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QUANTITATIVE AMINO ACID COMPOSITION OF THE
GERMAN COCKROACH, *BLATTELLA GERMANICA* (L.)

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While many qualitative determinations of the amino acids present in insects have been carried out (cited by Auclair and Dubreuil, 2) few efforts have been made to obtain quantitative data upon the occurrence of these biologically important compounds (1, 2, 4, 5). Of these, only the studies of Auclair and Dubreuil (1, 2) could be considered comprehensive. These authors published a summary of the ranges of concentrations of free amino acids present in the blood of nine species of insects studied semiquantita-

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tively (2). They have also published (1) a detailed description of the quantitative distribution of free amino acids in the blood of *Galleria mellonella* (L.).

In the course of studies of the sulfur metabolism² of the German cockroach, *Blattella germanica* (L.), it was necessary to obtain information concerning the total amounts of cystine and methionine present in samples of whole roach body solids prepared for radiological assay. The determinations were made following the "maximum color density" and "total spot area" (methionine) techniques of quantitative paper partition chromatography described by Block, LeStrange, and Zweig (3). As a corollary to this work it was possible to estimate the amounts of other

TABLE I
AMINO ACID COMPOSITION OF THE GERMAN COCKROACH,
BLATTELLA GERMANICA (L.)

Amino Acid	% Composition of dried roach	Amino acid	% Composition of dried roach
Arginine	3.0	Leucine	3.5
Histidine	0.9	Isoleucine	2.4
Lysine	1.9	Valine	2.7
Tyrosine	2.0	Glycine	3.0
Tryptophan	0.5	Alanine	4.6
Phenylalanine	3.3		
Cystine	2.2	Glutamic acid	7.5
Methionine	3.3	Aspartic acid	6.8
Serine	2.3	Proline	3.0
Threonine	3.0	Hydroxyproline	0.0?

amino acids present in these samples by the same methods. The roaches used for these tests had been fed solutions containing Na_2SO_4 labeled with S^{35} . When the insects were sacrificed for assay, the head and attached digestive tract of each insect were removed to eliminate interferences due to food residues remaining in the gut. The animals were ground and extracted with acetone, extracted with ethyl ether, and dried. Each batch of test material consisted of the water-free, fat-free body solids derived from 20 to 25 decapitated, gutted German roaches. Samples of known weight were hydrolyzed in 6 *N* HCl for 15 to 16 hours. The resulting hydrolysate was then prepared and chromatographed by means of the methods referred to above.

The results of the analyses are given in Table I.

The significance of these data lies in their usefulness in the fields of

² Unpublished data presented as a scientific paper at the Entomological Society of America Annual Meeting, Philadelphia, Pa., December 18, 1952.

insect physiology and biochemistry. Although the values found are subject to the limitations of the methods and are derived from test animals reared and studied under specialized conditions, they will perform a two-fold function. They will serve as a basis for further research into the quantitative distribution of amino nitrogen in the German cockroach and as a guide for studies of the intermediary metabolism of this and other insect species.

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