

## SUITABILITY OF RIDASCREEN® ENZYME IMMUNOASSAY TO DETECT VEROTOXINS IN FOODS

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### Background

Foods which have been contaminated with verotoxin-producing *E. coli* (VTEC) or the highly pathogenic enterohemorrhagic *E. coli* (EHEC) generally only contain these microbes in very slight quantities along with other enterobacteriaceae. Since an ingestion of only 10 - 100 EHEC can already be dangerous for humans, suitable test methods must be able to detect <10 KbE/25g in foods. According to the current state of knowledge, the EHEC pathogens belong to the VTEC group. They are therefore detected on the basis of their production of verotoxin (VT). Suitable detection methods are screening by Enzyme-Linked Immunosorbent Assay (ELISA) and Polymerase Chain Reaction (PCR).

### Objectives

Our work involved testing the suitability of the RIDASCREEN® Verotoxin Test (from R-Biopharm GmbH), a commercially available ELISA test, to detect VT in the foods *Zwiebelmettwurst* (German soft pork and onion sausage), smoked salmon, yogurt and soybean sprouts. Furthermore, two enrichment methods were compared with each other, and we examined whether a 6-day storage in inoculated foods at 4 - 6°C influenced the VT-producing ability of VTEC/EHEC.

### Methods

Four different VTEC serovars in quantities <10, 10-100 and 100-1000 VTEC/25g were used to inoculate the food. After determining the microbial status of the food, the samples inoculated with VTEC were enriched according to a one-stage (A) and a two-stage (B) method and examined with the RIDASCREEN® verotoxin test. In the two-stage method the second enrichment was carried out by adding Mitomycin C. A PCR method was used as reference method as a control against erroneously negative results.

