

A STUDY OF ATYPICAL YERSINIA STRAINS ISOLATED FROM MOSELLE RIVER

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Key words: Atypical yersinia, serotypes, Moselle river.

ABSTRACT

Biotypes, serotypes and lysotypes of 38 yersinia isolated from 48 water samples were studied. These strains belonged to Y. enterocolitica, Y. frederiksenii, Y. kristensenii and Y. intermedia. Except 23.7% of non-serotypable strains, ten different serotypes were isolated of which 0:6 and 0:10 K1 were the most frequent.

The serotypes 0:3, 0:8, 0:9 responsible for almost all registered cases of yersiniosis in man were not detected. However, a few types 0:5, 0:6, 0:10k1 isolated rarely from specimens (urine or feces) of patients were found. These serotypes can be used for correlation with yersinia and yersiniosis in man.

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INTRODUCTION

The demonstration of the Presence of Yersinia strains from various sources has been reported by several researchers. Some authors think that water might be an important media for the diffusion of this microorganism (1,5,7,13,). Then , the diseases due to yersinia might be transmitted by consumption of contaminated water. However, the strains frequently incriminated as pathogen agents of human diseases were exceptionnally isolated from water. Thus, among 700 strains of Yersinia collected from water at the collaborating center for Yersinia of WHO, only two strains were found be human Pathogen serotypes 0:3 and 0:9 (9).

The aim of this report is to present the biotypes, serotypes and lysotypes of Yersinia strains isolated from Moselle river water.

MATERIALS AND METHODS

1. Water samples: The study was undertaken during the Period from April 1985 to March 1986 Forty eight water samples were collected from the Moselle river (france) and stored at +4⁰ c in laboratory. The samples were then filtered after 1,7,14 and 28 days of cold (4C) enrichment.

2. Isolation of Y. strains: 100 ml of samples were filtered through a cellulose acetate filter (Porosity 0.45 µm) from Sartorius Gottingen FRG. The filter was placed on Yersinia mannitol (Y-M) described by Saari and Jansen(11).

The medium was incubated under anaerobic conditions in a gas pak Jar (BBL- Microbiology systems) for 72 hours at +25°C. Then, it was incubated aerobically for 48 hours at +25°C. After subculture on Y-M agar, suspect colonies as described by Meadows and Snudden(8) were tested for urease.

3. Identification of strains: Positive urease colonies were retained for complete identification using API 20 E and API 50 E from API System (La Balme-les Grottes, France).

This identification was completed by serological and Phage typing studies performed in Yersinia Center of Pasteur Institute of Paris (Prof. H.H. Mollaret, according to methods as described by Wauters and Le Minor (15, 16). Test colonies were suspended directly in a drop of somatic antisera placed on clean glass slides. After mixture, slides were examined with the naked eye against a dark background.

All Yersinia strain belonging to one of serotypes produced a total and massive agglutination which appeared immediately. With regard to Phage typing, lytic activity using cultures grown on ordinary nutrient agar was performed as described by Nicolle et al (10).

RESULTS

Forty three Yersinia strains were isolated from the forty eight water samples. These strains belonged to Y. enterocolitica (23), Y. kristensenii (5), Y. frederiksenii (4) and Y. intermedia (6). The biotypes found were distributed

as follows: i) among Y. enterocolitica, twenty one belonged to biotype 1, one to biotype 2 and one to biotype 3-ii) all the Y. intermedia isolated were biotype 4.

Table 1 represents the distribution of the serotypes of strains. In total, 29 strains representing 10 different serotypes were isolated, of which 0:6 (24%) and 0:10K1 (20.7%) were the most frequent. For the serotype 0:10 - K1, 34, the agglutination with serum 34 was often late. Nine strains could not be serotyped.

Table 2 represents the Phage typing. The results show that the strains belonged to lysotypes X_z and x_0 . Lysotype x_z was significantly the most common ($p < 0,01$). Y. enterocolitica belonged often to the lysotype x_z (78.3%) as Y. frederiksenii (75%), whereas Y. intermedia belonged often to the lysotype x_0 (66.7%) and Y. Kristensenii always to the lysotype x_z .

DISCUSSION

Despite the different media used for the isolation of Yersinia from environment, mainly from water, most serotypes did not correlate with those isolated from humans. Our data confirmed those results published by Caprioli, Langerand, Meadows, Van Pee (3,6,8,14). None of the serotypes commonly found in human Y. enterocolitica infections (4) was present in our water samples e.g. 0:3, 0:8 and 0:9. On the other hand, certain serotypes less frequently found in human urine and feces [Caprioli et al (3)] were present in our samples. Serotype 0:7,8 was

isolated twice, and serotype O:16 was isolated once. Serotypes such as O:5, O:6 and O:10 K₁ had been found in the course of a systematic search for *Yersinia enterocolitica* in human feces from symptomatic or asymptomatic carriers (11). Our findings showed the presence of the serotypes O:5, O:6 and O:10 K₁ having the same biochemical and Phage typing characteristics.

Pathogenic serotypes observed in humans are very rarely found in the environment due to their short survival "in vitro" (2). However, isolation of less frequent serotypes of human specimens might be used as a basis for investigation of correlation reported rarely between yersinia and gastroenteritis diseases.

Unfortunately there are no data available on yersinia in Iran, its surface, underground and drinking waters.

Therefore the results of this study cannot be compared with similar data from Iran. However, it is hoped that this type of investigation can be expanded in Iran in the near future so that the data can be compared with those from other parts of the world.

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Table 1: Distribution of strains according to serotypes.

serotypes species (num)	5	6	7,8	10 k ₁	10 k ₁ , 34	11	16	28	34 k ₁	34LATF	NON TYPABLE
Y.e. (23)	1	7	2	-	1	-	1	2	1	-	8
Y.fr. (4)	-	-	-	-	-	-	-	-	-	3	1
Y.kr. (5)	-	-	-	-	-	3	-	2	-	-	-
Y.i. (6)	-	-	-	6	-	-	-	-	-	-	-

Y.e.: Y. enterocolitica; Y.fr.: Y. frederiksenii; Y.kr.: Y. kristensenii; Y.i.: Y. intermedia

Table 2 : Different lysotypes of isolated strains

SPECIES PHAGE TYPING	y.e.	y.fr.	y.kr.	y.i.	TOTAL N°
x z	18	3	5	2	28 (73.7%)
x o	5	1	-	4	10 (26.3%)

y.e. : y. enterocolitica ; y.fr. : y. frederiksenii ; y.kr. : y. kristensenii ;

y.i. : y. intermedia

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