COMPARATIVE STUDIES ON LABORATORY DIAGNOSTIC METHODS IN THE DIAGNOSIS OF SWINE DYSENTERY

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Spirochetes associated with swine dysentery are difficult to distinguish from non-pathogenic spirochetes present in swine faeces. The ability to cause disease by oral inoculation is the decisive character, but this is expensive and cumbersome, and impractical when testing large numbers of isolates. The character most widely used in routine diagnostic work is the ability of pathogenic spirochetes to produce strong β-haemolysis in blood agar. However, non-pathogenic spirochetes produce weak β-haemolysis under the same conditions. The degree of haemolysis is assessed subjectively, and is influenced by the medium and by other cultural conditions. Therefore, a simple, rapid screening method suitable for use on a large number of isolates is needed. Two such methods have been suggested, viz., the rapid slide agglutination test and the API ZYM system (a commercialized semiquantitative micromethod for rapid, systematic testing for 19 different enzymes). In the present work, seven reference strains and 35 strains isolated in this laboratory were tested by both these methods and the results compared with the degree of haemolysis produced by these strains.

The rapid slide agglutination was performed with antisera for the following reference strains: B78[1], B169[1], B204[1], Dys754[3], P18A[2], B256[1], and Dys40[3]. The five first mentioned of these reference strains were strongly haemolytic (shr) whereas the two last were weakly haemolytic (whr). Eighteen of the strains isolated in the laboratory produced strong haemolysis (shl) and seventeen weak haemolysis (whl). The sera, which were used unabsorbed were tested in the dilution 1/100.

The API ZYM test was performed as previously described (Hunter & Wood).

The antisera for the reference strains were rather specific when used in dilution 1/100. Cross reactions were observed between antisera and cells of strains B204 and Dys754, which shows that these strains are antigenically closely related, if not identical. Cells of strain B169 were agglutinated by antisera to B78 and P18A as well as by their homologous antiserum, whereas antiserum to B169 agglutinated B169 cells only. The rest of the antisera were strain specific. The existence of several serotypes among these spirochetes is thus obvious. Of the 18 shl strains, 13 were agglutinated by one or more of the antisera to shr strains. No shl strain was agglutinated by antisera for the whr strains, and of the 17 whl strains only two were agglutinated by such antisera. Ten whl strains were agglutinated by antisera for shr strains (9 by anti-P18A, one of which was also agglutinated by anti-Dys754). Five shl and five whl strains were not agglutinated by any of the antisera.

All the shr strains and 17 of the 18 shl strains lacked α-galactosidase as did also the two whr strains and five of the 17 whl strains. Two shr strains and 15 shl strains lacked α-glucosidase as did also the two whr strains and 16 whl strains. All five shr strains and 13 of the 18 shl strains possessed β-glucosidase, and so did 12 of the 17 whl strains, whereas both of the whr strains lacked this enzyme (Table).

Four of the shl strains that lacked α-galactosidase and the one shl strain that possessed this enzyme were not agglutinated by any of the antisera, while the remaining 13 shl strains were all agglutinated by antisera for shr strains. Three of the ten whl strains that reacted with antisera for shr strains lacked α-galactosidase.

The present results will be discussed in relation to previously published results obtained with the same or similar tests, and suggestions will be made for further research.

Selected references: Kinyon, J.A., Harris, D.L. and Glock, R.D.: Infect. Immun. 1977, 15:638; Hunter, D. and Wood, T.: Vet. Rec. 1979, 104:383; Burrows, M.R. and Lemcke, R.M.: Vet. Rec. 1981, 108:187.

1) Strains isolated in the USA
2) Strains isolated in the United Kingdom
3) Strains isolated in Denmark

Table. Comparison of degree of haemolysis and presence of some enzymes

Strains \ Enzymes	α-galactosidase +	α-galactosidase -	α-glucosidase +	α-glucosidase -	β-glucosidase +	β-glucosidase -
shr[1]	0	5	3	2	5	0
shl	1	17	3	15	13	5
whr	0	2	0	2	0	2
whl	12	5	1	16	12	5
SH[2]	0	19	19	0	19	0
WH[2]	12	0	2	10	7	5

1) For explanation of the abbreviations, see text.
2) Results from the study by Hunter & Wood.