

BACTERIOLOGY

Chairman: M. S. A. CAMPBELL, Indiana State Board of Health

Robert P. Ervin, Notre Dame, was elected chairman for 1949.

ABSTRACTS

Comments on Aerating Liquids by Shaking

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Although agitating submerged cultures of certain microorganisms on shaking machines has become a popular method of supplying microorganisms with oxygen, the question of exactly how much oxygen this procedure makes available to them is still open. The following approach was used to obtain at least some preliminary answers to this question: One hundred and fifty ml of freshly boiled and rapidly cooled distilled water, sometimes containing added substances, in 500 ml Erlenmeyer flasks were agitated at 28°C on a reciprocating shaker, having a 4 inch stroke and shaking at a rate of 85 strokes per minute. At zero time and intervals thereafter the amount of oxygen dissolved was determined by the Winkler method. The rate at which oxygen diffused into distilled water during the first 30 seconds was approximately 300 ppm of O₂ per hour, and 50 ppm of O₂ per hour, when the liquid was still. The addition of glucose to give a 0.5 percent solution did not appreciably alter the rate of diffusion; the addition of gum arabic on the other hand reduced the rate of oxygen diffusion as well as the total amount of oxygen dissolved after 3 hours, probably because it increased the viscosity of the liquid. When nitrogen was bubbled from a sintered-glass aerator through a 2.5 percent solution of gum arabic, a thick foam developed, which completely covered the solution and in spite of agitation stayed intact for about an hour. As long as this foam persisted, the diffusion of oxygen was almost completely prevented. The foams that commonly form during actual shake-flask fermentations may not interfere as seriously with aeration as did the gum arabic foam in these experiments; nevertheless, to guarantee an adequate supply of oxygen considerable foaming should be avoided by the addition of suitable anti-foam agents. When "penicillin defoamer" was added to the solution of gum arabic, no foam developed and diffusion of oxygen into the solution proceeded fairly rapidly.

Some Biological Properties of Circulin, an Antibiotic from *Bacillus Circulans*. O. W. KAUFMANN, P. A. TETRAULT, AND H. KOFFLER, Purdue University.—*In vitro* circulin very effectively inhibited representatives

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of the following genera: *Aerobacter*, *Brucella*, *Escherichia*, *Klebsiella*, *Neisseria*, *Pseudomonas*, *Salmonella*, and *Shigella*. In general, gram-negative bacteria were more sensitive to polymyxin than to circulin; the opposite was true for gram-positive bacteria. A polymyxin-resistant strain of *Pseudomonas aeruginosa* was less resistant to circulin than it was to polymyxin. The LD₅₀ for circulin, given to white mice by single intraperitoneal injections, was approximately 68 mg per kilogram. One hundred percent of the mice survived after having received daily intraperitoneal injections of 45 mg per kilogram for 10 days. Preliminary experiments indicated that circulin protected white mice against 100 minimum lethal doses of *Klebsiella pneumoniae* given intraperitoneally.