A HIGH CAPACITY MICROPLATE RACK

Glynn T. Faircloth, David Newman, and Michael Young

Immunology Project, SeaPharm, Inc., 5602 Old Dixie Highway, Ft. Pierce, Florida 34946 (G. T. F.); Microbiology Project, SeaPharm, Inc., Ft. Pierce, Florida 34946 (D. N.); and Engineering Department, Harbor Branch Oceanographic Institute, Ft. Pierce, Florida 34946 (M. Y.)

SUMMARY: A microplate rack has been designed for use with in vitro biological assays. The microplate rack can hold up to 15, 96-well microplates and easily fits into most incubator chambers. Placement and retrieval of large numbers of microplates is convenient and quick. Incubation conditions (e.g. temperature and gas diffusion) surrounding microplates arranged in the rack are more uniform than when microplates are stacked directly atop one another. Moreover, the incubator environment is disturbed less by virtue of the efficient quick entry and access afforded by the rack design.

Key words: in vitro biological assays; microplate rack; 96-well microplate.

I. INTRODUCTION

Many tissue culturists tempt fate when they place their microplates one on top of the other in an incubator. Manually stacked microplates are often carelessly maneuvered when making room for other microplates or rummaging for a particular microplate, and they may even be dropped during these attempts. The microplate rack is a device that stacks a large number of microplates together to protect against just such occurrences. The microplate rack is open ended to allow for easy placement and retrieval of individual microplates so that the remaining microplates are not dislodged. In addition, the racks are notched to prevent sliding of the individual microplates. Although the chief advantage of this device is the efficiency it affords the

Fig. 1. a, Side view dimensions for microplate stacker. Material is 316 stainless steel, 0.090-in. thick sheet or 0.125-in. rod. Total capacity of stacker is for 15 microplates; three microplates per level; b, front dimensions of microplate stacker.
investigator in carrying and storing large numbers of microplates, an added advantage exists. The microplates are raised one from the other in a column of five microplates and between one another in a row of the three microplates per level. The extra space surrounding each microplate thereby provides for better diffusion of gases and even temperatures around the microplate.

II. MATERIALS

A. Rack components
   Stainless steel, 316 or 400 grade, 0.90-in. thick and 0.125-in. rod, Tull Metals

B. Miscellaneous equipment and solutions
   Autoclave
   Detergent solution
   Ethyl alcohol 95%, no. EX-0280-3, Curtin Mathesont
   Ethyl alcohol 70% (diluted from 95%)
   Freezer bags (Zip-locks), one-gallon size (10 and 9/16 X 11 in.)
   Incubator

Microplates, 96-well cell culture cluster dish, disposable, no. 925-325OXT, Sigma

III. PROCEDURE

A. Assembly
   The microplate rack is tooled and welded in a machine shop to the dimensions diagrammed in Fig. 1 a, b. The finished rack is pictured in Fig. 2. The rack should be conditioned for its first use by a proper cleaning. Oils or resins on the metal can be dissolved using a mild detergent followed with sterilization by autoclaving or ethanol (70 or 95%) or both. Subsequent use of the rack should include prior cleaning with 70% ethanol.

B. Use
   Microplates (e.g., 96-wells) are placed 3 per row for a total of 15 per rack. Each row is notched to separate each microplate and to prevent sliding. In incubators with high humidity, a plastic "tent" can be made from Zip-lock freezer bags (one gallon size) to cover the entire microplate rack. Fig. 3 illustrates this technique.