

# THE FERMENTATION OF SODIUM MALONATE AS A MEANS OF DIFFERENTIATING AEROBACTER AND ESCHERICHIA

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In the course of a rather comprehensive study of the fermentation of organic acids by intestinal bacilli, a perfect correlation was found in the *Aerobacter-Escherichia* group between the fermentation of sodium malonate and the production of acetyl-methyl-carbinol. The correlation seems to be not only qualitative but quantitative as well. A bacillus which gives a weak acetyl-methyl-carbinol test also ferments sodium malonate slowly, and one which gives a strong acetyl-methyl-carbinol test ferments sodium malonate rapidly.

It was thought at one time that perhaps acetyl-methyl-carbinol might be formed from malonic acid. In no case, however, could any demonstrable amounts of acetyl-methyl-carbinol be produced from sodium malonate. Outside of the *Aerobacter-Escherichia* group the correlation between the production of acetyl-methyl-carbinol and the fermentation of sodium malonate is not so perfect. In our collection there are three strains of bacteria having the fermentation reaction of the *Salmonella* group and which are acetyl-methyl-carbinol positive. One of these produces indol and does not ferment sodium malonate. The other two are indol-negative and ferment sodium malonate. There are also in the collection a number of strains of non-gas-producers of various kinds which are acetyl-methyl-carbinol positive, but which do not ferment sodium malonate, and vice versa.

The sodium malonate medium has been used routinely in con-

junction with the Voges-Proskauer medium for the last year in the diagnosis of autopsy cultures. Our autopsy bacteriologist has always found a perfect correlation between the two tests. Recently a Gram-negative bacillus was isolated from the colon of a patient, and this bacillus gave a positive acetyl-methyl-carbinol test but did not ferment sodium malonate. It gave a negative indol test and fermented sodium citrate. This bacillus is the only strain we have encountered so far which has the main physiological reactions of *Aerobacter*, but which does not ferment sodium malonate.

The composition of the medium is as follows:

(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub> .....	2	grams
K <sub>2</sub> HPO <sub>4</sub> .....	0.6	grams
KH <sub>2</sub> PO <sub>4</sub> .....	0.4	grams
NaCl.....	2	grams
Na malonate.....	3	grams
Indicator (0.5 per cent alcohol solution of B.T.B.).....	5	cc.
Distilled water.....	1000	cc.

The phosphates adjust the pH to a medium green color with the B.T.B. indicator. *Aerobacter* grows fairly well on the medium and turns it blue. *Escherichia* does not grow appreciably and leaves the medium green.