

## Extraction of Proteases from Medicinal Plants and their Potential as Anti- Viral Targets

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Medicinal plants especially leaves are used in traditional medicine for rapid anti-viral therapy against infectious diseases. Protease, a potential candidate in medicinal plants is not so far studied in leaves. So an attempt was made to determine the protease activity of various medicinal plants especially leaves. Buffers of different pH range were used for extraction of the leaves to identify the best buffer for extraction of protease. Firstly, protein from fresh plant leaves of these medicinal plants were determined and then evaluated its protease activity using crude enzyme of protein (leaves) against specific protein antigen i.e. Bovine serum albumin (BSA). Thereafter, exposure of these proteases (acid or basic) on virally infected human whole blood samples determined through flow cytometry. The results showed that protease at particular pH of PBS buffer range of these medicinal plant leaves on virally infected human whole blood samples showed anti-viral activity. Development of vaccines against intracellular infectious diseases e.g. polio, mumps, smallpox etc. have been controlled but infections like HIV have been difficult to target because of variation in genotypes. As per literature, infectious diseases have widely been treated using various medicinal plants and about 25% of current medicines originated from medicinal plant products. Numerous medicinal plants are known for their magical medicinal properties and serve as an indispensable reservoir for drug discovery against infectious diseases. In this regard, separation of these active metabolites using HPTLC technique have enabled researchers to find out the active compounds of medicinal plants as antiviral agents and to overcome the provocation of emerging infectious disease in human population. There is a wide range of medicinal plants which are being used to extract compounds from plant products that are being used for their antiviral activity. In view of this, viral infections are still painful to threat and some remained calamitous diseases in spite of antiviral drug research over decades. For this purpose, medicinal plant proteases have emerged as new targets for antiviral intervention and showed that proteases play a interpretative role in the life cycle of many viruses by effecting or splitting the high-molecular-weight viral polyprotein predecessors to generate functional products or by catalyzing the processing of the structural proteins indispensable for assembly and morphogenesis of virus particles e.g. liver diseases (HCV).

In general, antiviral drugs extracted from medicinal plant products in the form of proteases that may stop the development and propagation of a virus without causing an appropriate damage in the host cell. In spite of this, major achievement i.e. more than 30 new drugs are approved to fight against AIDS virus but its number is limited group of pathogens e.g. herpes simplex virus (HSV), varicellazoster virus (VZV), human cytomegalovirus (HCMV), influenza virus and hepatitis B and C viruses (HBV and HCV, respectively). Recently, pharmaceuticals used proteases as drug or in the form of formulation for the treatment of various diseases. These are based largely on the production of small molecules identified through HPTLC or synthesized by microbes. It includes various hormones, antibiotics, analgesics etc. Previously, researchers mostly focused on plant proteins in the form of large or complex molecules and tried to use as therapeutic agents. The first protein i.e. Insulin was used to treat diabetes that is more common cardiovascular disease in all over the world and it was a major breakthrough in that era of biotechnology. Now a day, scientists focused on those proteases (crude enzyme of protein against specific protein antigen) extracted from medicinal plants and is responsible for breaking down the simple or complex protein that is responsible for causing intracellular infections.

One of the most important groups of industrial enzymes i.e. Proteases that conducts proteolysis (protein catabolism by hydrolysis of the peptide bonds) and showed several physiological processes and determine the potential of proteolytic enzyme that are required or essential e.g. digestion of food proteins, protein turnover, cell division, blood clotting cascade, signal transduction, processing of polypeptide hormones, apoptosis etc. [10,15]. In view of this, proteases are physiologically needed for living organisms and are normally reported in plants, animals and microorganism. For protease production, use of medicinal plants is totally dependent on the availability of land for agriculture and certain climatic conditions.

### Conclusion

The present study helps to identify the protease (acid and basic) activity in leaves of these medicinal plants against specific protein antigen, BSA. These medicinal plant leaves showed

more protease activity against infected human whole blood samples and responsible for its anti-viral properties. However the isolation and purification of proteases from this plant and in

vitro and in vivo testing of the enzyme on various pathogenic micro micro-organisms will help us to understand the anti-viral potential of medicinal plant leaves.