

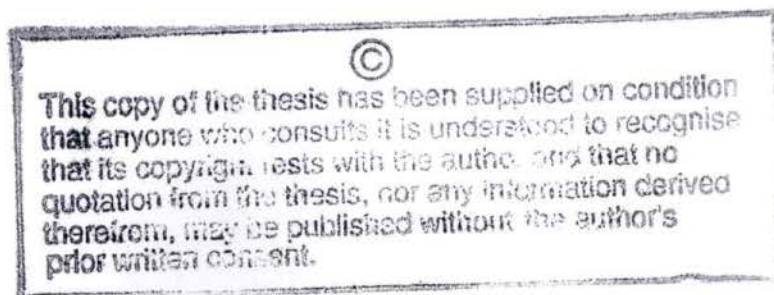
**Mur,
a manganese-responsive,
Fur-like regulator in
*Rhizobium leguminosarum***

Thesis submitted by

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Abstract

The Ferric uptake regulator (Fur) is widely distributed in bacteria and in many species (e.g. *E. coli*) it plays an essential role in the regulation of several genes involved in iron acquisition. Fur binds to the regulatory DNA of these genes through a conserved *cis*-sequence known as the *fur*-box. Interestingly, a Fur homologue was identified in *R. leguminosarum*, which did not regulate any of the expected iron-responsive genes. However, mutations in this gene severely affected the expression of the *sitABCD* operon, which was initially thought to be involved in iron transport, but, in this project it was demonstrated that this operon is involved in the transport of manganese. Another protein that may be involved in manganese transport was identified (MntH) and its promoter cloned. The expression of both promoters (*sit* and *mntH*) was repressed by the *R. leguminosarum* Fur. It was therefore decided to rename *R. leguminosarum* Fur as *R. leguminosarum* Mur (manganese uptake regulator). This is the first Fur homologue identified as a Mn regulator *in vivo*. Interestingly, Mur is still responsive to iron, since it can bind to a classical *fur*-box if this is artificially supplied. Additionally, Mur can partially correct an *E. coli fur*-mutant. Importantly no *fur*-box was identified in the promoter of the *sitABCD* operon or *mntH*. However Mur does bind to the promoter of the *sitABCD* operon, which strongly suggests that it recognizes a new *cis*-sequence in addition to the canonical *fur*-box.

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