Letters to the Editor

Urea Restrains Swarming of Proteus mirabilis

In veterinary microbiology, samples taken from ears or wounds of dogs and cats are often contaminated by Proteus mirabilis. P. mirabilis swarms over the entire plate culture of these samples, making it almost impossible to isolate single colonies of other bacterial species present in the sample. Various compounds, like p-nitrophenyl glycerin and activated charcoal, abolish the swarming of Proteus (1–4). Here, we describe the inhibitive effect of urea on the swarming of P. mirabilis. The use of urea in isolating single non-P. mirabilis colonies from P. mirabilis-overgrown cultures is discussed.

Sterile urea (Difco Laboratories, Detroit, Mich.) was added to blood agar base 2 (BL2 agar; Oxoid Ltd., Basingstoke, United Kingdom) to a final concentration reaching from 0.0 to 1.5%. Plates were inoculated in the center with 1 ml of a liquid culture of P. mirabilis and incubated at 37°C for 16 to 24 h. On agar plates without urea, growth of P. mirabilis completely covered the plates; however, the diameter of “colonies” grown on plates containing urea decreased with increasing urea concentration.

Next, we tested the usefulness of urea in isolating single colonies of Staphylococcus intermedius, Streptococcus group G spp., and Pseudomonas aeruginosa from mixed cultures with P. mirabilis. We focused on these species since they are most frequently isolated from samples taken from infected wounds or ears of dogs and cats.

A mixture of one of these species with P. mirabilis was inoculated on a blood agar plate and incubated at 37°C. The next day non-P. mirabilis colonies were picked from the P. mirabilis-overgrown plate and streaked on BL2 agar plates with or without sheep erythrocytes containing different concentrations of urea. After overnight incubation, the degree of swarming of P. mirabilis, the possibility of discrimination between P. mirabilis and the above-mentioned species, as well as the recognizability and size of the colonies of interest were evaluated for the different plates. We found that BL2 agar plates with 0.5% urea and no added sheep erythrocytes are very suitable for the isolation of S. intermedius. Also, P. aeruginosa grows well on BL2 agar plates with 0.5% urea in the presence of P. mirabilis; however, it is difficult to distinguish colonies of P. aeruginosa and P. mirabilis, especially since no pigment formed by P. aeruginosa is visible.

In the presence of P. mirabilis, streptococci of group G do not form visible colonies on these plates after a 16-h incubation at 37°C. Apparently growth of Streptococcus group G is completely inhibited by the degradation products of urea, since they grow well on these plates in the absence of P. mirabilis.

We conclude that whether the addition of urea to a solid medium is useful in isolating single colonies from P. mirabilis overgrown cultures depends on the species of the non-P. mirabilis colonies.

REFERENCES

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