Fahrig, R.* Genetisches Institut der Justus-Liebig-Universität, Giessen, Germany. The influence of temperature upon the concentration of the free amino acids of D. melanogaster.

The free amino acids of Drosophilae cultivated for some generations at a distinct temperature are very constant in their concentrations. A change of the temperature is correlated with a change of the concentration of many amino acids. In this work we have determined the concentration of 19 different amino acids by using an automatic amino acid analyzer of Beckman. The concentration changed in nine amino acids in larvae (96 h old), in ten in pupae (24 h old) and only in one in adults (72 h old). The concentration of ammonia which has also been determined is not influenced by temperature.

AMINO ACIDS	LARVAE			PUPAE			ADULTS		
umol wt/100mg wet weight	18°C	24°C	30°C	18°C	24°C	30°C	18°C	24°C	30°C
Histidine	0.28	0.28	0.28	0.38	0.33	0.30	0.49	0.47	0.48
Lysine	0.27	0.18	0.05	0.27	0.20	0.07	0.06	0.05	0.05
Arginine	0.30	0.34	0.38	0.37	0.30	0.22	0.36	0.37	0.35
Ammonia	0.24	0.23	0.24	0.25	0.24	0.26	0.43	0.40	0.42
Aspartic acid	0.12	0.11	0.12	0.15	0.14	0.15	0.17	0.17	0.17
Glutamic acid	0.42	0.40	0.39	0.56	0.56	0.55	0.53	0.54	0.53
Threonine	0.18	0.11	0.05	0.13	0.10	0.08	0.08	0.08	0.08
Serine	0.16	0.21	0.31	0.18	0.13	0.10	0.17	0.17	0.18
Proline	0.36	0.34	0.35	0.17	0.18	0.17	0.32	0.30	0.32
Glycine	0.23	0.23	0.22	0.18	0.16	0.17	0.29	0.29	0.30
Alanine	0.64	0.63	0.64	0.35	0.26	0.16	0.39	0.40	0.41
Valine	0.05	0.04	0.05	0.22	0.17	0.12	0.05	0.06	0.05
Methionine	0.01	Traces	Traces	Traces	Traces	Traces	Traces	Traces	Traces
Isoleucine	0.01	Traces	Traces	0.12	0.07	0.01	Traces	Traces	Traces
Leucine	0.07	0.07	0.07	0.40	0.24	0.11	0.04	0.04	0.05
Tyrosine	0.37	0.34	0.32	0.16	0.16	0.17	0.08	0.08	0.08
Phenylalanine	0.01	0.01	0.01	0.07	0.05	0.03	0.02	0.02	0.02
β-Alanine	0.02	0.02	0.01	0.03	0.03	0.03	0.45	0.38	0.33
γ-Aminobutyric acid	0.02	0.02	0.03	Traces	Traces	Traces	0.07	0.06	0.06
Ornithine	0.03	0.03	0.04	Traces	Traces	Traces	Traces	Traces	Traces
TOTAL	3.79	3.59	3.55	3.99	3.32	2.70	4.00	3.88	3.88

A rise of temperature in the cultures results in a decline of the concentration of all amino acids being influenced in larvae, pupae and adults with exception of arginine and serine in larvae.

Amino acids	Larvae	Pupae	Adults
Histidine		+	
Lysine	+	+	
Arginine	-	+	
Ammonia			
Aspartic acid			
Glutamic acid	+		
Threonine	+	+	
Serine	-	+	
Proline			
Glycine			

Amino acids	Larvae	Pupae	Adults
Alanine		+	
Valine		+	
Methionine	+		
Isoleucine	+	+	
Leucine		+	
Tyrosine	+		
Phenylalanine		+	
β-Alanine			+
γ-Aminobutyric acid			
Ornithine			
TOTAL	8	10	1

The total amount of all amino acids shows little differences in larvae, high differences in pupae (in accordance with Anders, Drawert, Anders and Reuther 1964) and no differences in adults.

References: Anders, F., Drawert, F, Anders, A and Reuther, K.H., 1964, Z. Naturforschung 19b: 495-499.

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