# *In silico* approaches for structure and function analysis of calcium-dependent protein kinases (CDPKs) in potato (*Solanum tuberosum* L.)

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Various stimuli are known to alter the cytosolic concentration of $Ca^{2+}$, which in turn trigger the physiological responses in plant and animal cells. Such $Ca^{2+}$-mediated signals are decoded in the form of spatio-temporal expression of different calcium-binding proteins. Calcium-dependent protein kinases (CDPKs) are regarded as one of the largest and most differentiated group of calcium sensors. The regulatory domains of these proteins bind calcium ions. Activities of the CDPKs are regulated by specific phospholipids and autophosphorylation. CDPK-mediated phosphorylation reactions are known to influence various metabolic activities such as carbon and nitrogen metabolism, phospholipid synthesis, defence responses, ion and water transport, organization of cytoskeletons along with transcription, hormonal responses and intra-cellular signaling. Potato (*Solanum tuberosum* L.), a member of the *Solanaceae* family, is a nutritious and non-grain starchy food crop. It is a C3 plant, and grows well in short-day and cool night temperature. Multiple allelism is a common feature in the tetraploid potato cultivars. The tubers are the sink organs for storage of starch, proteins and other biomolecules. Tuberization is a complex process that involves number of signals, genes, extrinsic and intrinsic factors and developmentally-regulated metabolic processes. Protein phosphorylation is known to play crucial roles at various stages of tuber development. A number of studies revealed the presence of different forms of CDPKs showing varying expression patterns and functional specializations. For example, StCDPK1 is transiently induced upon tuberization in swelling stolons. Likewise, StCDPK3 is involved in tuberization. StCDPK2 is expressed only in leaves; whereas StCDPK4 and StCDPK5 are involved in immune responses. The CDPKs act as mediators of responses to diverse endogenous and environmental cues. The biological function of the individual CDPKs still remain elusive. In this study *in silico* approaches were adopted for predicting various structural and functional attributes of various potato CDPKs which were hitherto unknown.

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Category : poster presentation