ratories will undertake this specialized testing. We would like to reemphasize that *Yersinia* strains can be immediately subcultured from primary plates to CR-MOX agar. Most pathogenic strains will be apparent after overnight incubation at 36°C because of the characteristic small red colonies they will produce.

We used the term pathogenic serotypes because it has been widely used in the literature to indicate strains that are potential enteric pathogens. Chiesa et al. encountered strains of *Y. enterocolitica* (usually from environmental sources) that agglutinated in 6 of the 11 sera used to define pathogenic serotypes: O3; O4,32; O8; O18; O20; and O21. However, these strains had other phenotypic properties indicating that they are not enteric pathogens. For example, they found 19 strains that agglutinated in O3 antiserum but were pyrazinamidase, salicin-esculin, and xylose positive. These strains would be classified as serotype O3, a pathogenic serotype, yet they would not be considered enteric pathogens. This conflicting nomenclature could easily be confusing, particularly to those not familiar with the subtleties of pathogenicity in the genus *Yersinia*. We agree with Chiesa et al., who used the term pathogenic phenotype, that the term pathogenic serotype can occasionally be very misleading. Perhaps it is time to replace it with a more precise term such as pathogenic phenotype, pathogenic bio-serotype, or pathogenic bio-serogroup.

J. J. Farmer III
G. P. Carter
I. K. Wachsmuth
Division of Bacterial and Mycotic Disease
National Center for Infectious Diseases
Centers for Disease Control and Prevention
Atlanta, Georgia 30333

V. L. Miller
S. Falkow
Department of Medical Microbiology
Sanford University
Sanford, California 94305

Wellcolex Colour Salmonella Test and Selenite-F Broth

I read with interest a recent publication entitled "Evaluation of the Wellcolex Colour Salmonella Test for Detection of *Salmonella* spp. in Enrichment Broths" (6). However, we would like to make a number of comments on the results of the Wellcolex Colour Salmonella Test in the above publication, as they are significantly different from our own experience with the test (5).

In the study by Rohner et al., the sensitivity of the Wellcolex test is lower, even with the Selenite-F broth, than those in other studies (1, 3, 5). A number of key factors were omitted in this study which could explain the lower performance of the Wellcolex Salmonella Test.

(i) **Amount of inoculum.** The manufacturer gives precise instructions regarding the amount of inoculum to be used for a specific volume of Selenite broth, as it is added at a critical stage for optimum recovery of Salmonellae. Seeding Selenite broth with too little or too much would lead to poor growth of salmonellae.

(ii) **Emulsification.** Emulsification of fecal specimens prior to inoculation is also recommended by the manufacturer, as this should liberate *Salmonella* spp. and allow maximum growth in this selective environment.

(iii) **GN broth.** The recommended incubation time for GN broth is 6 to 8 h (2). In the study by Rohner et al. (6), the incubation time was 18 to 24 h, which would indicate that the laboratory procedure did not use culture conditions for optimal recovery of *Salmonella* spp. This appears to be confirmed by the fact that the subcultures from the GN broth missed five *Salmonella* spp. which were isolated with the primary plates. There was therefore no point in evaluating the performance of the Wellcolex Colour Salmonella Test on this GN broth. Furthermore, the manufacturer recommends testing only on Selenite-F Broth.

(iv) **Quality of the Selenite-F broth.** Lastly, the quality of the Selenite-F broth is obviously critical in the recovery of *Salmonella* spp. The above study (6) only compared GN and Selenite-F broths, without comparing different Selenite broths. Our own evaluation (5) has shown quality differences between Selenite-F broths from two manufacturers.

By changing the methodology as described above, we found that the sensitivity of the Wellcolex Colour Salmonella Test was 99% on Selenite-F broth (5). It should also be noted that the salmonella incidence in our study was over 20%, compared with 4% in the study by Rohner et al.

We wish to publish this letter in reply to Dr. Rohner's publication, as we feel that the results of their study are incomplete and do not represent the true performance of the Wellcolex Colour Salmonella Test.

