INTRODUCTION

The records of the use of medicinal plants by native people are as old as human race. The health care needs and diseases are documented in ancient literatures like *RigVeda* and *AtharVeda* (Gurib-Fakim, 2006). *Sheng-Nong’s Herbal book* (China), comprising of 365 medicinally important plants, animals and minerals, is considered to be one of the earliest sources of folk knowledge (Pie, 2001). India has a rich heritage of the use of plants as medicines. Indian system of medicine utilizes 80% of the material derived from the plants (Chauhan, 2003).

As we know that traditional medicines comprising of therapeutic practices have maintained their popularity since prehistoric times. They are an essential part of traditional health care systems and provide significant clues/leads for modern pharmaceutical medicines. These play key role in the development of many studies by serving as a starting point for the discovery of any novel drugs for the welfare of society (Wright, 2005).

The plant-based medicines have been consumed in all civilizations (Gurib-Fakim, 2006). It is believed that the herbal medicines have good effect on body without causing any side effects. Although, they contain many inert compounds, but they also possess some active compounds that boost their ability (Kamboj, 2000; Sannomiya *et al.*, 2007; Verma and Singh, 2008). According to a study, ~18% of the world’s top 150 prescription drugs are derived from plant sources (Kate and Laird, 1999).

Out of the total 4, 22,000 flowering plants that are known all over the world (Govaerts, 2001), more than 43% are reported from India and possess medicinal importance (Pushpangadan, 1995a). The use of herbs, aromatic and medicinal plants in healthcare (i.e. ethnobotanic medicine or ethnomedicine) traces its origin from Greek medicine, which was later adopted by Arabs and then spread to India and Europe (Fabricant and Farnsworth, 2001).
As per the WHO (World health organisation) about 70% of the world inhabitants rely mainly on traditional medicines for their primary health care (Mukherjee and Wahile, 2006). In the developing countries, nearly 80% of the human population is dependent on plant resources for healthcare due to poverty and lack of infrastructure (Farnsworth et al., 1985). The use of medicinal plants by native people is one of the important aspects of Ethnobotany. This term “Ethnobotany” refers to the association, interaction, and interrelationship of human societies, especially tribal and the aboriginals, with surrounding flora (Harshberger, 1896). It also gives complete information about the plants and their medicinal uses.

During last three decades, the tribal medicine gained significant place in the field of science and emerged into the new branch of ethnobotany called ethnomedicobotany. Earlier, ethnomedicines were confined to tribal and remote areas. However, now Those have been accepted throughout the world. Wild plants have contributed towards the upliftment of the economy and generation of employment in rural areas (Karori and Pulu, 2003). During the last quarter of the twentieth century, there has been a renewal of interest in natural plant products, particularly in the Western countries (Gurib-Fakim, 2006). It is primarily because of their greater biological compatibility with human system, lesser toxic nature than synthetics, easy accessibility and increased awareness among people about the use of plants as source of medicine (Plotkin and Famolare, 1992; Balick et al., 1996).

Of late, Jain (2000) has coined another term ecological ethnobotany that refers to the role of indigenous people in study, quantification and management of plant resources. It is now gaining importance by suggesting new paths in scientific research and understanding ecological processes (Jain, 2000). The ecological concept of ethnobotany brings better understanding of interrelations of the native people with plants. Native people have the knowledge of the flora and fauna, their utility and seasonal variations in ecosystem. They share their knowledge among themselves and have first-hand interaction with ecosystems, which is based on their wisdom, observations, long experiences, rituals, customs and traditions (Gavali and Sharma, 2004). India is mega-diversity rich country known for its medicinal plants. If we look back at the history, the earlier documentation of plants, especially the medicinal plants, has provided mankind the treasure of knowledge for the treatment of various
ailments (Chadwick and Marsh, 1994; Cox and Ballick, 1994; Fabricant and Farnsworth, 2001).

Such plant species from our rich flora can become a safe, cheaper and potent source of drugs in most of the developing countries for those who can’t afford expensive drugs (Singh and Gautam, 1997). The green pharmaceuticals are gaining lots of popularity. Ethanobotany and ethanopharmacology have led to the discovery of many plant based drugs (Soejarto et al., 2005).

Over the last decades or so, the WHO has passed many resolutions to give recognition to the use of medicinal plants. It has called upon the health authorities and administrators from the developing countries to explore the ways in which these plants can be used in primary health care system. As modern medicine system alone is not sufficient to provide health care facilities in the developing countries, the practice of traditional medicine system is important in this context so that no single individual is left without health care facilities.

