

A simple method for making disposable race tubes

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Race tubes (Ryan, Beadle and Tatum 1943. *Am. J. Bot.* 30:784-799; Davis and de Serres 1970. 17A:79-143), glass tubes carrying strips of agar medium, are frequently used to measure the growth rates and circadian rhythmicity of *Neurospora* strains. However, the glass tubes can be quite difficult to fill, sterilize, and clean. The following is a simple and rapid method for using sterile disposable pipettes to make race tubes. We have had excellent results with *Neurospora* in these tubes.

The race tube is contained in a 25 ml sterile disposable plastic pipette (almost any brand will work). First, draw up enough sterile molten medium to nearly fill the pipette. Do this slowly to prevent bubbles. Then release all but 13 ml. (The initial filling wets the tube and prevents subsequent condensation on the wall.) Close the pipette tip with a gloved finger of your free hand. The gloved finger can be sterilized by dipping with ethanol and used immediately; the small amount of ethanol has not been a problem. Keeping both ends closed, lay the pipette down slowly, starting with the tip and slowly lowering the cotton-plugged end so as not to wet the plug. Tubes can be kept from rolling by first putting down two strips of laboratory tape, sticky side up and tuck under at the ends, then sticking the tubes down on the tape. Work quickly because the air in the pipette rapidly heats and expands, causing leakage and bubbles.

Allow the medium to cool and harden. When ready to use the tubes, snap off the pointed tip of the pipette, cap it with a sterile test-tube cap, and secure the cap with a piece of tape. For the pipettes we have used (Costar), we have found that a wrench with a tapered hole is the best tool for breaking off the tip. Any box wrench or pliers can be used that will fit part way up the tip. Insert the tip into the hole of the wrench at the end of the workbench and snap it off quickly; this minimizes fracturing the straight part of the pipette.

To inoculate, remove the cap at the broken end of the tube, and replace it after inoculation. Record growth by marking the graduated bottom of the tube. The volumetric graduations can often be used as a built-in scale to measure linear growth rates. The conversion factor from ml to mm can be determined for any particular brand by measuring one pipette.