

Amino acid analysis in tomato puree (Physiological Fluid Analysis Method / GABA short analysis method)

Tomato is known as a vegetable containing many amino acids including aspartic acid and glutamic acid. In recent years, it has also attracted attention because it contains a large amount of γ -Amino-n-butyric acid (GABA), which is a functional food ingredient. Simultaneous analysis (Physiological Fluid Analysis Method) can simultaneously analyze 40 free amino acids including GABA, but GABA short analysis method, which has a short analysis time, is effective for measuring only GABA.

In this report, we will introduce an example of measuring commercially available tomato puree by Physiological Fluid Analysis Method and GABA short analysis method using LA8080 HIGH SPEED AMINO ACID ANALYZER (AminoSAAYA).

Since these analytical methods can be used together without changing the eluents and columns, they can be easily selected according to the amino acid to be analyzed in the sample, and the total measurement time can be shortened.

We also compared the GABA quantification results of the tomato puree sample by Physiological Fluid Analysis Method and GABA short analysis method.



**LA8080 HIGH SPEED
AMINO ACID ANALYZER
(AminoSAAYA)**

Analytical Conditions, Sample Preparation

Table 1. Analytical Conditions for Physiological Fluid Analysis Method and GABA short analysis method

| | |
|----------------------------|---|
| Column | #2622PF 4.6 mm I.D. × 60 mm |
| Ammonia filter column | #2650L 4.6 mm I.D. × 40 mm |
| Eluent | MCI buffer PF-Kit (*) |
| Flow rate | 0.35~0.40 mL/min |
| Column temperature | 30~90 °C |
| Reaction reagent | Ninhydrin Reagent Wako Amino Acid Automated Analyzer Kit (ID code: For Hitachi) (*) |
| Reaction reagent flow rate | 0.30~0.35 mL/min |
| Reaction temperature | 135 °C |
| Detection wavelength | VIS 440 nm, 570 nm |
| Injection volume | 20 μ L |

