

The search for novel pharmacotherapy from medicinal plants for central nervous system (CNS) disorders has become of importance since new agents with improved efficacy for more effective therapy are required. For centuries people have used plants for healing. Natural products have been used with varying success to cure and prevent diseases throughout history, and continue to provide mankind with new remedies. People often resort to traditional and other forms of complementary and alternative medicines for chronic conditions which do not respond well to conventional or modern drug treatments. Among these are neurological disorders such as anxiety, depression, epilepsy and pain. The World Health Organization (WHO) estimates that about 75 % of the world population primarily those of developing countries depend on traditional remedies (mainly herbs) for the healthcare of its people. Considering the great reliance on traditional medicinal plants for treatment of diseases and the potential for drug discovery, it becomes relevant to search for potent, effective and relatively safe plant medicines.

Epilepsy is a chronic neurological condition characterized by recurrent, unprovoked, and sudden neuronal discharge of impulses. Several diverse mechanisms have been suggested in the development of epilepsy that includes abnormal ionic conductance, alteration in neuronal membrane functions, imbalance in inhibitory and excitatory neurotransmission or a combination of these. Several antiepileptic drugs (AEDs) are available which act on miscellaneous molecular targets to suppress the abnormal excitability of neurons, either by reducing the seizure discharges, or by preventing the spread of abnormal excitation. However, around 30% of epileptic patients still have 'intractable seizures' that means they are unresponsive to these agents. The use of available AEDs is linked with variety of side

effects, and often results in augmentation of the associated comorbid conditions, particularly cognitive impairments. Unfortunately, many times these conditions remain under-recognized and therefore left untreated in the patients. Prolonged and extensive use of AEDs impart considerable amount of negative impact on lives of the patients, that includes increased suicidal risk, poor tolerability, more predisposition to psychiatric side effects, and sometimes development of pharmacoresistant epilepsy. Hence, a lot of research is being carried out in search of safe and effective agents that can also reduce the risk of epileptic comorbidities. Natural products have been found to be a better alternative for management of neurobehavioural epileptic comorbidities due to their multi-targeted nature. Natural products as one of the complementary and alternative medicine modalities offer potential opportunities to discover lead compounds for novel drug development. Though several herbs and their active ingredients have been studied in laboratory and clinical settings, only a few have been investigated for their molecular mechanisms of action. Thus, the discovery of a new anticonvulsant drug with better efficacy and improved safety profile is of fundamental importance. *Pyrus pashia* (Hamilton ex D. Don; Family: Rosaceae) is a deciduous plant with small and ovate shaped toothed leaves, attractive white flowers, and small pear-like fruits. Native to Himalayan region of Northern India fruits of this plant are used traditionally to treat convulsions and epilepsy. Moreover its fruits are persuasive source of polyphenolics. Earlier research have established that these polyphenols are implicated in treatment of epilepsy. Polyphenols can interplay with variety of cellular receptors or proteins that are involved in signaling cascades, resulting in physiological responses or gene expression which leads to neuroprotection. Hence the present study intends to investigate pharmacognostical and phytochemical standardization of *P.pashia*. Phytochemical

standardization included polyphenolic fingerprinting and isolation of its major polyphenol chrysin. Further the study also scientifically validates the traditional anticonvulsant claims of *P.pashia* fruits.

The subject matter of thesis has been divided into following chapters:

- **Chapter I** deals with introductory part which provides information about importance of medicinal plants in human health care system. It also provides brief introduction on epilepsy, and plant *P.pashia*.
- **Chapter II** deals with detailed literature review on epilepsy and medicinal plants used for the treatment of same. It also provides detailed information of the plant under investigation i.e. *P.pashia*.
- **Chapter III** deals with the objective of study and briefly describes the plan of the present study.
- **Chapter IV** includes the experimental methods implemented in the pharmacognostical and phytochemical standardization along with investigation of anticonvulsant potential of *P.pashia*.
- **Chapter V** illustrates results section.
- **Chapter VI** deals with the discussion on the observed results.
- **Chapter VII** includes conclusion section which is followed by references and list of papers published.