Content

1. Summary	1
1.1 Summary English	1
1.2 Deutsche Zusammenfassung	2
2. Introduction	3
2.1 Copper in biology	3
2.2 Regulation of copper homeostasis in bacteria	4
2.2.1 Cytoplasmic copper-responsive regulators: CopY, CueR, and CsoR	4
2.2.2 Copper-dependent two-component systems	7
2.3 Copper homeostasis in Corynebacterium glutamicum	8
2.4 Aims of this work	13
3. Results	14
3.1 The Two-Component Signal Transduction System CopRS of	
Corynebacterium glutamicum Is Required for Adaption to	
Copper-Excess Stress	15
3.2 First insights into the sensing properties of the copper-responsive sensor	
kinase CopS of the CopRS two-component system in Corynebacterium	
glutamicum	28
3.3 Copper homeostasis of Corynebacterium glutamicum is regulated by a	
CsoR-type repressor in combination with the two-component system CopRS	40

4. Discussion	58
4.1 Regulation of copper homeostasis in C. glutamicum	58
4.1.1 The two-component system CopRS	59
4.1.2 The cytoplasmic copper sensor CsoR	63
4.2 Copper homeostatic proteins	66
4.3 Copper influence on C. glutamicum physiology	69
4.4 Conclusion	70
5. References	73
6. Appendix	83
6.1 Supporting Information - The two-component system CopRS	83
6.2 Supporting Information - CsoR	88