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Action of Certain Bacteria on Uric Acid and Its Substitutes.

R. F. HANZAL AND E. E. ECKER.

From the Institute of Pathology, Western Reserve University, Cleveland, Ohio.

Morris and Ecker[1] demonstrated that uric acid is destroyed in fecal infusions under conditions that indicate activity of microorganisms. Various bacteria were studied to determine their ability to utilize uric acid. It was found that 6 strains of *B. aerogenes* grew and utilized uric acid in Koser's medium and that the *Bacterium acidi urici* (Ulpiani) which was isolated from chicken excreta readily destroyed all the uric acid employed within 30 hours. No uricolytic enzyme, however, was extracted from the organisms.

These observations led to the present study of whether or not the above named organisms are capable of attacking (a) 1-monomethyl uric acid, (b) 3-monomethyl uric acid, (c) 3-9-dimethyl uric acid, (d) 1-3-dimethyl uric acid, (e) 1-3-7-trimethyl uric acid, and a study of the selective destruction of uric acid in a mixture containing the substituted uric acids.

The organisms were implanted in the Benedict and Hitchcock[2] phosphate standard (containing 9 gm. of Na_2HPO_4-12 H_2O; 1 gm. NaH_2PO_4-H_2O; and 200 mg. uric acid per liter). The pH was 7. The substituted uric acids were added in colorimetric equivalents since they gave less color than the uric acid itself. We used for each mg. of uric acid: 1 mg. of 1-monomethyl uric acid, 4 mg. of 3-monomethyl uric acid, 7 mg. of 3-9-dimethyl uric acid, 1.2 mg. of 1-3-dimethyl uric acid, 14 mg. of trimethyl uric acid.

All the culture tubes contained 5 cc. of the media, sterilized at 15 lb. for 15 minutes. Inoculations were made with the Pasteur pipette using 2 drops of a saline suspension made from a 24-hour culture of the organism on slant agar. The organisms were allowed to grow for various periods of time up to 14 days at 37°C. and all determinations were made by the Benedict and Franke[3] method.

Since sterilization might destroy a considerable amount of the uric acid and its substitutes, the amount destroyed in 15, 30 and 45 minutes at 15 lb. pressure, was determined. The results were as follows:

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[1] Morris, J. Lucien, and Ecker, E. E., *J. Inf. Dis.*, 1924, **34**, 592.

[2] Benedict, S. R., and Hitchcock, E. H., *J. Biol. Chem.*, 1915, **20**, 619.

[3] Benedict, S. R., and Franke, E., *J. Biol. Chem.*, 1922, **52**, 387.

TABLE I.
Showing the % destruction of uric acids and its substitutes in the autoclave.

Uric acids	Time in minutes		
	15	30	45
Uric	9.7	15.9	24.0
1-monomethyl	12.5	19.7	23.4
3-monomethyl	14.0	14.1	14.9
3-9-dimethyl	9.0	4.0	11.0
1-3-dimethyl	15.6	16.2	15.6
1-3-7-trimethyl	6.0	10.0	7.0

The usual 15 minutes exposure at 15 lb. pressure, therefore, does not destroy more than 15% of the compounds employed.

The *Bacterium acidi urici* of Ulpiani destroyed 30% of the uric acid employed in 12 hours and 100% in 24 hours, while *B. aerogenes* accomplished the destruction in 48 hours at 37°C. Although all the cultures were incubated for a period as long as 14 days they failed to destroy any portion of the substituted compounds. All growth ceased when the uric acid was completely utilized. In mixtures of uric acid and the substituted uric acids the organisms selectively utilized all the uric acid employed and left the methylated uric acids quantitatively unaffected. These results are comparable with the findings of Armstrong and Horton,[4] who showed that urease is capable of acting on urea itself but not on methyl urea, s-dimethyl urea, as dimethyl urea, ethyl urea or s-diethyl urea. In other words, the bacteria and the enzyme (urease) exercise a selective effect.

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A New Pathological Condition of Probable Dietetic Origin in Rats.

CASIMIR FUNK, SAUL CASPE AND HELEN CASPE.

From the Casa Biochemica, Rueil-Malmaison, (S & O), France.

It has recently been observed in this laboratory, that when young or mature rats, of both sexes, which have been on the laboratory stock diet (milk, white bread and mixed grains) are transferred to individual cages with screen bottoms and are fed on an artificial food mixture, consisting of 18% casein (A and B free, British Drug

[4] Armstrong, H. E., and Horton, E., *Proc. Royal Soc. of London*, 1912, **85**, 109.