(*) FUJIFILM Wako Pure Chemical Corporation

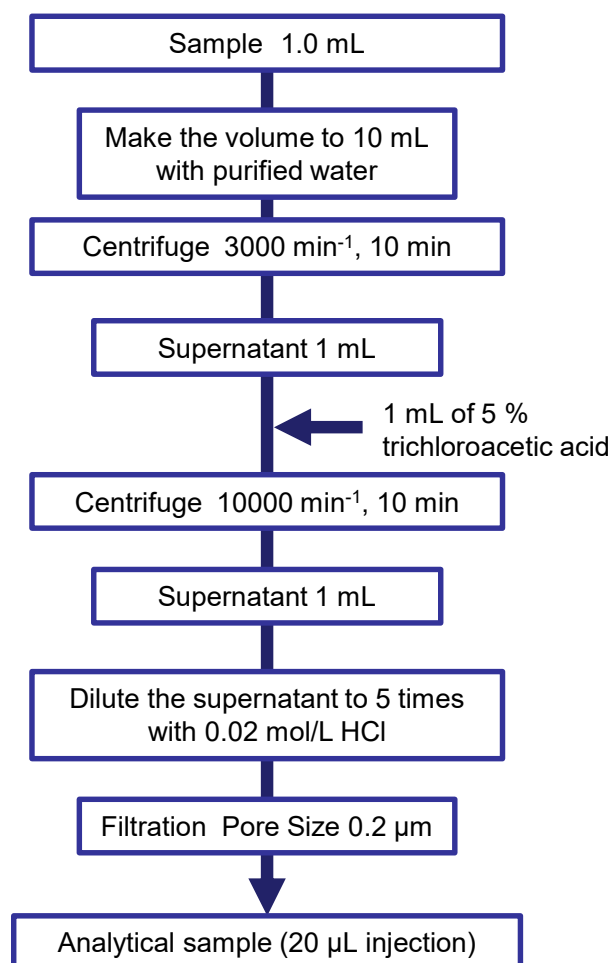


Fig.1 Preparation Method

Analysis of tomato puree by Physiological fluid analysis method

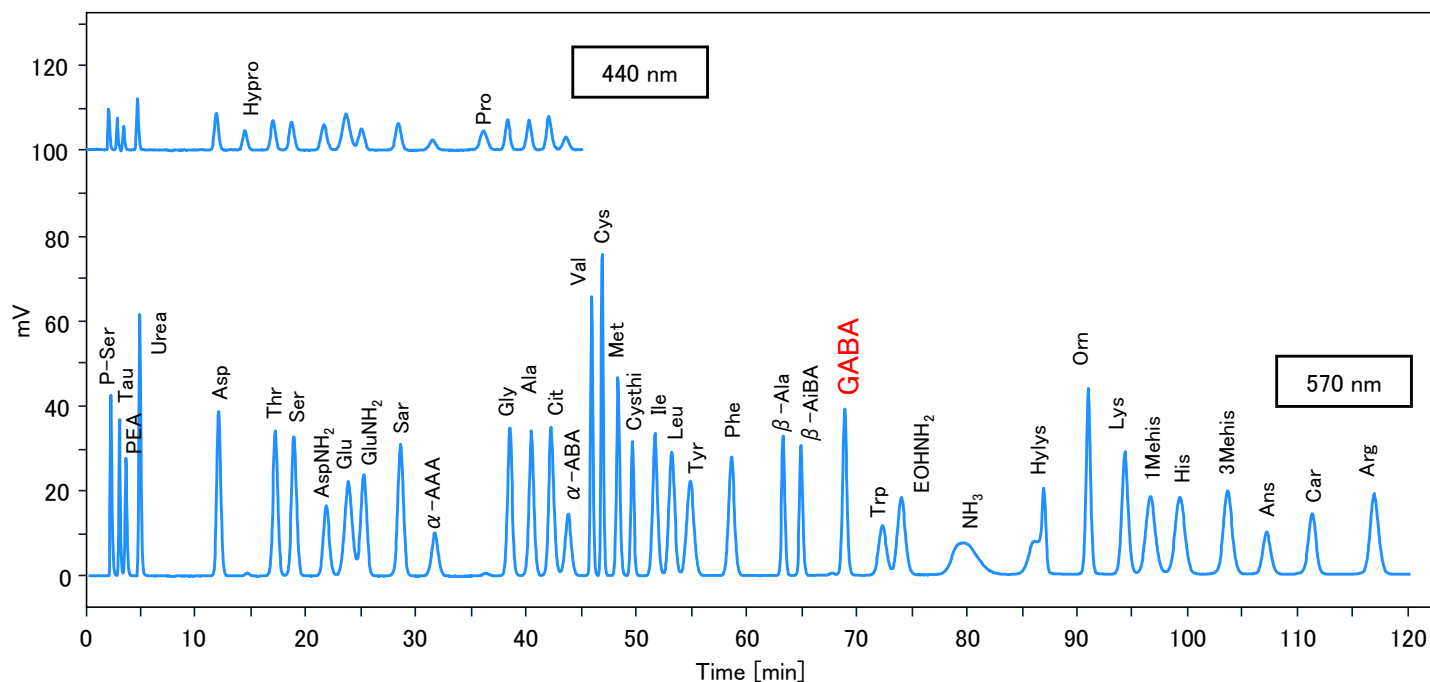


Fig.2 Analysis of Amino Acid Standard Solution (Physiological Fluid Analysis Method)

