SUBJECT: PHYSIOLOGICAL FLUID ANALYSIS OF BEER

INSTRUMENT: HITACHI MODEL L-8800 AMINO ACID ANALYZER

TABLE OF CONTENTS

Introduction 1
Physiological Fluid Analysis
(Standard Specifications)
Physiological Fluid Analysis
(High Resolution Specifications) 2, 3
Analytical Conditions 4

Introduction

Amino acid analysis includes analyses of the amino acids as components of protein and physiological fluid analysis, such as analysis of free amino acids deriving from an organism. Of those analyses, the physiological fluid analysis requires a higher separability, because it involves a number of analytes. Compared here are the results of analyses with a standard column (4.6 × 60 mm) and a high resolution column (4.6 × 80 mm), selecting beer as a fermented food sample which depends on the amino acid analysis for quality control. For usual quality control, the standard column is adequate. However, when analysts focus attention selectively on taurine (Tau) or the like constituents which have a short retention time, a higher quantitative accuracy is ensured by using the high resolution column. The Model L-8800 Amino Acid Analyzer has succeeded in high sensitivity and high resolution analysis of each constituent through a faster ninhydrin reaction achieved by adopting a new method of reaction in a reaction column (4.6 × 40 mm) instead of the conventional method of reaction in a reaction coil (0.25 mm I.D. × 7 m). As a result, peak broadening of each constituent can now be reduced by about 40% so that excellent chromatograms are available.

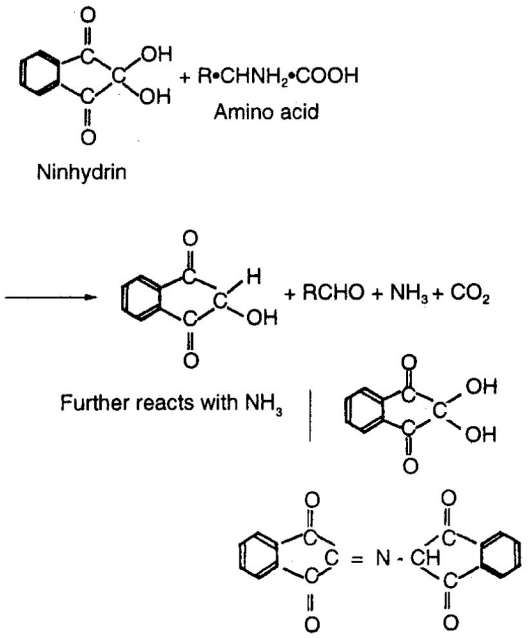

Fig. 1 Reaction of Ninhydrin

Physiological Fluid Analysis (Standard Specifications)

Sheet No.	Measured Substance	Field
56-1	Beer	Foodstuffs

Features

- Peaks from Gly to Phe are adequately separated.
- The entire range can be covered with the standard column of 4.6 × 60 mm.

