

## *Characterization and Differentiation of Probiotic Bacillus cereus Isolates from Feeds*

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Currently, animal feed often contains so-called "probiotics" used as feed additives. Among them, two non-toxic *B. cereus* products, Toyocerin® and Paciflor®, are applied. The differentiation of these both food additives from wild-type, toxic *B. cereus* strains, cannot be achieved using conventional biochemical tests. *B. cereus* wild-type strains (11 strains) and a number of Toyocerin® (15 strains) and Paciflor® (12 strains) behaved equal in catalase- and hemolysin-production, positive in starch hydrolysis, gelatinase, and lecithinase-reaction, and did not show any significant differences in fermentation of carbohydrates. In the API 50 CHB-testsystem the two probiotic strains showed two typical positive reaction: fermentation of turanose and  $\alpha$ -Methyl-D-glucoside.

Randomly, checking these strains by Fourier-transform infrared spectroscopy (FT-IR) the probiotic *B. cereus* strains could be separated from each other as well as from *B. cereus*/*B. thuringiensis*/*B. mycoides*/*B. weihenstephanensis* strains using the hierarchical cluster analysis. The discriminatory information was contained in the spectral windows 3000-2800  $\text{cm}^{-1}$  ("fatty acid region"), 1200-900  $\text{cm}^{-1}$  ("carbohydrate region"), and 900-700  $\text{cm}^{-1}$  ("fingerprint region"). Furthermore, all of the *B. cereus*/*B. thuringiensis* strains and the "probiotics" produced myo-inositol-1-phosphat-phosphatase but with different enzymatic activity. This was detected by growth onto BCM® *Bacillus cereus* and *B. thuringiensis* Plating Medium (Biosynth AG, Staad, Switzerland). Additionally, the whole cell protein profiles of *B. cereus* wild strain and of the both probiotic species appear clearly different. It is concluded that FT-IR may be useful for rapid quality and risk factor control in the use of animal feeds containing "probiotics" as additives.

### References:

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