A Method for Permanent Identification of Materials Sealed in Small Containers

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Bacterial cultures, viruses, bacteriophages, and other materials which might be dried and sealed in small containers under the original vacuum are frequently kept for months or years before use. Methods commonly used for identification of such tubes, frequently only 7–10 mm. in diameter, are unsatisfactory. Gummed-paper labels are defaced or soak off during the customary preliminary freezing. If a spiral strip of paper is used, the contents of the tube may not be readily visible for inspection. Paper labels of any type are likely to become dry and frequently fall off during prolonged storage under varying conditions of humidity; furthermore, they are subjected to the attentions of the cockroaches and silverfish which are too frequently present in many laboratories. Adhesive tape is awkward to handle and difficult to write on. Scotch tape protects labels to some extent, but eventually dries. Writing on the container itself with wax pencil is impermanent, while the use of a diamond point introduces the possibility of weakening the glass. Most small containers do not afford sufficient area to permit inscribing adequate data.

Introduction of a marker into the tube before use is more satisfactory. Permanent identification can be afforded by colored "seed" glass beads now available at 5- and 10-cent stores. These beads, about 2 mm. in diameter and 1 mm. in height, can be obtained for about 15 cents per vial containing approximately 1,000 beads. Ten clearly differentiated colors are sold.

The beads are made of colored glass and do not change color after being subjected to autoclaving or treatment in the hot-air sterilizer. No toxic effect has been apparent. They can be introduced into the tube and sterilized with it or can be sterilized separately and put into the tube with aseptic precautions. The colors are readily visible after the culture or other material has been dried in the usual amounts.

A standard code for identification of cultures dried by lyophile, cryochem, or other processes would permit exchange of materials between laboratories and ready identification. By a suggested system, now in use, a single bead is assigned to each of the major groups as follows: red, *Clostridium*; purple, *Corynebacterium*; green, *Hemophilus*; blue, *Neisseria*; white, *Pasteurella*; yellow, *Salmonella*; brown, *Shigella*; black, *Streptococcus*; gold, bacteriophage; and silver, virus. Forty-five additional generic combinations can be made by using two beads, each of different color. The use of an indicator code for each genus reduces records to a minimum, permits rapid recognition, and will simplify correspondence.

Amplifying this system, the species is represented by two beads of the same color. With a single genus indicator bead, 10 species can be identified, using a total of three beads per tube. An additional 10 species can be identified by using three similarly colored beads with the single genus indicator color. When this possibility is exhausted, the number of combinations becomes greatly increased, since the addition of four beads to the genus indicator permits the possibility of representing the species by pairs differing in color from each other. If the genus is represented by two single beads of different colors, the 8 remaining colors are available for use in sets of two or more similarly colored beads to represent species. Beads differing in shape from those described are also available, permitting a large number of additional combinations.

The method is inexpensive, simple, and permanent. It can readily be adapted to materials other than those used by the bacteriologist. The use of larger beads would permit a permanent identification of materials dried in containers larger than those customarily used for bacterial cultures. The possibility of using beads of different size or shape to expand the code to include data on lot number, date, and other information will be apparent.

A Modified Warburg Vessel[1]

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The present method of introducing various substances into the main reaction mixture of a Warburg vessel has certain drawbacks. The usual method of transferring the contents of the side arm involves removing the manometer from the water bath, which inevitably causes temperature changes in the system. The contamination by KOH from the center well may also occur, and when 10 or more manometers are used in the same experiment, the procedure may take several minutes.

In order to eliminate these difficulties, the flask illustrated in Fig. 1 was constructed. In this flask the side arms are inserted in the main vessel by means of ground-glass joints and

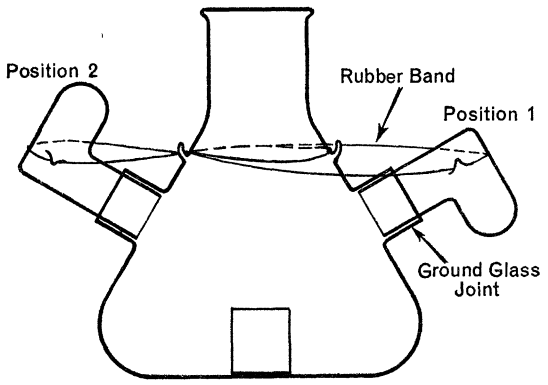

FIG. 1

are attached with rubber bands. At the beginning of the experiment the side arms are placed in position 1. After temperature equilibrium has been reached, they may be turned to position 2 at any moment. The rubber band keeps the side arms fixed in either position.

This modified Warburg vessel enables one to add one or two substances to the main reaction mixture at any time during the experiment. The addition can be carried out quantitatively within a few seconds and without causing any temperature changes. The modified vessel may be used also for chemical microanalyses in which the determination of certain substances is based on gas reactions.

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