Negligible Evaporation Retardation by Oxyethylene Docosanol Under Static Conditions

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Oxyethylene docosanol (OED) retarded evaporation of agar media in petri plates when the plates were used in an air sampler; this confirmed the report of May (2). Flooding of plates with OED solutions or incorporation of OED into agar media, however, did not alter evaporation rates when the plates were stored in incubators or were refrigerated.

In 1969, May (2) reported that a wax, oxyethylene docosanol (OED), substantially reduced dehydration rates of agar media during sampling of air. May (2) incorporated the OED into agar media or flooded plates with a 0.2% emulsion of OED before they were used in an Andersen air sampler. The OED presumably suppressed evaporation by forming a monomolecular layer on the moist surface of the agar.

We became interested in OED-treated media for several reasons. First, very rapid dehydration of media occurs when thermophiles are cultivated at high temperatures. We thought that OED treatment of media might expedite study of thermophiles by extending the useful incubation periods of agar plates. OED-treated media also seemed to have application to the cultivation of slowly growing microorganisms, such as mycobacteria, at mesophilic temperatures. Furthermore, prepared media, such as those purchased by clinical and other laboratories, might be stored for extended periods if the media were treated with OED.

The usual alternative to use of an evaporation retardant in or on media is to place containers of media in plastic bags. This practice may be suitable for storage of prepared media, but it is inconvenient. In addition, atmospheric O₂/CO₂ ratios may be altered, with concomitant changes in pH of the media, when microorganisms are cultivated within plastic bags; moisture also tends to accumulate on the agar surfaces, even when plates are incubated in an inverted position.

To determine the effects of OED on dehy-

reduction in evaporation of water from agar media under static conditions, we reexamined the efficacy of our OED preparation when used under conditions similar to those reported by May (2). Plates were weighed before they were placed in a sieve sampler (3) and were weighed again after operation of the sampler at room temperature (about 25 C) for 15, 30, 45, and 60 min. The results (Fig. 1) demonstrated that OED treatment, especially the flooding technique, retarded evaporation caused by a moving airstream.

Controversy exists (1) concerning which mechanisms are important in retardation of evaporation by monolayers and whether or not laboratory studies on liquids in small dishes can help to elucidate this phenomenon. Our results, and those of May (2), show that small-scale studies might be entirely appropriate. Furthermore, the use of gels, rather than liquids, might serve a useful purpose in studies on the physics of evaporation retardation by monolayers.

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LITERATURE CITED