Example of Measurement

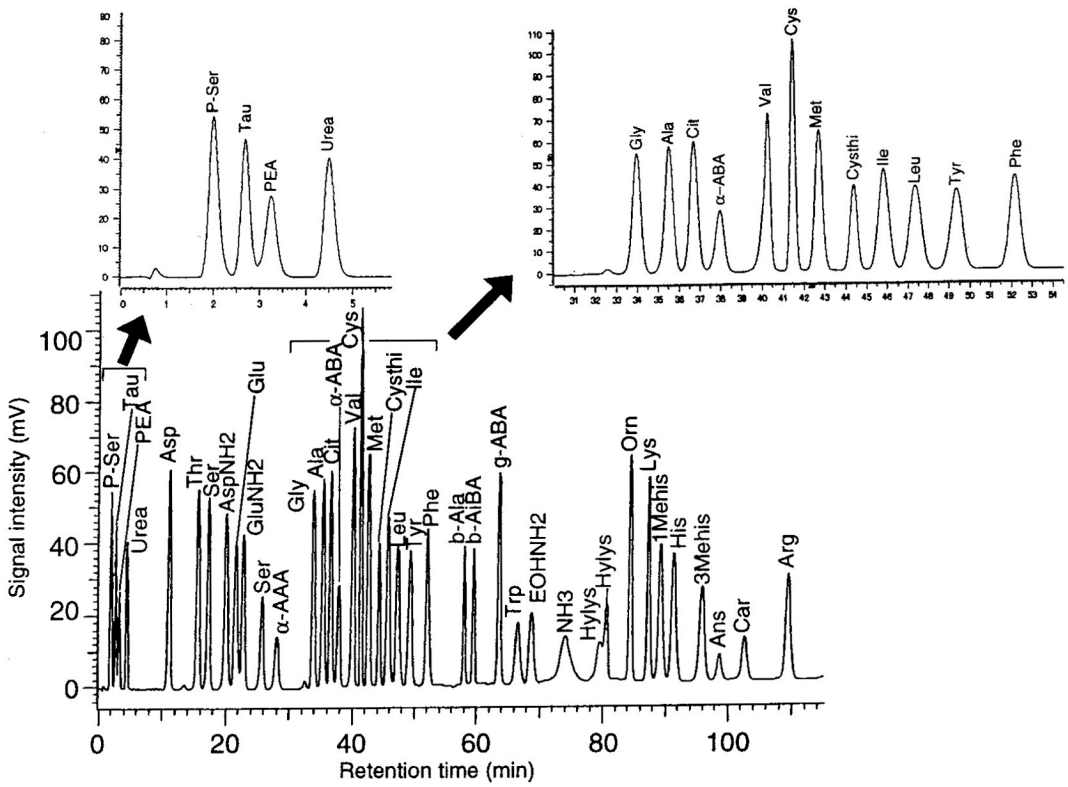

Fig. 2 Chromatogram of Standard Sample Mixture

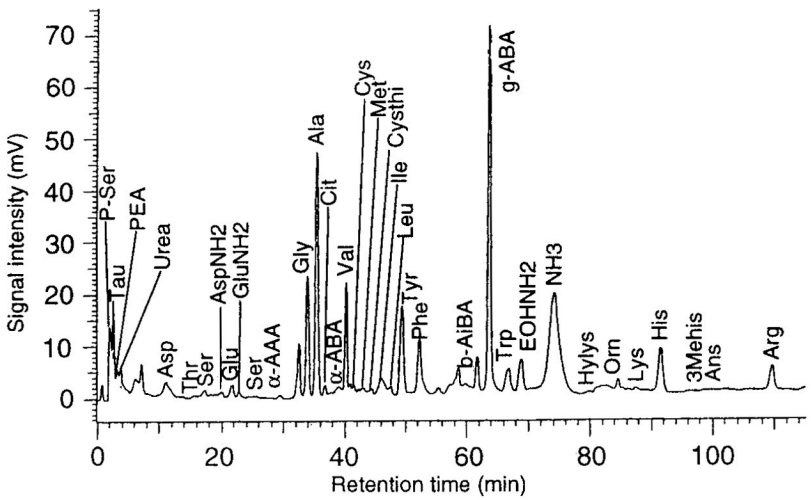

Fig. 3 Chromatogram of Beer

Keywords: Physiological fluid analysis, free amino acid, beer, foodstuffs

Physiological Fluid Analysis (High Resolution Specifications)

Sheet No.	Measured Substance	Field
56-2	Beer	Foodstuffs

Features

- Peak separation is excellent around taurine (Tau) due to the high resolution column.
- High resolution is ensured over the entire range of measurement.

Example of Measurement

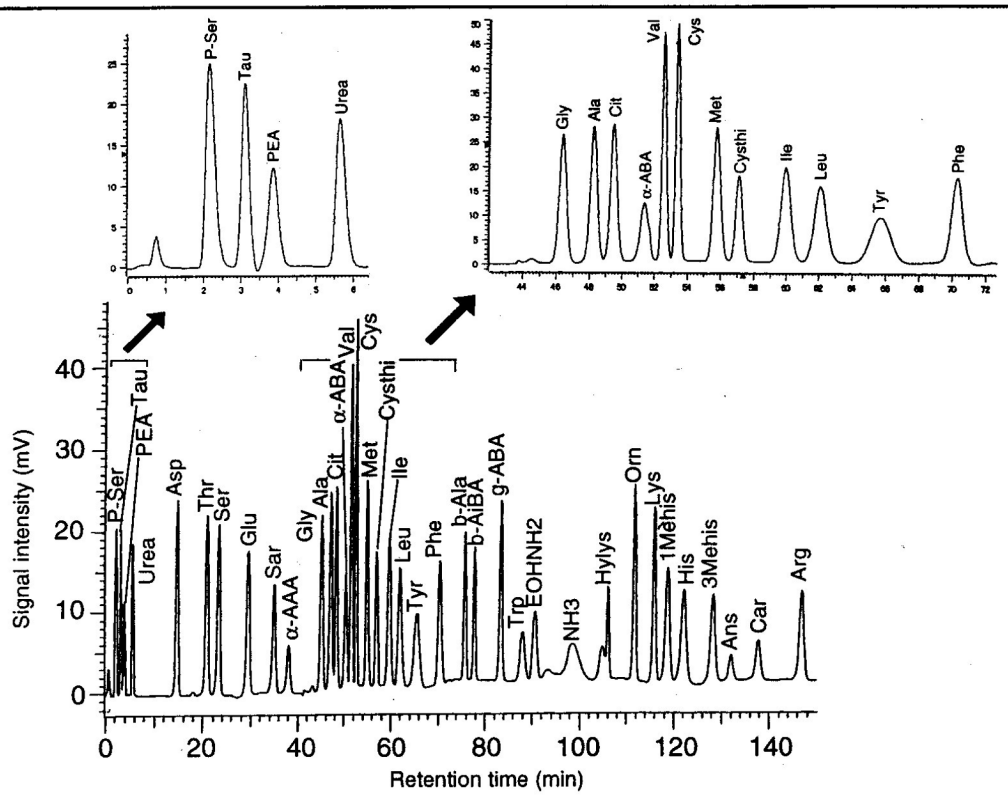

Fig. 4 Chromatogram of Standard Sample Mixture (with High Resolution Specifications)

