society may do as it chooses, whereas upon incorporation the organization must comply with the laws of the jurisdiction where it is incorporated. Practically, however, the disadvantages resulting from this restraint or freedom of action is regarded by legal authorities as being slight. The statutes of some jurisdictions impose fewer restraints than others and the requirements for headquarters, annual meetings, reports, etc., differ in different jurisdictions.

The procedure of incorporating under the laws of the District of Columbia, and also in certain other jurisdictions, is relatively simple. The statutes of the District of Columbia relating to corporations and of certain other jurisdictions relating to learned *non-profit* organizations neither require a resident director nor the maintenance of an office in the jurisdiction. Meetings may be held anywhere and at any time without restriction.

The principal requirements under the laws of the District of Columbia may be taken as an example of the general procedure: (1) Any three or more persons of full age, citizens of the United States, the majority of whom are citizens of the District of Columbia may incorporate; (2) a certificate in writing must be filed in the office of the Recorder of Deeds stating (a) the name of the society, (b) the term for which it is incorporated, which may be perpetual, (c) the business and objects of the society, (d) the number of its trustees, directors or managers for the first year of the incorporated society's existence.

Upon the execution of the articles of incorporation of the society and the deposit of same with the recorder of deeds, the incorporators then form a temporary organization in Washington, D. C., at which meeting one of their number is elected temporary chairman and another temporary secretary. The constitution and by-laws of the organization as then standing are adopted, and all the then existing members of the society are declared elected members of the corporation with their present rights and privileges. The meeting then adjourns to assemble at the next regular place of meeting of the now incorporated society.

Many of the scientific societies investigated dispensed with legal assistance. Under such conditions the only expense involved is the registration fee of two or three dollars. A few societies, however, obtained advice of counsel in making such changes in their by-laws to conform with the statute under which incorporation is sought. The expense in such cases is about one hundred dollars.

A comprehensive discussion of the business relations of non-profit corporations is given by Harriman in Corporate Practice, Review 1, 7–11, 1929.

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SCIENTIFIC APPARATUS AND LABORATORY METHODS

APPARATUS FOR DETERMINATION OF CO_2 AND O_2 OF RESPIRATION

IN determining the respiration rate of fruit in storage a modification of the apparatus described by Magness and Diehl[1] has been used. The apparatus as modified has proved very satisfactory and is described here in the hope that it may be useful to others interested in respiration rate determinations.

With this apparatus the O_2 consumed as well as the CO_2 evolved can be measured. It consists (Fig. 1) of a water reservoir "A" which is connected by a siphon to a beaker "B" in which the water is maintained at a constant level by means of the siphon feed. The beaker "B" is connected by tubing to a liter-graduated cylinder "C" containing oxygen. The cylinder "C" is connected by capillary tubing to the respiratory chamber "D," which consists of a desiccator with a funnel fitted into the tubulature of the lid and the stem extending down to a second funnel which is fitted into a hole bored through the bottom of the desiccator. The apparatus of Magness and Diehl is modified in that the container for the O_2 is a graduated cylinder instead of a bottle and the beaker for the KOH solution is replaced by the two funnels in the

RESPIRATION APPARATUS

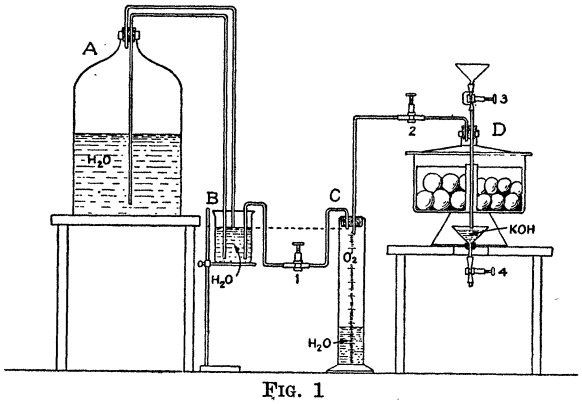

FIG. 1

[1] J. R. Magness and H. C. Diehl, "Physiological Studies on Apples in Storage," *Jour. Agr. Res.*, 27: 1–38, No. 1, 1924.

desiccator. The use of a graduated cylinder for the O_2 has been previously described by Johnstone[2], but was developed independently by the authors. These changes greatly facilitate the measurement of the O_2 and the changing of the KOH solution and make possible more accurate determinations.

