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Specific determination of *Salmonella* strains using a phage-typing scheme

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Phage-typing is a practical method for bacterial differentiation based upon the sensitivity and high specificity of the strains to bacteriophages.

There are numerous potentially pathogenic serotypes of *Salmonella* and some of them can possess an epidemiological relevance. The methods actually applied to study the epidemiological markers of these strains are based on serological and antimicrobial resistance characteristics. However, these markers offer a low discrimination rate and they are unable to determine the epidemic outbreaks. For this reason, a single, wide-spectrum phage-typing scheme may provide additional advantages with respect to the classical typing methods (Gershman & Markowsky, 1983).

A phage-typing scheme, comprising 25 bacteriophages isolated from sewage on 12 *Salmonella* serotypes, were used as a possible epidemiological marker and/or determinative tool of *Salmonella* isolates, regardless their source or serotype.

A total of 224 *Salmonella* strains, belonging to the 20 serotypes most frequently isolated from waters in Malaga (Spain) (Morinigo *et al.*, 1988), were analysed using the phage-typing techniques described by Adams (1959) and Anderson (1962).

On the basis of the phage set lytic activity, 117 phage-types have been recognized. Table 1 shows the phage-patterns obtained from the different serovars of *Salmonella* tested. Only one strain could not be typable by this method, however self-agglutinable, non-motile and monophasic strains of *Salmonella* can be determined by the phage-typing method.

The detection frequency of the different phage-types of the same serotype is relatively low (less than 5%), which coincides with the results obtained by other authors (Gershman, 1976; Bouzoubaa *et al.*, 1985).

In short, the results obtained indicate that: (i) no significant relationship was observed between the susceptibility of the strains to specific bacteriophages and their somatic antigenic characteristics. (ii) All the strains belonging to C1 serogroup present a narrow and specific sensitivity pattern to bacteriophages, which implies the possible diagnostic use of this phage set. (iii) A close relationship between the phage-types on *S. typhimurium* and *S. enteritidis* was observed, which indicates a possible common source or epidemiological route.



TABLE 1.- Phagetypes from the different *Salmonella* serotypes tested.

Serotype	Serogroup	Number of	
		Strains	Phagetypes
<i>S. blockley</i>	C2	27	15
<i>S. bovis-morbificans</i>	C2	2	2
<i>S. braenderup</i>	C1	2	2
<i>S. enteritidis</i>	D1	21	6
<i>S. infantis</i>	C1	7	6
<i>S. london</i>	E1	20	10
<i>S. menden</i>	C1	1	1
<i>S. montevideo</i>	C1	1	1
<i>S. muenchen</i>	C2	4	2
<i>S. ohio</i>	C2	24	15
<i>S. oranienburg</i>	C1	1	1
<i>S. paratyphi C</i>	C1	1	1
<i>S. potsdam</i>	C1	4	3
<i>S. richmond</i>	C1	3	3
<i>S. senftenberg</i>	E4	6	4
<i>S. taksony</i>	E4	1	1
<i>S. thompson</i>	C1	15	9
<i>S. typhimurium</i>	B	45	24
<i>S. virchow</i>	C1	7	7
<i>S. weltevreden</i>	E1	3	3
Self-agglutinable	-	24	17
Non-motile	-	3	3
Monophasic	-	1	1

References

- Adams, M.H. 1959. Bacteriophages. Interscience Publishers Inc., New York.
- Anderson, E.S. 1962. Brist. Med. Bull., **18** :64-68.
- Bouzoubaa, K.; K.V. Nagaraja; J.A. Newman & B.S. Pomeroy. 1985. Avian Dis., **30** : 358-361.
- Gershman, M. 1976. Appl. Environ. Microbiol., **32** : 190-191.
- Gershman, M. & G. Markowsky. 1983. J. Clin. Microbiol., **17** : 240-244.
- Morinigo, M.A.; R. Cornax; M.A. Muñoz; D. Castro; P. Romero & J.J. Borrego. 1988. Rapp. Comm. int. Mer Médit., **31**, 1(175).