Schluttig, A. and W. Fritsche The regulation of urease synthesis by repression in N. crassa.

The synthesis of urease (urea amidohydrolase, EC 3.5.1.5) is mainly influenced by ammonia concentration of the medium.

The wild type strain 3a6A was cultivated in Vogel's medium N with 2% glucose and N-equivalent amounts of urea or NH_4Cl. We used 20 mM urea or 40 mM NH_4Cl for nitrogen-surplus conditions and 5 mM urea or 10 mM NH_4Cl for nitrogen-limited conditions. The mycelium was cultivated at 30° C in 500 ml flasks containing 100 ml medium on a rotary shaker. Urease activity was measured by the method of Kaltwasser and Schlegel (1966 Analyt. Biochem. 16: 132). The specific activity is expressed here as µmoles NH_3/min/mg Protein. The specific activity of the inoculum (macroconidia) was at a level of 0.54. In cells grown under urea or amonia-surplus conditions the specific urease activity decreases to 0.18. This decline is connected with the consumption of urea and accumulation of ammonia in the medium. Cultivation in a medium with a low content of the nitrogen source (urea or NH_4Cl) results first in a decrease of specific urease activity to 0.2, followed by a fivefold increase in urease (specific activity 0.96) after consumption of the nitrogen source. A second addition of NH_4Cl and glucose to such cultures with a high level of urease results in a renewed repression of urease synthesis. The specific activity decreases again (to 0.18) as a consequence of the renewed growth.

Experiments using cycloheximide as an inhibitor of protein synthesis demonstrated that the increase in urease content following nitrogen depletion requires protein synthesis. Deficiency of urea or ammonia in the medium causes a derepression of urease synthesis. - - - Martin-Luther-University, Section of Biosciences, Halle (Sale), G.D.R.