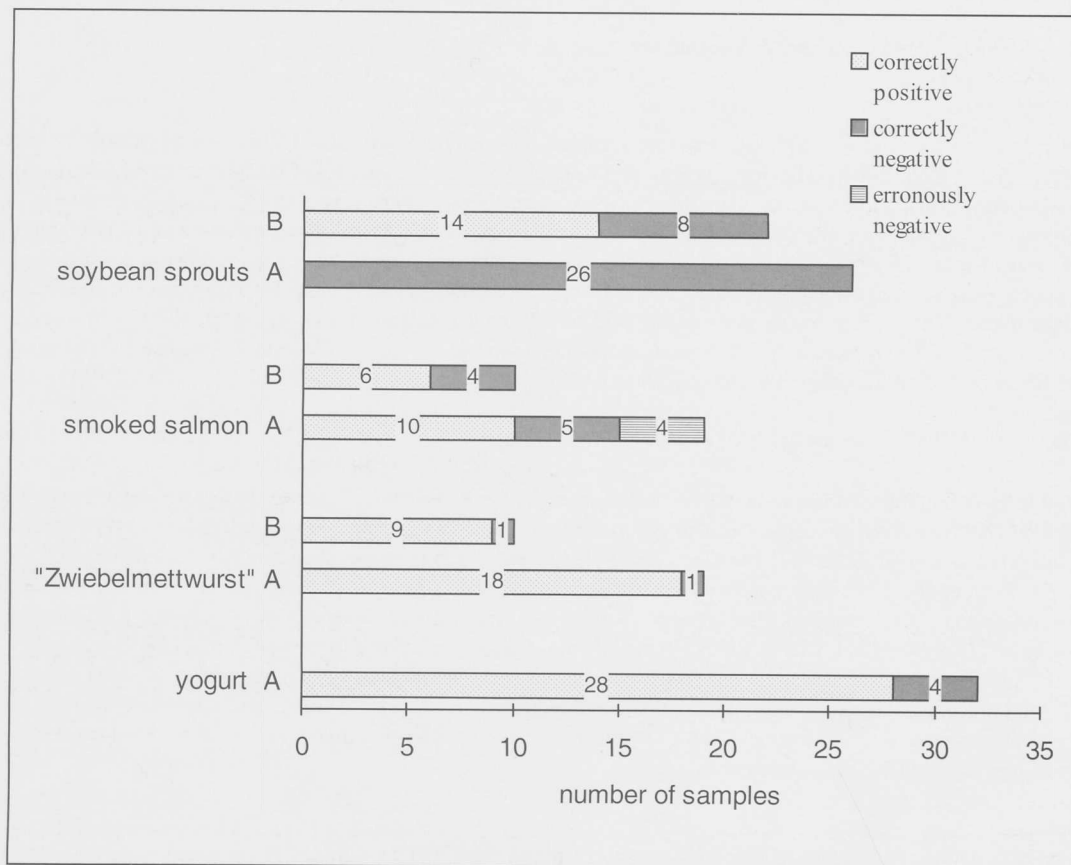
### Results and discussion

- The RIDASCREEN® verotoxin test was able to detect VT produced by <10 VTEC/25g food. The microbes must be isolated to confirm a positive VT finding and a characterization of the microbe should be made.
- Food components or added ingredients did not affect the detection of VT with the RIDASCREEN® enzyme immunoassay.
- The enrichment method must be adjusted to the conditions present in the food. After there has been a two-stage sample enrichment by adding Mitomycin C, the RIDASCREEN® verotoxin test is equivalent to the PCR.
- If a food contains enterobacteriaceae (smoked salmon  $3.8 \cdot 10^3$  KbE/g, soybean sprouts  $8.0 \cdot 10^7$  KbE/g), this affects the detection of VT.
- Storage temperatures of 4 - 6 °C, a low pH value of 4.3 in yogurt and the added lactic acid-producing starter cultures do not influence the toxin activity of the VTEC.
- It could not be clarified whether or not smoke components in the food (smoked salmon) influenced the VTEC during storage.

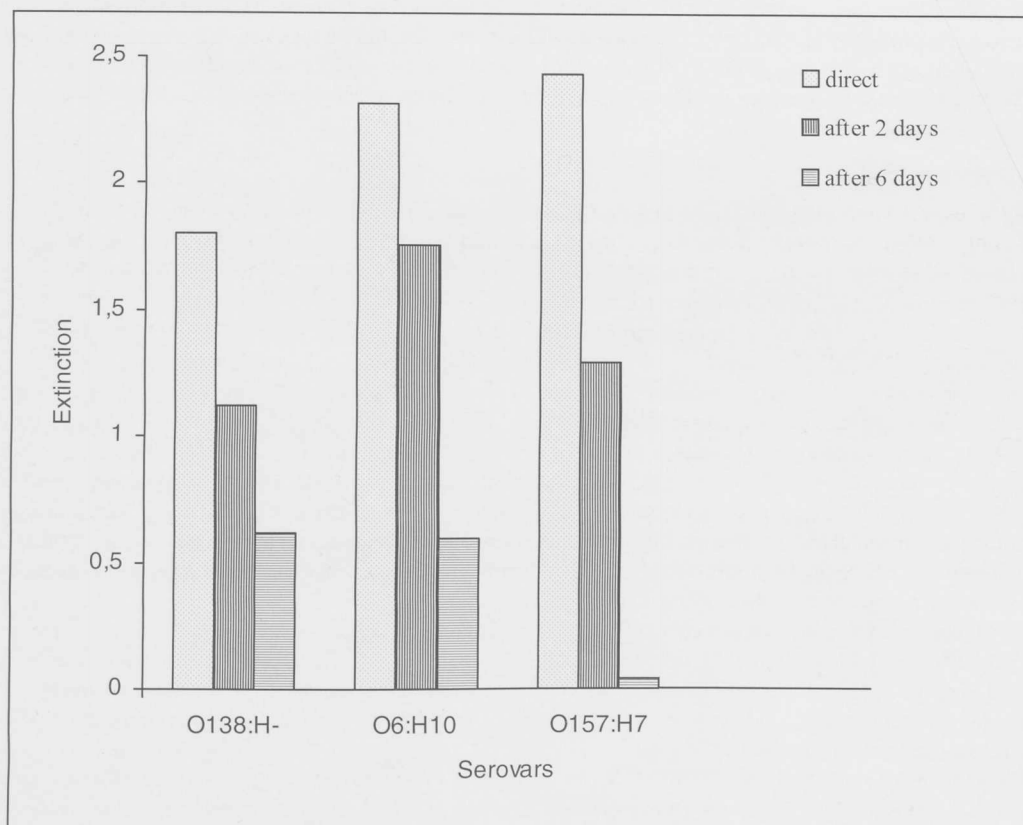
### Pertinent literature

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Figures



RIDASCREEN® verotoxin test results after one-stage (A) and two-stage (B) enrichment



Reduction in toxin activity depending on the storage duration (at 4-6 °C).