

## ABSTRACT

Plants are known to contain variety of secondary metabolites such as tannis, terpenoids, alkaloids, flavonoids and oil that exhibit therapeutic importance and are employed by herbalist/ naturopaths in the treatment of various ailments. A number of therapeutic proteins such as astragalins, fisetin, B-glucan and many more have been obtained through plant-based system and one such protein that naturally occurs in plant kingdom is ribosome-inactivating protein.

Ribosome inactivating proteins (RIPs) are ribotoxins with an N-glycosidase action that hydrolyses the N-glycosidic bond of adenine residue arranged in significantly loop structure of 28S rRNA. The selective toxicity of RIPs is the main reason to have primary focus of research has been the application of RIPs as the toxic agent in the carcinogenic applications. RIPs have been classified into three types on the basis of their physical structure and function. Type-1 RIPs has a single chain with the molecular weight 30 kDa, in type-2 RIPs subunits are linked by a disulfide bond; these types of proteins are heterodimeric proteins which have the ribosome-inactivity activity on separate polypeptides. Type-3 RIPs are produced as inactive single polypeptide protein with a molecular weight around 58 kDa contains a single polypeptide chain combined to zymogens are held for proteins.

Ribosome-inactivating proteins are most found in plant families such as *Cucurbitaceae*, *Caryophyllaceae*, *Eupobiaceae* and *Phytolaccaceae*. Majority of RIPs have been investigated from the family *Cucurbitaceae* to determine of their biological activities, like MAP30 from *Momordica charantia*, balsamin from *Momordica balsamin*, trichosanthin from *Trichosanthes kirilowii*, bryodin from *Bryonia dioica*, momorcharin from *Momordica charantia*.

*Momordica balsamina* is found in tropical region of Africa, North-part of India, Norther Territory Australia and Central America. It is also known as Balsam apple. It belongs to the *Cucurbitaceae* family that is tendril-bearing high climbing vine. All parts of this plant such as seeds, leaves, bark as well as the fruit contain various types of nutritional and medicinal components such as alkaloids, saponins, flavonoids, terpense and balsamin protein. The leaves of this plant used as a source of nutrient because they contain 17 amino acids while mineral composition such as magnesium, phosphorus, calcium, zinc, sodium, potassium etc. It also plays an important role in pharmaceuticals and most of the components of this plant are used as anti-cancer agents.

The phytochemical analysis of the balsamin revealed that it contains different varieties of secondary metabolites such as tannin, terpenoids, alkaloids, phenols that have been used for the treatment of various types of diseases. Balsamin was partially purified from the seeds of *Momordica balsamina*. The three dimensional (3D), structure of balsamin was predicted with SWISS-MODEL server while using  $\alpha$ -MMC as a template (a RIP obtained from *M. charantia*; RIP1\_MOMCH).