies that 88% of the world's inhabitants dependant mainly on herbal medicine for their primary health care (Jadhav & Bhutani, 2003; Patwardhan et al., 2004).

Plant produces both primary and secondary metabolites. Primary metabolites are the substances that are needed for general growth and physiological development of the plant e.g. carbohydrates, proteins and lipids. Secondary metabolites are biosynthetically derived from primary metabolites. They may represent chemical adaptations to environmental stresses, or they may serve as defensive, protective or offensive chemicals e.g. glycosides, alkaloids, terpenes, resins, tannins. The plant based drugs are classified on the basis of their chemical constituents, since they are responsible for the pharmacological activity and therapeutic significance of these drugs (Natural Products: The secondary metabolites, 2003; Phytochemical Methods, 1973).

Various leads from plant sources were taken for discovering the new active therapeutic agents. Hence herbal medicine has played important role in managing the health conditions like diabetes, hypertension, inflammation, obesity etc. It is very important to explore new possibilities for the treatment of these diseases. Diabetes is a major problem in India. The prevalence and morbidity associated with diabetes mellitus continues to increase throughout the world. The secondary complications in diabetes mostly are related to micro and macro vascular changes (Engelgau et al., 2004). Several studies on the treatment of type 2 diabetes suggest that improved glycemic control reduces micro vascular risks (Gaster & Hirsch, 1998; Ohkubo et al., 1995; Vijan et al. 1997). One approach in treatment of diabetes is inhibition of α-glucosidase and α-amylase enzyme in gut. Glucosidase inhibitors are widely studied and isolated from different sources such as plants (Yoshikawa et al., 1998) and microbes (Kameda et al., 1984). In 1970s, it was realized that inhibition of all or some of the intestinal disaccharidases and pancreatic α-amylase by inhibitors could regulate the absorption of carbohydrate and these inhibitors
could be used therapeutically in the oral treatment of the non insulin-dependent diabetes mellitus.

Natural $\alpha$-amylase and $\alpha$-glucosidase inhibitors from food-grade plant sources offer an attractive therapeutic approach to the treatment of post-prandial hyperglycemia by decreasing glucose release from starch and delaying carbohydrate absorption by inhibiting the activity of the carbohydrate hydrolyzing enzymes in the small intestine and may have potential for use in the treatment of diabetes mellitus and obesity. On the basis of the prevalence, the delay or inhibition of carbohydrate digestion would contribute to optimize a postprandial blood glucose level (Oyaizu, 1986; Chakraborty & Tripathy, 1992; Pedraza-Chaverrí et al., 2004). There are many natural resources with the $\alpha$-glucosidase inhibitory activity and some of them are more specific for sucrase inhibition rather than maltase inhibition. Inhibition of $\alpha$-amylase, maltase and sucrase by a polyphenolic extract of green tea has been reported (Aruoma & Halliwell, 1987; Pedraza-Chaverrí et al., 2007). Taking this study in consideration, present work was proposed. Reported literature suggests that seeds of *P. dulce* have good antidiabetic potential. Wood bark of this plant contains good amount of polyphenols and leaves contain catechol type of compound. Various activity of *P. dulce* bark been investigated, but there have not been much reports on the phytoconstituents from wood bark and leaves of *P. dulce*. So, based on these facts and reports, *P. dulce* was selected for the further study.
2 OBJECTIVES

Over 30 million people have been diagnosed with diabetes in India. The fruit and seed part of *P. dulce* were investigated previously by other workers for phytochemistry and pharmacological activity, which shown good anti-diabetes potential. Considering the importance of *P. dulce* in diabetes and various medical benefits, this plant was selected for investigation. Hence the objective of the present investigation was to study the phytoconstituents present in the *P. dulce*.

**Methodology adopted for the research work comprises of following steps:**

1. Extraction and isolation of phytoconstituents from wood bark and leaves of *P. dulce*.
2. Characterization and elucidation of chemical structures of isolated phytoconstituents.
3. Development of HPLC quantification method for important phytoconstituent.
4. Biological evaluation for anti-diabetic & antioxidant potential along with determination of total phenolic & flavonoid content of extracts.