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## Bacterial Blackening of Canned Vegetables

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INFLUENCE OF BILE AND BRILLIANT GREEN ON  
RATE OF GROWTH OF COLON BACILLI

HAROLD W. COLES AND MAX LEVINE

Evaporated bile may inhibit or stimulate growth of colon bacilli depending on concentration of bile, reaction of the medium, and the strain of organism employed.

With all samples of bile employed, a concentration of 2.0% was found to accelerate growth whereas 5.0% was inhibitory in acid media (about pH 6.0), and stimulating in alkaline media (pH 7.3-7.8).

With 2.0% dried bile concentrations of more than 1-50,000 brilliant green distinctly retarded growth, and with 5.0% evaporated bile concentration, of 1-20,000 or less of the dye were not considered inhibitory.

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## BACTERIAL BLACKENING OF CANNED VEGETABLES

C. H. WERKMAN AND HELEN WEAVER

"Sulfur stinker" is the trade name given to canned sweet corn which has undergone an anaerobic decomposition resulting in a blackened condition of the germ, and the evolution of hydrogen sulfid gas. The condition is caused by an anaerobic, gram positive, sporulating, hydrogen sulfid producing thermophile whose spores resist boiling temperature for five hours. Vegetative cells are destroyed by 10 min. at 100°C. Optimum temperature for multiplication is 55°C.; the upper limit is 65°C. Growth and blackening of corn occur at room temperature if incubation is sufficiently long — 6-8 weeks. The organism occurs singly or in chains of as many as eight bacilli. Twenty-four sugars, glucosids and alcohols were tested, but none has been attacked with acid production. Nitrates are reduced with no liberation of gas; blood agar is hemolyzed.

Spores are difficult to demonstrate. They are oval; cause little distension of the vegetative cell walls and are best produced in blood medium.

Granules are produced in the cell (one to six in an organism), which retain the methyl violet stain after the remaining part of the cell decolorizes with acetone.

Canned peas are very susceptible to infection developing a black

condition of the pea broth. The following canned vegetables offer conditions for the growth of the organism and development of the blackened condition: Sweet corn, peas, green and wax beans, carrots, beets, pumpkin, plain baked beans and hominy.

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### SOME OBSERVATIONS ON THE GERMICIDAL EFFICIENCIES OF ALKALIES

MAX LEVINE, J. H. BUCHANAN, GRACE LEASE AND  
E. E. PETERSON

A technique is described for measuring the relative germicidal efficiencies of strong alkalies.

For a given alkali, the germicidal efficiency increases with decreasing  $H^+$  ion concentration, but the  $H^+$  ion concentration is not suitable as an index of the germicidal powers of different alkalies.

The addition of various salts to sodium hydroxide increased the germicidal effects of the alkali.

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### THE SYNTHESIS OF VITAMINS BY MICRO- ORGANISMS

GERTRUDE SUNDERLIN AND C. H. WERKMAN

The synthesis of vitamin B is of general occurrence among microorganisms. Negative results of some investigators may be accounted for by inadequate amounts fed or too limited feeding periods. Our experiments showed the following organisms to elaborate vitamin B when tested by the rat weight test: *Saccharomyces cerevisiae*, *Torula rosea*, *Oospora lactis*, *Bacillus adhaerens*, *Bacterium coli* (three strains), *Bacillus subtilis* and *Bacillus mycoides*.

The amount of organism fed is very important in the determination of vitamin B production by microorganisms. Drying at  $37^{\circ}C$ . and  $100^{\circ}C$ . for forty-eight hours did not materially diminish the vitamin potency of the bacterial mass. The three strains of *Bacterium coli* used in our experiments show little variation in their ability to synthesize vitamin B. The vitamin B furnished by intes-