Adaptation of a Roller-Tube Apparatus to Accommodate Cultivation of Cells in Roller-Bottles

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We have adapted the standard roller-tube apparatus to production of large scale cell culture by modifying the drum to accept bottles.

Increasing use is being made of roller-type cell culture apparatus for large-scale production of cells and viruses in vitro. The advantages of such systems are well known, i.e., increased cell and virus yields per unit volume (1–3). However, at the present time the cost of commercially available equipment may be prohibitive for some laboratories operating within a limited budget.

We have designed a drum and bottles which the standard roller-tube base (Wyble or New Brunswick type) can accommodate. The modification is simple and will enable those laboratories with roller tube machines to gain at moderate cost the advantages that the roller systems offer.

Figure 1 illustrates the design which consists of a drum made by bracing three circular discs 36 cm in diameter with six support rods. The center spindle of the drum is secured to the driving axle of the base with a 9.5-cm long retaining screw. The distance between the discs or plates is 10.2 cm. The back plate of the drum is solid. The middle and front plates have seven 8.5 cm holes which will hold bottles 8 cm in diameter and 34 cm long. The neck of each bottle is 2 cm in diameter and takes a no. 38 white rubber-lined cap. Bottles can each be filled with 200 ml of medium without spilling when placed horizontally, and each is equivalent in growth area to six 32-oz (ca. 900 ml) prescription bottles. The roller drum and bottles described can easily be driven by any roller tube motor at approximately 12 revolutions per hr. Drums also can be modified to accommodate commercially available bottles.

We have used such a system to grow the human diploid fibroblast WI-38 and heteroploid embryonic rhesus' kidney MA-104 cells in Eagle minimum essential medium, plus 10% fetal calf serum. An inoculum of $30 \times 10^6$ WI-38 cells per bottle consistently resulted in a yield of $60 \times 10^9$ to $70 \times 10^9$ cells in 3 to 4 days. A yield of $1.0 \times 10^9$ MA-104 cells per bottle was obtained in 7 days with a refeeding on day 5 from an inoculum of $1.0 \times 10^9$/ml.

The ease with which the roller drums can be transported, interchanged, and autoclaved are additional desirable features of this system.

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LITERATURE CITED

