

# Evaluation of commercial latex slide test for identifying *Escherichia coli* 0157

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**SUMMARY** A commercial latex slide test (Oxoid DR 620) for the identification of *Escherichia coli* 0157 was compared with a standard tube agglutination method using *E coli* 0157 antiserum (Difco). Thirty isolates previously confirmed as *E coli* 0157 were positive by both methods: 30 isolates of *E coli* of serogroups other than 0157, 30 isolates of non-sorbitol fermenting organisms from various genera, and one isolate of *E hermannii* were all negative by both methods. It is concluded that the latex slide test offers a rapid and economical alternative to tube agglutination for the identification of *E coli* 0157.

Strains of *Escherichia coli* producing a powerful cytotoxin active against cultured Vero cells were first described in 1977 by Konowalchuk *et al.*,<sup>1</sup> and have since been recognised as important pathogens in man. Such Verotoxin (VT) producing *E coli* (VTEC) have been associated with outbreaks and sporadic cases of haemorrhagic colitis in North America,<sup>2,3</sup> England,<sup>4,5</sup> and Japan,<sup>6</sup> with sporadic cases of haemolytic uraemic syndrome in North America<sup>7,8</sup> and England.<sup>9</sup> Although VTEC may be found in a variety of serogroups, most cases of haemorrhagic colitis and haemolytic uraemic syndrome are caused by the VTEC of serogroup 0157.

## Material and methods

Twenty eight strains of VT positive *E coli* 0157 from cases of haemorrhagic colitis or haemolytic uraemic syndrome and two strains of VT positive *E coli* 0157 isolated from cattle faeces were those described in a previous study.<sup>5</sup> Thirty strains of *E coli* of serogroups other than 0157 included VTEC, heat-labile enterotoxin producing *E coli* (ETEC), and enteropathogenic *E coli* (EPEC) isolated in previous studies<sup>5,10</sup> and during routine examination of clinical samples in this laboratory. Serogroups of *E coli* included 01, 02, 06, 09, 0181ac, 025, 026, 086, 0103, 0111, 0117, 0124, 0127, 0128, 0148, and 0156. Thirty non-sorbitol fermenting organisms isolated from faecal samples using sorbitol MacConkey agar (Oxoid CM813) were: *Aeromonas hydrophila* (n = 4); *Morganella morganii* (n = 4); *Providencia alcalifaciens* (n = 4); *Proteus mirabilis* (n = 1); *Proteus vulgaris* (n

= 2); and *E coli* (n = 15). One strain of *E hermannii* was also tested. Organisms had been kept in nutrient broth with 15% glycerol v/v at -70°C since first isolation.

## LATEX SLIDE TEST

The kit consists of two latex reagents. The test reagent comprises latex particles coated with rabbit antibody specific to the 0157 antigen of *E coli*, and the control reagent comprises latex particles coated with pre-immune rabbit globulins. Both test and control latex are supplied in small dropper bottles. Test organisms were grown on MacConkey agar (Oxoid CM7b) overnight before testing according to the manufacturer's instructions. Two smooth suspensions of the organism were made in saline on a clean slide (either a black slide or a clear slide viewed against a dark background). One drop of test latex was added to the first and one drop of control latex to the second. After mixing with a loop the slides were rocked gently in a circular motion and observed for agglutination. The test was recorded as positive if agglutination visible to the naked eye was observed with the test latex, but not the control latex, within one minute of mixing.

## E COLI TUBE AGGLUTINATION TEST

O antigen from the test organisms was prepared by a standard method. Serial dilutions of *E coli* 0157 antiserum (Difco) in 0.5 ml volumes in phosphate buffered saline were made, ranging from 1/20 to 1/1280. O antigen (0.5 ml) was added to each dilution; 0.5 ml of PBS and 0.5 ml O antigen were used as controls. Tubes were incubated at 50°C overnight and read for agglutination. Tubes showing 50% or more cells agglutinated at a dilution of 1/320 or greater were recorded as positive.

Table Comparison of latex slide test and tube agglutination for identifying *E coli* 0157

No of samples	Strain	Test latex positive	Control latex positive	Tube test
30	<i>E coli</i> 0157	30	0	30
30	<i>E coli</i> non-0157	0	0	0
30	Non-sorbitol fermenting organisms	0	0	0
1	<i>Escherichia hermanii</i>	0	0	0

## Results

The table shows in detail the results obtained. All *E coli* previously confirmed as 0157 were positive by both the latex slide test and tube agglutination. All other organisms tested were negative by both procedures.

## Discussion

VT positive *E coli* 0157 are now known to be a major cause of haemorrhagic colitis and haemolytic uraemic syndrome. *E coli* 0157 is unusual among *E coli* strains in that it does not ferment sorbitol,<sup>3,11</sup> a feature which was used to develop a medium for screening faecal samples for the presence of *E coli* 0157<sup>12</sup>; such a medium is now available commercially (Oxoid CM 813). Apparently, non-sorbitol fermenting organisms on this medium should always be checked by a suitable series of biochemical tests<sup>5</sup> to confirm their identity as non-sorbitol fermenting *E coli*, which should in turn be confirmed as *E coli* 0157. Such confirmation has hitherto been possible only by tube agglutination tests using a specific antiserum. Although reliable, these tests are tedious and time consuming. By contrast, the latex slide test seems to offer a rapid, simple, and economical means of identifying *E coli* 0157; instructions with the kit are clear and accurate. Occasional mis-identifications of *E hermanii* as *E coli* 0157 have been reported.<sup>13</sup> *E hermanii* is uncommon and only one isolate was available for testing; this was negative in both tests. Demonstration of VT production is necessary for all isolates of *E coli* 0157, because not all produce VT. In the absence of *E coli* 0157, other VTEC serogroups should be sought as these have occasionally been implicated in haemorrhagic colitis and haemolytic uraemic syndrome. Suitable methods

for detecting all VTEC serogroups have been reviewed elsewhere.<sup>9</sup>

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