

AN ARRANGEMENT ADAPTING THE OZONE LAMP FOR INACTIVATION WORK

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A portable and inexpensive UV unit for microorganism inactivation or other irradiation experiments can be constructed around a 4 watt ozone lamp as the ultraviolet source. The low output (about 0.1 watt) of 2537 Å energy (see General Electric bulletin LD-14, revised Sept., 1953) necessitates that the lamp be used closer to the sample, but the effects of other wavelengths at this distance are not objectionable. The amount of visible light produced is not great, and the 1849 Å energy emitted probably about 1/1000 that of 2537 Å energy) is dissipated rather rapidly in a few inches of moderately humid air.

The electrical system of this unit is quite simple, a GE OZ4S11 ozone lamp wired in series with a GE 40A15/1 appliance lamp (which serves as a ballast and limited voltage regulator) and operated from 115 volts. The housing for the components is made from two empty rolled oat cartons about 5½ inches in diameter by 9½ inches tall. After removing only the tops, the containers are each trimmed to a length of 8½ inches and the bottoms are fastened together with a short bolt, as in the diagram (figure 1 A). In one (the upper) container, diametrically opposite this bolt, a standard porcelain light socket is mounted upright with two bolts running through the bottoms of both cartons. In the other (the lower) container, a porcelain intermediate base socket is bolted to the side, just below the first small bolt. Cuts are made through the bottoms of the cartons and through the upper end of the top carton as indicated, and the resultant flaps bent to allow ventilation with maximum light shielding. The opening (about 1½ inches square) formed between the two compartments also accommodates the wiring from one socket to the other.

In one of the box lids an eccentric hole is cut to fit snugly over the neck of the socket for the incandescent lamp, and about ¼ inch is trimmed off around the opposite ⅔ of the lid. When in place, this serves as an additional light baffle which does not prevent air circulation. The remaining lid is used to cover the top container. Finally, a cut-out is made near the open end of the bottom container to permit entry of a Petri dish when the unit is standing upright on the table. This opening may be about 4 X ¾ inches, and for greater mechanical stability should be on the side opposite the appliance lamp socket. The unit, except for the sockets, is subsequently painted inside and out with black poster paint, and wired with ordinary drop cord.

After placing the bulbs in their respective sockets, an initial warm up period of about 20 minutes establishes a moderate degree of air circulation which tends to carry away the ozone without furthering contamination. Agitation of the irradiated sample may be accomplished manually with a suitably shaped glass stirrer having a loop of about 1 inch in diameter formed at the end.

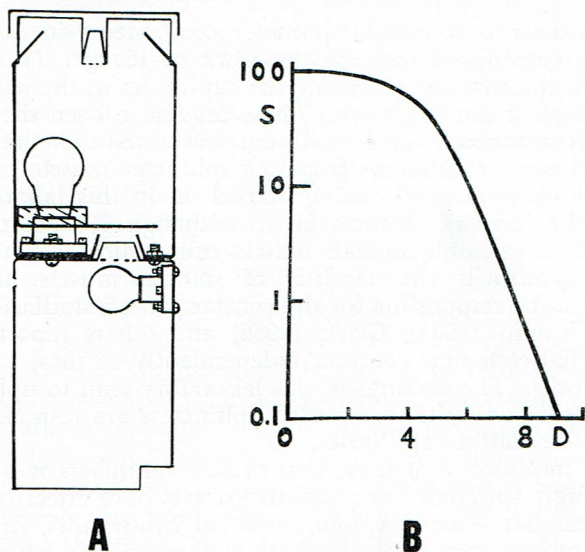


FIG. 1. A. Diagram of the UV unit, shown without wiring.
B. Typical survival curve for a strain of bakers yeast.
S: Percent survival. D: Dosage in minutes.

This UV unit produces inactivation of *Saccharomyces cerevisiae* with reasonable exposure periods, as shown in the survival curve of figure 1 B, yet it has the advantage of low initial cost, of portability, and of requiring only standard, easily procured electrical components.