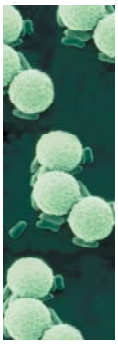
Norwegian Institute for Food and Environmental Analysis response to an "E. coli Outbreak" (using Dynabeads® EPEC/VTEC O103)

Karl F. Eckner . The Norwegian Institute for Food and Environmental Analysis Inc.;
Postboks 6166 Etterstad; 0602 OSLO; NORWAY. Email: KAE@matanalyse.no

Introduction

Verocytotoxin-producing *Escherichia coli* serotypes other than O157 VTEC are emerging as important human pathogens, although their disease-causing abilities as enteropathogenic *E. coli* (EPEC) in animals have been recognised long ago. Illnesses caused by non-O157 VTEC infections can range from self-limiting watery diarrhoea, bloody diarrhoea or haemorrhagic colitis (HC) to life-threatening manifestations such as haemolytic uremic syndrome (HUS) or thrombotic thrombocytopenic purpura (TTP). Non-O157 VTEC infections may be associated with consumption of animal products, although knowledge of their incidence throughout the entire food chain is limited.

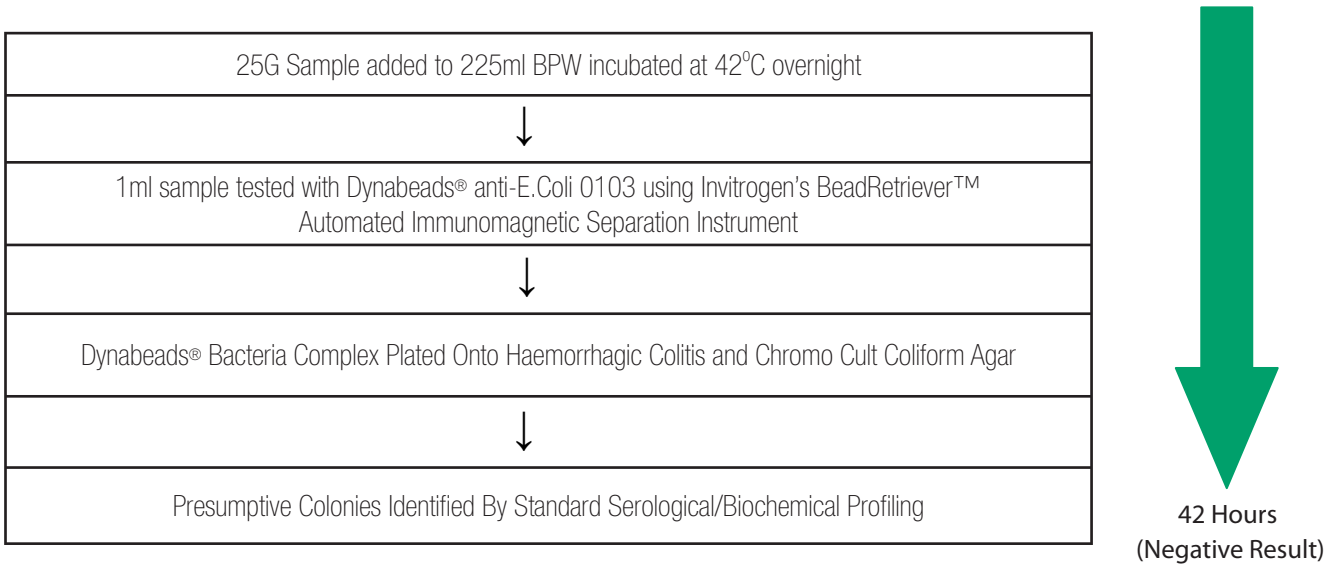


In general, the detection of non-O157 VTEC is not widely practiced in most microbiological laboratories worldwide and few laboratories are able to detect non-O157 strains. This is primarily because many non-O157 VTEC strains lack the phenotypic characteristics of O157 VTEC, such as delayed fermentation of sorbitol and the haemolytic activity on haemolysin agar, and therefore cannot be identified on the routinely used modified sorbitol-MacConkey agar, CT-SMAC. Some strains of *E.coli* 0103 exit increased susceptibility to cefixime and tellurite in CT-SMAC and do not seem to grow on this medium.

However, Immunomagnetic Separation (IMS) using Dynabeads EPEC/VTEC O103 represents a physically selective concentration procedure needed to improve the isolation and detection of the organisms from diverse sample matrices

During an outbreak of *E. coli* O103, earlier this year in Norway, there were over 3000 meat samples to be analysed in a matter of weeks. The addition of two Invitrogen Environmental Diagnostics products: Dynabeads® EPEC/VTEC O103 and two Invitrogen BeadRetreiver™ instruments to the laboratory workflow, significantly improved the capability of dealing with the large sample numbers by reducing the sample processing time. Therefore, the time to determining the presence or absence of *E. coli* O103 in samples was decreased significantly using Automated Immunomagnetic separation (AIMS).

Example of workflow



Conclusions

→ The combined use of the Invitrogen BeadRetriever™ and Dynabeads® EPEC/VTEC O103 reduced the sample processing time and improved the overall efficiency of the laboratory carrying out these tests. Therefore, during this critical time period ("The Outbreak") the responsiveness of the NIFEA was enhanced. The new additions to the test procedure were incorporated into Standard Operating Plans (SOP's) for Outbreaks and this analysis demonstrated the utility of this approach for the detection of Non-O157 VTEC from outbreak related samples.

→ The Dynabeads® EPEC/VTEC O103 AIMS protocol provided additional sensitivity and selectivity in the isolation and concentration of *E. coli* O103 from test samples and allowed the NIFEA to detect lower levels of *E. coli* O103 than would normally have been possible by direct surface plating.

→ Currently a global standard method for use with *E. coli* O103 as well as other EPEC/VTEC strains has not been developed largely due to the absence of a suitable selective indicator medium. The NIFEA uses IMS as part of their standard method for detection and isolation of *E. coli* O103.

References:

1.Dynabeads EPEC/VTEC 0103 rev 000, Invitrogen Dynal AS