Tuberization is an important process in potato that is governed by a complex of environmental as well as internal factors. As a morphogenic process, it is closely connected with regulation of frequency and orientation of cell division. Thus, the aim of this thesis was to transform potato with mitotic activator cdc25 from Schizosaccharomyces pombe (Spcdc25) and to follow the resulting changes in potato phenotype with a special focus on tuber formation.

In previous studies with tobacco, it has been shown that the expression of the above mentioned Spcdc25 gene results in dramatic changes in morphology (leaf structure, restricted root development and growth, and also remarkable developmental change – acceleration of flowering). Moreover, many other characteristics that can be induced in control by cytokinin application have been observed (e.g. cytokinin independent de novo shoot formation, carbohydrate metabolism changes). The two last characteristics – cytokinins independency of morphogenic process and changes in carbohydrate metabolism (e.g. increased starch deposition) - are important from the point of view of expected changes in characteristic of Spcdc25 transgenic potato.

To transform potato, the preparation of a plasmid carrying construct with suitable selectable marker was necessary. From original plasmid containing hygromycin resistance the target gene was taken out and inserted into binary plasmid pCP60. The plasmid was electroporated into Agrobacterium tumefaciens that was used for the potato transformation. Seven out of thirty six isolated lines were checked for the cdc25 gene expression. In five lines the presence and expression of the gene was confirmed. There were no visible changes in plant morphology, with important exception represented by a change in tuber formation. The Spcdc25 expressing plants exhibited sessile tubers in contrast to control tubers formed on outgrowing stolons.