REFERENCES

1. **Crotti, D., M. L. D'Annibale, and G. Fonzo.** 1990. Evaluation of a commercial kit for the rapid diagnosis of salmonella in stool specimens, p. 83, abstr. 148. Abstr. 6th Int. Congr. Rapid Methods Automation Microbiol. Immunol. Helsinki, 1990.
2. **Gilligan, P. H., J. M. Janda, M. A. Karmali, and J. M. Miller.** 1992. Cumitech 12A, Laboratory diagnosis of bacterial diarrhea. Coordinating ed., F. S. Nolte. American Society for Microbiology, Washington, D.C.
3. **Hansen, W., Y. Glyoczynsky, and E. Yourassowsky.** 1990. Evaluation of a latex agglutination test for the detection of *Salmonella* in enrichment broth and comparison with traditional culture methods, abstr. C-223, p. 381. Abstr. 90th Annu. Meet. Am. Soc. Microbiol. 1990. American Society for Microbiology, Washington, D.C.
4. **Orden, B., and M. A. Amerigo.** 1991. Screening of *Salmonella* spp. in Selenite broth by a new latex colour test, abstr. C-274, p. 387. Abstr. 91st Gen. Meet. Am. Soc. Microbiol. 1991. American Society for Microbiology, Washington.
5. **Orden, B., A. Gonzalez, E. Juarez, D. Caravaca, and A. Franco.** 1991. Wellcolex Colour Salmonella Test for detection of Salmonella spp. from selenite broth an/or enteric differential agars. Abstr. 17th Int. Congr. Chemother., Berlin, 1991.
6. **Rohner, P., S. Dharan, and R. Auckenthaler.** 1992. Evaluation of the Wellcolex Colour Salmonella Test for detection of *Salmonella* spp. in enrichment broths. J. Clin. Microbiol. **30:**3274–3276.

Beatriz Orden
Ana Franco
Sección de Microbiologia
Servicio de Analisis Clínicos
Ambulatorio "Argüelles"
Quintana 11
28008 Madrid
Spain

Authors' Reply

For the Wellcolex Colour Salmonella Test using Selenite-F broth, sensitivities ranging from 62 to 100% have been reported (1, 3, 4). Since these values depend on the quality of the reference culture method, the true sensitivity of the Wellcolex Colour Salmonella Test can be expected to be somewhere between the two. We achieved a sensitivity of 87% (5), which is higher than the sensitivities of 62.1% (4) and 83.1% (3) communicated in abstracts by B. Orden and coworkers. Our sensitivity results are therefore not significantly lower than those found in other studies, as stated in the letter by Orden and Franco. Since they have not cited or published the evaluation in which they achieved a sensitivity of 99%, we cannot comment on their results (3, 4).

We believe that no key factors were omitted in our study. First, our method of Selenite-F inoculation follows exactly the recommendations of the manufacturer, Becton Dickinson: "For feces and other solid materials, suspend 1 or 2 g of the specimen in the broth (approximately 10 to 15% by volume) and emulsify with an inoculating needle, if necessary." This is mentioned in the Materials and Methods section of our paper (5). Second, as it is a basic procedure in stool cultures to emulsify the few solid fecal specimens, we did not mention this detail.

Third, the reasons for evaluating the Wellcolex Colour Salmonella Test with gram-negative broth incubated for 18 to 24 h at 35°C are explained in the third paragraph of our paper. The survey we cite (2) indicates that 23 of 26 laboratories use gram-negative broth for stool cultures and that only 5 of these perform subcultures after 4 to 6 h of incubation. Our study indicates to what extent an incubation of gram-negative broth for ≥18 h would miss *Salmonella* spp. in stools. Lastly, the aim of our study (5) was to evaluate the Wellcolex Colour Salmonella Test and not to compare the performance of Selenite-F from different sources. We may assume that Selenite-F brands with a high yield of *Salmonella* spp. in subcultures would achieve comparable results with the Wellcolex Colour Salmonella Test.

For hospitalized patients, from whom we receive specimens, the incidence of *Salmonella* spp. in feces is normally lower than that for ambulatory patients. Moreover, this prevalence can differ significantly from one country to another. In the context of analyzing stool specimens of a population with a low salmonella incidence, the specificity (99%) of the Wellcolex Colour Salmonella Test in our hands is remarkable.

REFERENCES

1. **Crotti, D., M. L. D'Annibale, and G. Fonzo.** 1990. Evaluation of a commercial kit for the rapid diagnosis of salmonella in stool specimens, p. 83, abstr. 148. Abstr. 6th Int. Congr. Rapid Methods Automation Microbiol. Immunol., Helsinki, 1990.
2. **Lue, Y. A.** 1986. Is enrichment broth necessary for stool culture? Microbiol. Newsl. **8:**5–6.
3. **Orden, B., and M. A. Amerigo.** 1991. Screening of *Salmonella* spp. in selenite broth by a new latex color test, p. 387, abstr. C-274. Abstr. 91st Gen. Meet. Am. Soc. Microbiol. 1991. American Society for Microbiology, Washington, D.C.
4. **Orden, B., A. Gonzales, E. Juarez, D. Caravaca, and A. Franco.** 1991. Wellcolex Colour Salmonella Test for detection of *Salmonella* spp. from selenite broth and/or enteric differential agars, abstr. 730. 17th Int. Congr. Chemother., Berlin, 1991.
5. **Rohner, P., S. Dharan, and R. Auckenthaler.** 1992. Evaluation of the Wellcolex Colour Salmonella Test for detection of *Salmonella* spp. in enrichment broths. J. Clin. Microbiol. **30:**3274–3276.

Peter Rohner
Sasi Dharan
Raymond Auckenthaler
Central Bacteriological Laboratory
University Hospital Geneva
24, rue Micheli-du-Crest
1211 Geneva 4
Switzerland