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Biochemical Research

MRR-B, 1954, No. 8

To: Mr. Kenneth H. Hoover
Director of Research

August 25, 1954

Re: MONTHLY RESEARCH REPORT
Biochemical Research
1954, No. 8

Period Covered
July 20 to August 20

A. BIOCHEMISTRY OF THE AGING PROCESS

I. The Enzymatic Nature of the Aging Process

a. Inorganic Catalysts

No additional data are available at this time. The main effort is being directed toward planning of the program for 1954 crop samples. This program will include studies aimed at correlating the carbon dioxide evolution and oxygen uptake rates with specific chemical changes in the substrate.

b. Organic Catalysts

Revisions in procedures for determination of carbohydrates in tobacco have permitted resumption of studies on the fate of these compounds during aging.

II. Chemical Changes During the Aging Process

a. Amino Acids

Quantitative methods for assay are in advanced stages of development. The remaining problems resolve about development of extraction-purification procedures resulting in amino mixtures sufficiently concentrated to permit photometric determination of individual components.

Additional work on insolubilized amino acid complex has not resulted in additional data establishing the relationship of the complex to aging.

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b. Organic Acids

The primary effort is toward improvement of methods for determination of oxalic, citric and malic acids and development of procedures for volatile acids. These studies have resulted in an improved method for oxalic acid and promise of improvements in malic acid. Likewise a quantitative extraction procedure for volatile acids has been developed.

c. Alkaloids

No further progress.

d. Carbohydrates

A totally new procedure for quantitative determinations of glucose, sucrose and fructose has been developed and is being applied as a routine for analysis of 1954 samples.

e. Fluorescing Components

No further progress.

III. Microbiological Involvement in the Aging Process

Routine quantitative counts of aerobes, anaerobes, microaerophiles and nicotinophiles have continued.

Because of the detection of cycling in organism counts, much emphasis is being placed on qualitative determinations of species present during aging. Because of the complexity of normal taxonomic procedures, preliminary studies have been started to prove the potential value of infrared spectrophotometry as a tool for identification of species. This procedure shows promise and, if feasible, will greatly expedite the determination of bacterial species.

The studies on Arthrobacter oxydans are aimed at determining the mineral requirements for degradation of nicotine. This study is coming to conclusion and at present attention is being directed to actual metabolic pathways.

B. BIOCHEMISTRY OF TOBACCO MANUFACTURING

An investigation of methods for producing a substitute black aromatic tobacco for pipe mixtures was started. The exploratory test involved incubation of scrap tobacco under conditions found to be most desirable for the composting of tobacco stems. Gross observations suggest a positive potential as evidenced by pronounced darkening of scrap accompanied by what may be described as a potentially desirable odor.

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C. UTILIZATION OF STEMS AND DUST

The problem of composting of stems has advanced to the point where it is proved that an inoculum must be used. Isolates suggest that an Actinomycete thermophilic organism is needed and current work is aimed at procedures for large scale propagation of this organism to provide the required inoculum for these studies.

D. MISCELLANEOUS

A sampling program for the 1954 flue cured crop has been adopted. This program covers the South Carolina, Eastern Carolina and Old Belt growing regions. In each Belt the samples will include grades SFx, 44x, 6x, green and 33. The present plans provide for a research emphasis on the Eastern Carolina Belt samples. Old Belt and South Carolina samples will be analyzed only at six months' intervals.

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