

A report on the Salmonella cultures isolated in Korrea (1974)*

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=國文抄錄=

1974年 韓國에서 分離된 살모넬라 菌에 관한 報告

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1974年度 1年間 各市道 衛生試驗所와 保健所 등에서 檢査 의뢰된 檢體 1504件中에서 717株의 Salmonella 菌屬을 分離 同定하였다.

同定된 717株中에서 Salmonella Typhi 가 698株로 대부분을 차지하고 있었으며 그 外의 Salmonella 菌株 가 19株이 있는데 이들을 serotype 別로 나누어 보면 다음과 같다.

| | | | | | |
|------------------|---|----------------|---|-----|---|
| Salmonella Group | A | S. paratyphi | A | 7 | 株 |
| Salmonella Group | B | S. paratyphi | B | 1 | 株 |
| | | S. typhimurium | | 6 | 株 |
| Salmonella Group | C | S. thompson | | 1 | 株 |
| Salmonella Group | D | S. typhi | | 698 | 株 |
| | | S. enteritidis | | 4 | 株 |

抗生物質에 對한 感受性試驗 結果 ampicillin 에 對한 感受性菌이 99.6%이었고 chloramphenicol 에 對한 感受性菌이 93.4%이었으며 gentamycin 에 對하여서는 88.6%가 感受性菌이었고 streptomycin 에 對한 感受性菌이 49.7%이었으며 tetracycline 에 對하여서는 42.3%가 感受性菌이었다.

INTRODUCTION

Members of the genus Salmonella are widely distributed in nature and Salmonellosis have often been reported in Korea^{1,2,3,4,5}.

The authors identified 717 Salmonella cultures among 1504 suspectable cultures collected from various parts of the country in 1974 through the health laboratory channels.

Seven cultures of them belonged to the Group A, seven cultures to the Group B, one culture to the Group C, and seven hundred and two cultures to the Group D.

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MATERIALS AND METHODS

For the final identification 1504 suspectable cultures of enteric pathogens were received from the eleven hygiene laboratories of cities and provincial level and some hospital laboratories, and tested according to the manual published by USCDC⁶⁾.

The tests for biochemical properties and for antigenic formulas were performed in accordance with the method recommended by Edwards and Ewing⁷⁾.

The antibiotic sensitivity tests with chloramphenicol, gentamycin, tetracycline, streptomycin and ampicillin were carried out in accordance with the method recommended by Bauer et al^{8,9)}.

RESULTS

1. Seven hundred and seventeen cultures of Salmonella were identified from 1504 suspectable cultures of enteric pathogens collected from various parts of the country in 1974. Of seven hundred and seventeen cultures, seven cultures of A group, seven cultures of B group, one culture of C group and seven hundred and two cultures of E group were identified. The geographical distribution was tabulated in the Table 1.

2. The seven cultures belonging to the group A were all *S. paratyphi A*. The one out of seven cultures belonging to the group B was *S. paratyphi B* and the rest were *S. typhimurium*. The one culture belonging to the group C was *S. thompson*. The four cultures out of seven hundred and two cultures belonging to the group D were *S. enteritidis* and the rest were *S. typhi*.

3. The physical and biochemical tests on the Salmonella cultures identified demonstrated

the typical results comparing with the characteristics obtained in other countries as summarized in the Table 2.

4. The antibiotics-sensitivity patterns of Salmonella cultures as shown in the Table 3 were summarized as follows:

1) 652 cultures out of 698 *S. typhi* and 18 cultures out of 19 other Salmonella appeared to be sensitive to chloramphenicol.

2) 616 cultures out of 698 *S. typhi* and 19 other Salmonella cultures appeared to be sensitive to gentamycin.

3) 298 cultures out of 698 *S. typhi* and 5 other Salmonella cultures appeared to be sensitive to tetracycline.

4) 343 cultures of *S. typhi* and 13 other Salmonella cultures appeared to be sensitive to streptomycin.

5) 696 cultures of *S. typhi* and 18 other Salmonella cultures appeared to be sensitive to ampicillin.

SUMMARY

The authors identified 717 Salmonella cultures among 1504 suspectable cultures collected from all over the country in 1974.

According to the results obtained from the physical and biochemical tests, and the antigenic formula analysis, seven cultures of *S. paratyphi A*, one culture of *S. paratyphi B*, Six cultures of *S. typhimurium*, one culture of *S. thompson*, four cultures of *S. enteritidis* and six hundred and ninty eight cultures of *S. typhi* were confirmed.

The results of antibiotics-sensitivity test on Salmonella cultures revealed that chloramphenicol, gentamycin and ampicilin were considered to be the drugs of choice according to the results from the In Vitro test performed.

Table 1. Salmonella serotypes isolated by provinces

| Areas | Type S. para- typhi A | S. para- typhi B | S. typhim- urium | S. thomp- son | S. typhi | S. enterit- idis | Total |
|-------------------|-----------------------------|---------------------|---------------------|------------------|------------|---------------------|------------|
| Seoul | 3 | | | | 365 | 1 | 369 |
| Busan | 4 | 1 | 2 | 1 | 16 | | 24 |
| Kyunggi-Do | | | | | 6 | | 6 |
| Kangwon-Do | | | 4 | | 46 | 2 | 52 |
| Chungcheungbuk-Do | | | | | 75 | 1 | 76 |
| Chungcheungnam-Do | | | | | 27 | | 27 |
| Jeonla buk-Do | | | | | 104 | | 104 |
| Jeonla nam-Do | | | | | 32 | | 32 |
| Kyungsang buk-Do | | | | | 14 | | 14 |
| Kyungsang nam-Do | | | | | 13 | | 13 |
| Che ju-Do | | | | | | | |
| Total | 7 | 1 | 6 | 1 | 698 | 4 | 717 |