To determine the respiration rate the material to be studied is weighed into a round wire mesh basket that fits into the desiccator. This basket has a tubulature through the center so that when it is placed in the desiccator the stem of the upper funnel can extend down to the lower funnel. After sealing the lid on the desiccator, the upper funnel is fitted into the lid and a solution of twice normal KOH (usually 25 ml) is drained into the lower funnel through the upper funnel and rinsed down with a small quantity (10 ml) of water. The O_2 cylinder is connected to the beaker "B" and the clamp at "1" opened. The desiccator is then connected to the O_2 cylinder and the clamp at "2" opened. The lid must be sealed airtight to the desiccator and all connections must be airtight.

As the material respires, CO_2 is given off and O_2 absorbed. The CO_2 given off is absorbed by the KOH solution in the lower funnel and the O_2 used is replaced by O_2 from the cylinder C. The O_2 withdrawn from C is replaced by water from B. Thus the system remains at atmospheric pressure and the concentration of O_2 and CO_2 in the atmosphere in the respiration chamber remains practically unchanged.

At the end of a run the clamp at "2" is closed and the KOH solution in the lower funnel drained into a flask. The lower funnel is then rinsed into the flask by adding water through the upper funnel. Fresh KOH is added through the upper funnel, the amount of water in the cylinder recorded, the clamp at "2" reopened and the respiration determined continued. The KOH is titrated against standard 2 normal H_2SO_4 to the phenolthalein end point and then to the methyl orange end point and the amount of CO_2 computed from the difference between the two end points. The volume of water drawn into the cylinder represents the amount of O_2 consumed by the material after it has been corrected for changes in barometric pressure during the run, for O_2 and N_2 dissolved in the water and has been converted to standard conditions of pressure and temperature.

The humidity in the respiration chamber may be controlled by placing different concentrations of H_2SO_4 in the bottom of the desiccator around the lower funnel. It is desirable that the size of the sample be so regulated that about 200 to 300 cc of O_2 are used and about a third of the KOH neutralized by the CO_2 evolved during a run. When this is done there is no appreciable accumulation of CO_2 in the respiratory chambers. If about half or more of the KOH is neutralized the phenolthalein end point in the titration becomes indistinct and there is likely to be an accumulation of CO_2 in the respiratory chambers due to the decreased efficiency of the KOH solution. On the other hand, if less than 100 cc of O_2 are used during a 24 hour period, a lowering of the atmospheric pressure of more than .3 inch may cause the gas in the desiccator to expand more than 100 cc and result in a flow of gas from the respiration chamber to the oxygen cylinder.

[2] G. R. Johnstone, "Physiological Study of Two Varieties of *Ipomoea batata*," *Bot. Gaz.*, 80: 145–167, 1925.

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VEGETABLE PEPTONE AGARS FOR QUANTITATIVE WORK WITH LACTOBACILLUS ACIDOPHILUS[1]

LACTOBACILLUS ACIDOPHILUS does not grow well on plain nutrient agar. To meet this difficulty, various special media have been suggested from time to time. The most widely used of these are: the whey agar proposed by Rettger and Cheplin,[2] 1912; the galactose agar of Rettger and Kulp,[3] 1922; the casein digest galactose agar of Kulp and Rettger,[4] 1924; the whey peptone galactose agar of Kulp,[5] 1926, and the tomato peptone agar of Kulp,[6] 1927. The third and fourth named are made in the dehydrated form by the Difco Laboratories, Detroit, Mich.

In connection with work on another problem in which we used acidophilus milks made with the "Scav" strain, we amassed considerable quantitative data consisting of a series of parallel counts on galactose whey agar and a cabbage agar which proved very satisfactory.

[1] Read at the Baltimore meetings of the Society of American Bacteriologists, Dec., 1931.

[2] L. F. Rettger and H. A. Cheplin. "The Transformation of the Intestinal Flora with Special Reference to the Implantation of *Bacillus acidophilus*," Yale University Press, 1921.

[3] L. F. Rettger and Walter L. Kulp, "A Note on the Choice of Culture Media for the Study of Lactobacillus with Special Reference to the Carbohydrate Employed," *Abs. Bact.* 6, 24, 1922.

[4] W. L. Kulp and L. F. Rettger, "A Comparative Study of *L. acidophilus* and *L. bulgaricus*," *Jr. Bact.*, 9, 357–394, 1924.

[5] W. L. Kulp, "The Determination of Viable *Lactobacillus acidophilus*," SCIENCE, 64, 304–306, 1926.

[6] Walter L. Kulp, "An Agar Medium for Plating *L. acidophilus* and *L. bulgaricus*," SCIENCE, 66, 512–513, 1927.