

Abstract

NH_4^+ is one of the major inorganic forms of nitrogen taken up by plant roots from the soil. The response of plants to NH_4^+ depends on a number of factors – especially its concentration in the rhizosphere or the availability of other ions such as K^+ or NO_3^- . In the case of a low nitrogen availability in the rhizosphere, NH_4^+ positively affects the growth of the root system. In the NH_4^+ -rich area of rhizosphere, local stimulation of lateral root branching may occur to enhance effective acquisition of the present nitrogen source. A sensor that perceives NH_4^+ and induces this response of root system response is the high affinity ammonium transporter AMT1;3. With excess NH_4^+ , the growth of the whole plant is inhibited and this phenomenon is called ammonium toxicity syndrome. This syndrome is the result of the interaction of NH_4^+ with various processes in the plant and induced K^+ deficiency is one of the most important signs of this syndrome. NH_4^+ and K^+ directly interfere with each other during uptake. NH_4^+ enters the plant through K^+ channels and also inhibits the expression of the high affinity K^+ transporters, thereby significantly reduces its uptake. NH_4^+ and K^+ interference is one of the main topics that this bachelor thesis focuses on. It also summarizes mechanisms of uptake and assimilation of NH_4^+ , mechanisms of NH_4^+ toxicity and reaction of root system to different NH_4^+ concentrations in rhizosphere.

Key words: ammonium nutrition, ammonium toxicity syndrome, potassium nutrition, root system, NH_4^+ and K^+ interference