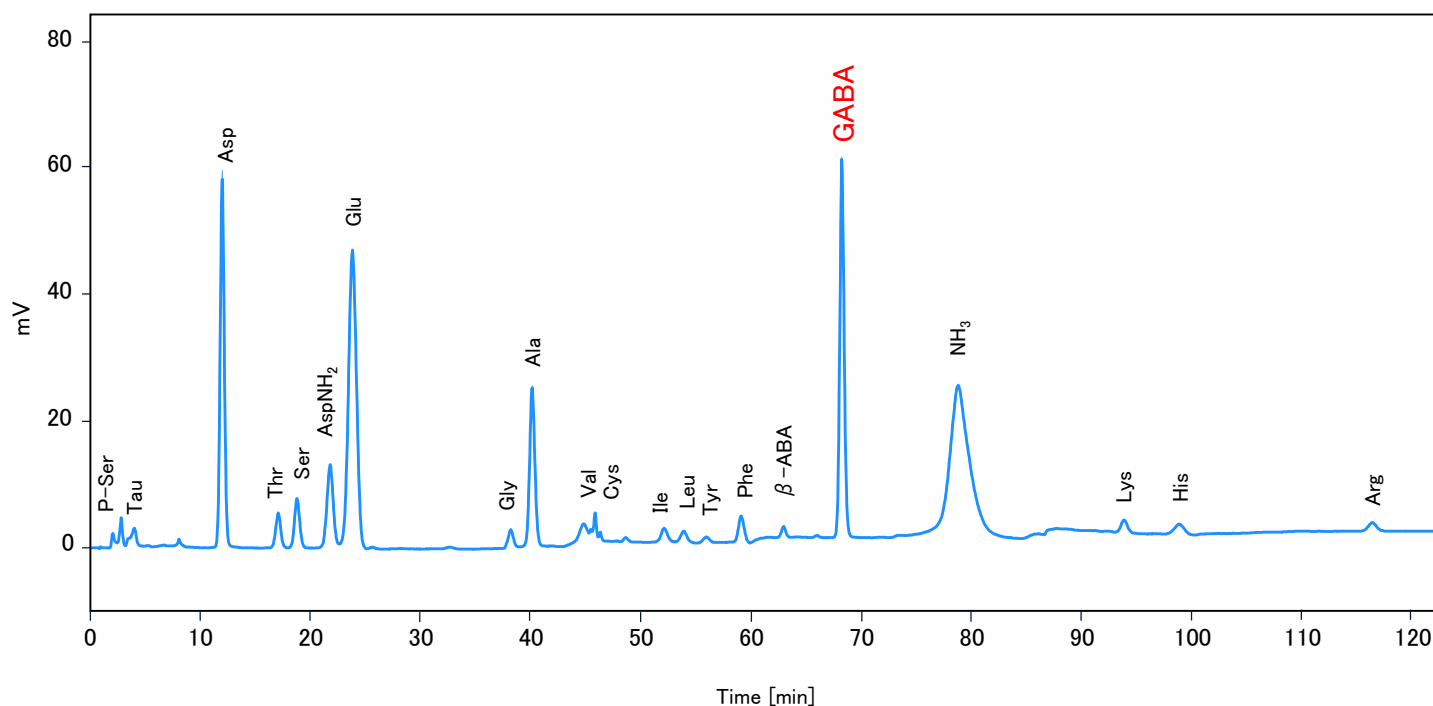


Fig.3 Analysis of tomato puree (Physiological Fluid Analysis Method)

Analysis of tomato puree by GABA short analysis method

- ✓ It was found that tomatoes contain a lot of GABA.
- ✓ It was confirmed that there is no big difference between the GABA quantitative values of Physiological Fluid Analysis Method and the GABA shortened analysis method.

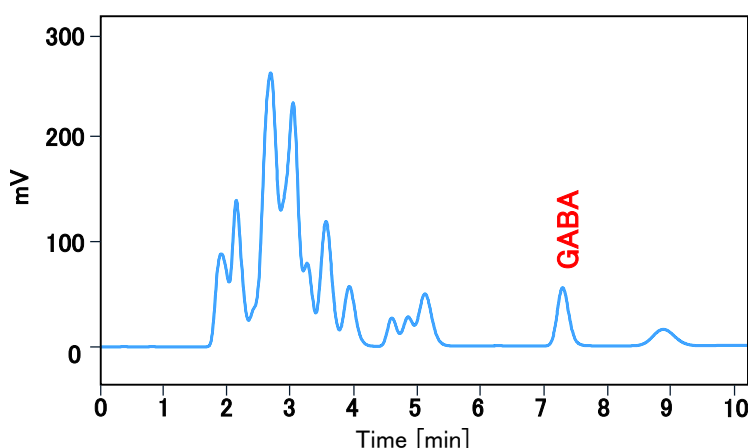


Fig.4 Analysis of Amino Acid Standard Solution (GABA short analysis method)

