

TECHNISCHE UNIVERSITÄT MÜNCHEN

Lehrstuhl für Chemisch-Technische Analyse und Chemische
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A proteome analysis of *Corynebacterium glutamicum*
after exposure to heavy metals (mercury, cadmium,
cobalt, silver and lead)

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DEDICATION

To my lovely country Palestine

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Publications

Fanous, A., Weiland, F., Lück, C., Görg, A., Friess, A., & Parlar, H., 2006. A proteome analysis of *Corynebacterium glutamicum* after exposure to the herbicide 2,4-dichlorophenoxy acetic acid (2,4-D). *Chemosphere*, 69, 25-31

Fanous, A., Weiss, W., Görg, A., Jacob, F., & Parlar, H., 2008. A proteome analysis of the cadmium and mercury response in *Corynebacterium glutamicum*. *Proteomics*, 8, 4976-4986.

Fanous, A., Görg, A., & Parlar, H., 2008. Proteomic study on the cellular responses to non-thermal low electric field in *Saccharomyces cerevisiae*. *Electromagnetic Biology and Medicine*. (under submission)

Fanous, A., Görg, A., & Parlar. The induction of stress-related proteins in *Corynebacterium glutamicum* by lead. (in preparation).

Fanous, A., Görg, A., & Parlar. Proteome analysis of *Corynebacterium glutamicum* under cobalt and silver stress. (in preparation).

Poster Presentations

Fanous, A., Weiss, W., Görg, A., Jacob, F., & Parlar, H., 2008, A proteome analysis of the cadmium and mercury response in *Corynebacterium glutamicum*. 4th International Conference on Trace Element Speciation in Biomedical, Nutritional and Environmental Sciences, Neuherberg, Germany.