Letters to the Editor

Plates Are Better than Broth for Recovery of Fastidious Organisms from Some Specimen Material

There has been considerable recent interest in the lack of value of broth cultures in diagnostic bacteriology, as noted by several publications in the *Journal of Clinical Microbiology* (2–4, 7). One important point that I believe has been demonstrated but not commented on is that, with some exceptions, agar cultures are better than broth cultures for the recovery of fastidious bacteria.

This point was best demonstrated by Scythes et al. (6) in their evaluation of 10 broth media. Suspensions of laboratory-grown bacteria were made and inoculated into broth. The size of each inoculum was determined from colony counts on agar media. In the case of *Neisseria meningitidis*, broth cultures generally failed to recover 10^3 CFU, demonstrating that the agar media used were some 1,000-fold more sensitive than any of the broths used. Similarly, the agar media were more reliable than broth for detection of *Haemophilus influenzae*. FAB broth was also much less sensitive than agar for the recovery of *Streptococcus anginosus-milleri*. The superiority of agar is also supported by other studies of laboratory-grown organisms (1, 5) which showed failure to consistently recover 10 to 100 CFU (demonstrated by plate counts) of fastidious organisms per ml from supplemented broths. The observation has been recently confirmed for culture of non-shunt-related cerebrospinal fluid (CSF) specimens (3).

There are at least two exceptions to the generalization that agar outperforms broth in recovery of significant pathogens. First, if the specimen being examined is actively antibacterial, then dilution in broth may have the advantage of inactivating the antibacterial mechanism. Second, if the number of organisms were small and the specimen volume large, then broth culture would have the advantage of allowing culture of a larger sample. Both of these considerations apply to nonfastidious as well as fastidious organisms. They both apply to blood culture and peritoneal dialysis cultures; therefore, broth would be expected to have benefit for these specimens, as has been demonstrated. Broth culture has also been shown to be useful for the recovery of propionibacteria and coagulase-negative staphylococci from CSF of patients with shunt infections (4), probably because of low numbers of organisms in a relatively large specimen.

With small samples such as joint fluids and samples submitted on swabs, however, it is likely that appropriate agar media are better than broths for recovery of fastidious organisms. Any antibacterial effect of these specimens should also be inactivated by dilution on the agar surface. If the volume of specimen is too great for a single chocolate plate, then inoculation of multiple chocolate plates could be considered instead of enrichment broth.

Resistance among laboratory workers and clinicians to the elimination of broth cultures is related to concerns over a reduction in the quality of the result. Evidence that broths rarely contribute useful results (2, 3, 7) does not exclude the possibility that broth might sometimes detect important organisms. However, the available data suggest that nonfastidious organisms would be detected just as well, and fastidious organisms would be detected better, by culturing the whole of a small specimen on agar media. In addition, culture would almost certainly lead to more rapid identification of the organism to species level.

REFERENCES


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Ed. Note: The necessity of using broth medium as a routine part of the culture of body fluids (other than blood) has been the subject of much debate among microbiologists. Such dialogue has been held in the literature, at educational symposia, and via electronic “chat rooms.” Dr. Gibb presents an opinion, derived from several observations appearing in the literature, that suggests the superiority of using agar media alone for initial processing in most instances. Although the majority of studies cited utilized cultivated fastidious organisms in the structure of the experiments, a logical extrapolation of data to the clinical lab environment always serves well as food for thought. Short of a long-term, broad-based meta-analysis across laboratories using similar media and techniques, the definitive resolution of the controversy is likely to remain elusive. In the absence of hard data, laboratorians will continue to make choices based on available resources, personal experience, tradition, and instinct.