During last twenty years, a lot of research has been done in the field of medicinal and aromatic plants as a result of the increasing interest among the people about them. It is well known that reactive oxygen species (ROS: superoxide ions, hydroxyl radicals, peroxy radicals, etc.) are highly active and toxic molecules generated in cells under normal metabolic activities. Their production increases considerably in response to a variety of factors including tobacco smoke, pollutants, ionizing radiations, alcohol, synthetic pesticides and solvents (Halliwell and Gutteridge, 1989). The oxidative stress also increases the production of ROS in different location of plants cell (mitochondria, chloroplast, peroxisome and nucleus) and it has potential to cause injury and sometimes it leads to the death of cells (Mano, 2002). Their presence in living systems causes peroxidation of lipids, proteins and nucleic acids and they have also been linked to pathogenesis of oxidative diseases (Halliwell, 1997).

Living cells possess an excellent scavenging mechanism to avoid ROS-mediated cellular injury. However, these mechanisms become inefficient due to ageing and increasing pollution (Halliwell, 1997). Thus, dietary supplementation of synthetic antioxidants is required. Accordingly, much attention has been paid to compounds that have radical scavenging properties (antioxidants) and are expected to prevent the
food and living system from oxidative damage. In day today life, we use a number of synthetic antioxidants such as \( t \)-butylated hydroxyl anisole (BHA), \( t \)-butylated hydroxyl toluene (BHT), quercitin and ascorbic acid. However, some toxicological studies have implicated that the excessive use of synthetic antioxidants have side effects and cancer inducing potential (Gülcin, 2012). Along with this, the increased consumer interest in natural food additives has reinforced emphasis on the natural plant antioxidants. Thus, the application of these synthetic drugs is being widely discouraged.

Therefore, the search of novel sources of antioxidants is of utmost importance. It can provide potential alternatives to synthetic materials such as BHA for use in foods (Camire and Dougherty, 1998) without causing any adverse effect. In this regard, plants, especially medicinal and aromatic, are receiving greater attention because they are rich in secondary metabolites like acetogenin, flavonoids, phenolics, aporphine alkaloids, glycoside and squamoline that enhance their activity. Phenolic compounds, one of the most widely occurring groups of phytochemical classes of secondary metabolites, play an important role in enhancing activity of natural antioxidants during stress. These compounds easily leach out in different extracts and provide antioxidant potential (Dixon and Paiva, 1995) The essential oils play an important role in many biological activities like antibacterial, antifungal and antioxidant properties (Barra et al., 2007; Bozin et al., 2006). Essential oil is a complex mixture of many active components like terpenoids, particularly sesquiterpenes (C15) and monoterpenes (C10) and a variety of other components like aromatic phenols, oxides, ethers, alcohols, esters, aldehydes and ketones that determine the characteristic aroma and odour of the donor plant. Plant phenolics, in particular phenolic acids, tannins and flavonoids, are known to be potent antioxidants that occur in vegetables, fruits, nuts, seeds, roots and barks (Pratt and Hudson, 1990). The essential oil extracted from plants has become an integral part of pharmaceutical, food and cosmetics sectors (Batish et al., 2008).

Simultaneously, fatty oils also play an important role in radical chemistry; it has formed the basis of many applications like natural therapies, food preservatives, pharmaceuticals and alternative source of medicine (Reynolds, 1996; Lis-Balchin and Deans, 1997). There are many reports and studies supporting that some antioxidant
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Compounds have been identified from fruit seeds; but, limited numbers of studies are there on antioxidant activity in seeds of the plant from sub-tropical and tropical area (Bocco et al., 1998). Higher content of linoleic acid in seed oils lowers the level of bad cholesterol that can cause ailments related to heart (El-Adawy and Taha, 2001). Omega-3 polyunsaturated fatty acids are used to treat many types of cancer (Curi et al., 2002). Edible oils are rich in natural antioxidants and play a vital role in reducing chronic diseases. Therefore, the oils are used in various food applications that provide number of health benefits (Siger et al., 2008). Keeping in mind the above background, the present study was undertaken in the unexplored area of Sangla valley (Kinnaur, Himachal Pradesh) inhabited by tribal population with following objectives in mind.

- To prepare an inventory of ethnomedicinal plants of Sangla Valley, Kinnaur, Himachal Pradesh, in terms of their medicinal uses, ecology, mode of application, Informant consensus factor (ICF), Use value (UV), and Fidelity level (FL).

- To determine the chemical constituents of fatty oils using GC-MS and evaluate the antioxidant activity and free radical scavenging capacity of fatty oils.

- To determine the chemical constituents of essential oils using GC-MS and evaluate the antioxidant activity and free radical scavenging capacity of essential oils.

- To study the antioxidant and radical scavenging properties of the water extracts of some selected medicinal and aromatic plants.

- To determine the antioxidant and radical scavenging properties of the methanolic extracts of some selected medicinal plants.