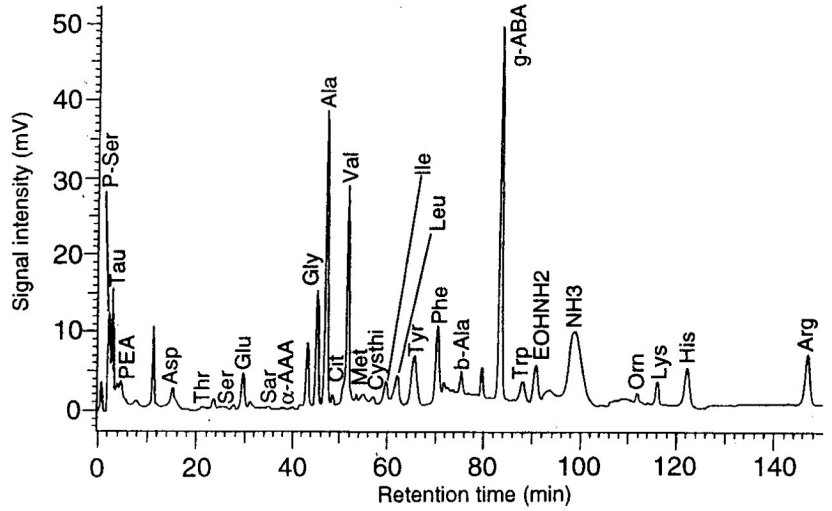

Fig. 5 Chromatogram of Beer (with High Resolution Specifications)

Keywords: Physiological fluid analysis, free amino acid, beer, foodstuffs

Analytical Conditions

(1) Standard specifications

Column	:	#2622 (4.6 × 60 mm)
Ammonia filter column	:	#2650L (4.6 × 40 mm)
Pump flow rate	:	P1; 0.35 mL/min P2; 0.30 mL/min
Reaction method	:	Reaction column (4.6 × 40 mm)

Gradient program

Time (min)	%B1	%B2	%B3	%B4	%B5	Temp. (°C)
0.0	100	0	0	0	0	38
2.0	100	0	0	0	0	32
19.0	100	0	0	0	0	
19.1	80	20	0	0	0	60
31.5	60	40	0	0	0	
31.6	10	90	0	0	0	
36.5	10	90	0	0	0	40
42.5	10	90	0	0	0	
42.6	0	100	0	0	0	
45.5						70
50.5	0	100	0	0	0	70
50.6	0	0	100	0	0	
68.4	0	0	100	0	0	45
69.5	0	0	100	0	0	
69.6	60	0	0	40	0	
74.0	60	0	0	40	0	
74.1	0	0	0	100	0	
86.0	0	0	0	100	0	
86.1	0	20	0	80	0	
92.5	0	20	0	80	0	70
99.5	0	20	0	80	0	
99.6	0	0	0	100	0	
109.5	0	0	0	100	0	
109.6	0	0	0	0	100	
118.5	0	0	0	0	100	
118.6	100	0	0	0	0	
125.0	100	0	0	0	0	38
148.0	100	0	0	0	0	

(2) High resolution specifications

Column	:	#2622 (4.6 × 80 mm)
Ammonia filter column	:	#2650L (4.6 × 60 mm)
Pump flow rate	:	P1; 0.35 mL/min P2; 0.30 mL/min
Reaction method	:	Reaction column (4.6 × 40 mm)

Gradient program

Time (min)	%B1	%B2	%B3	%B4	%B5	Temp. (°C)
0.0	100	0	0	0	0	38
3.0	100	0	0	0	0	30
25.4	100	0	0	0	0	
25.5	80	20	0	0	0	60
40.5	60	40	0	0	0	
40.6	10	90	0	0	0	
48.6	10	90	0	0	0	40
58.0	10	90	0	0	0	
58.1	0	100	0	0	0	
64.5	0	100	0	0	0	70
64.6	0	0	100	0	0	
91.0	0	0	100	0	0	45
92.9	0	0	100	0	0	
93.0	60	0	0	40	0	
98.5	60	0	0	40	0	
98.6	0	0	0	100	0	
114.5	0	0	0	100	0	
114.6	0	20	0	80	0	
123.0	0	20	0	80	0	70
132.9	0	20	0	80	0	
133.0	0	0	0	100	0	
146.0	0	0	0	100	0	
146.1	0	0	0	0	100	
158.0	0	0	0	0	100	
158.1	100	0	0	0	0	
167.0	100	0	0	0	0	38
200.0	100	0	0	0	0	

Author:
LC Group, Techno Research Laboratory,
Hitachi Instruments Engineering, Co., Ltd.

HITACHI

For further information, please contact your nearest sales representative.

Printed in Japan KY-R (LT)