

Abstract

Glutamine synthetase is a key enzyme for ammonium assimilation and glutamine biosynthesis in plants. Ammonium ions are important intermediates in nitrogen metabolism, but their elevated concentration is toxic to plants. Correct function of glutamine synthetase is essential to plant life - glufosinate, a specific inhibitor of glutamine synthetase acts as a total herbicide. Glutamine synthetase is involved in a number of important metabolic processes: primary assimilation of nitrogen nutrients, in re-assimilation of ammonium ions released during photorespiration or metabolism of phenylpropanoids and in nitrogen remobilization in developing seeds, during germination or senescence. According to localization in the cell glutamine synthetases in angiosperms are divided into the plastid form (GS2), which is typically encoded by a single gene, and the cytosolic form (GS1), which is encoded by a small multigene family. The various isoforms of glutamine synthetases have different location within plant organs and tissues, ways of regulation and role in nitrogen metabolism.

Keywords:

plastid and cytosolic glutamine synthetase, ammonium assimilation, nitrogen metabolism, photorespiration