Table 2. Biochemical properties of salmonella cultures tested in 1973 & 1974

| Substrate | Type | Year | | | | Year | | | |
|-------------------------|------|------------|------|------------------|------|------------|------|------------------|--|
| | | 1 9 7 3 | | 1 9 7 4 | | 1 9 7 3 | | 1 9 7 4 | |
| | | S. typhi | | other salmonella | | S. typhi | | other salmonella | |
| | Sign | (+)% | Sign | (+)% | Sign | (+)% | Sign | (+)% | |
| Indol | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| MR | + | 100 | + | 100 | + | 100 | + | 19/19 | |
| VP | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Simmons Citrate | — | 0 | + | 86.95 | — | 0 | + | 12/19 | |
| Urea | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Motility | + | 100 | + | 98.9 | + | 100 | + | 19/19 | |
| KCN | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Lysine | + | 100 | + | 88.0 | + | 66.8 | + | 12/19 | |
| Arginine | + | 88.9 | + | 86.95 | + | 100 | + | 18/19 | |
| Ornithine | — | 0 | + | 100 | — | 0 | + | 19/19 | |
| Phenylalanine | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Malonate | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Gas from Glucose | — | 0 | + | 59.8 | + | 0 | + | 17/19 | |
| Glucose | + | 100 | + | 100 | + | 100 | + | 19/19 | |
| Lactose | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Sucrose | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Manitol | + | 100 | + | 100 | + | 100 | + | 19/19 | |
| Dulcitol | — | 0 | + | 98.9 | — | 0 | — | 19/19 | |
| Salicin | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Adonitol | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Inositol | — | 98.0 | — | 66.3 | — | 0.2 | — | 3/19 | |
| Sorbitol | + | 100 | + | 98.9 | + | 94.8 | + | 19/19 | |
| Arabinose | — | 0 | + | 92.4 | — | 1.1 | + | 19/19 | |
| Raffinose | — | 0 | — | 0 | — | 0 | — | 0/19 | |
| Rhamnose | — | 0 | + | 100 | — | 0 | + | 19/19 | |
| No. of Organisms | | 334 | | 92 | | 698 | | 19 | |

Table 3. The result of sensitivity tests to antibiotic of salmonella cultures tested in 1974

| Antibiotics | Cultures Susceptibility patterns | S. typhi | | Salmonella other than S. typhi | |
|-----------------|--|-----------------|------|--------------------------------|------|
| | | No. of cultures | % | No. of cultures | % |
| Chloramphenicol | sensitive | 652 | 93.4 | 18 | 94.7 |
| | intermediate | 23 | 3.3 | 0 | 0 |
| | resistant | 23 | 3.3 | 1 | 5.3 |
| Gentamycin | sensitive | 616 | 88.2 | 19 | 100 |
| | intermediate | 82 | 11.8 | 0 | 0 |
| | resistant | 0 | 0 | 0 | 0 |
| Tetracycline | sensitive | 298 | 42.7 | 5 | 26.3 |
| | intermediate | 326 | 46.7 | 6 | 31.6 |
| | resistant | 74 | 10.6 | 8 | 42.1 |
| Streptomycin | sensitive | 343 | 49.2 | 13 | 68.4 |
| | intermediate | 336 | 48.1 | 5 | 26.3 |
| | resistant | 19 | 2.7 | 1 | 5.3 |
| Ampicillin | sensitive | 696 | 99.7 | 18 | 94.7 |
| | intermediate | 0 | 0 | 0 | 0 |
| | resistant | 2 | 0.3 | 1 | 5.3 |
| Total | | 698 | | 19 | |

REFERENCES

- 1) Ryu, Y. et al.: A report on the identification of Salmonella strains collected in Korea (1967-1969), *The Report of National Institute of Health, Korea*, Vol. 7, 1970.
- 2) Ryu, Y. et al.: A report on the identification of Salmonella strains collected in Korea (1969-1970), *ibid.*, Vol. 8, 1970.
- 3) Ryu, Y. et al.: A report on the identification of Salmonella cultures collected in Korea (1971), *Korean Journal of Infectious Diseases*, Vol. 4, No. 1, 1972.
- 4) Ryu, Y. et al.: A report on the Salmonella cultures collected in Korea (1972), *Journal of Korean Society for Microbiology*, Vol. 8, No. 1, 1973.
- 5) Ryu, Y. et al.: A report on the Salmonella cultures collected in Korea (1973), *Journal of Korean Society for Microbiology*, Vol. 9, No. 1, 1974.
- 6) Ewing, W.H.: *Differentiation of Enterobacteriaceae by biochemical reactions*, U.S. Dept. of Health, Education, and Welfare, public health service, 1973.
- 7) Edwards, P.R. and W.H. Ewing.: *Identification of Enterobacteriaceae*, Burgess publ. Co., Minnesota, 1972.
- 8) Bauer, A.W. et al.: *Antibiotic susceptibility testing by a standardized single disc method*, *American Journal of Clinical Pathology*, Vol. 45, No. 4, 1966.
- 9) Clyde Thornsberrry.: *Performance standards for antimicrobial disc susceptibility tests, as used in clinical laboratories*, National committee for clinical laboratory standards, Los Angeles, California, 1973.