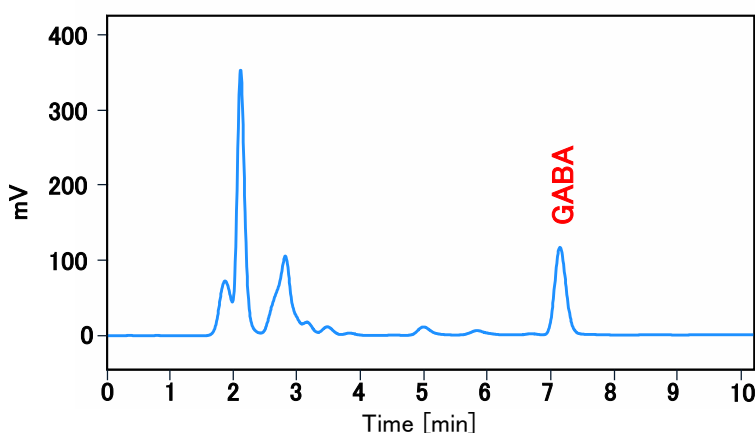


Fig.5 Analysis of tomato puree (GABA short analysis method)

Table 2. Comparison of GABA quantitative values

| Analysis method | Concentration (mmol/L) |
|-------------------------------------|------------------------|
| Physiological Fluid Analysis Method | 0.208 |
| GABA short analysis method | 0.211 |

Difference in quantitative values: 1.47%

List of Amino Acids

| Abbrev. | Amino acid | Molecular weight | Std. concentration (nmol/ 20 μ L) |
|--------------------|--------------------------------|------------------|---------------------------------------|
| P-Ser | Phosphoserine | 185.1 | 1 |
| Tau | Taurine | 125.2 | 1 |
| PEA | Phosphoethanolamine | 141.1 | 1 |
| Urea | Urea | 60.1 | 40 |
| Asp | Aspartic acid | 133.1 | 2 |
| Hypro | Hydroxyproline | 131.1 | 2 |
| Thr | Threonine | 119.1 | 2 |
| Ser | Serine | 105.1 | 2 |
| AspNH ₂ | Asparagine | 132.1 | 2 |
| Glu | Glutamic acid | 147.1 | 2 |
| GluNH ₂ | Glutamine | 146.2 | 2 |
| Sar | Sarcosine | 89.1 | 5 |
| α -AAA | α -Aminoadipic acid | 161.2 | 1 |
| Pro | Proline | 115.1 | 2 |
| Gly | Glycine | 75.1 | 2 |
| Ala | Alanine | 89.1 | 2 |
| Cit | Citrulline | 175.2 | 2 |
| α -ABA | α -Amino-n-butyric acid | 103.1 | 1 |
| Val | Valine | 117.1 | 2 |
| Cys | Cystine | 240.3 | 2 |
| Met | Methionine | 149.2 | 2 |
| Cysthi | Cystathionine | 222.3 | 1 |
| Ile | Isoleucine | 131.2 | 2 |
| Leu | Leucine | 131.2 | 2 |
| Tyr | Tyrosine | 181.2 | 2 |
| Phe | Phenylalanine | 165.2 | 2 |
| β -Ala | β -Alanine | 89.1 | 2 |
| β -AiBA | β -Aminoisobutyric acid | 103.1 | 2 |
| GABA | γ -Amino-n-butyric acid | 103.1 | 2 |
| Trp | Tryptophan | 204.1 | 2 |
| EOHNH ₂ | Ethanolamine | 61.1 | 2 |
| NH ₃ | Ammonia | 17.0 | 2 |
| Hylys | Hydroxylysine | 162.2 | 2 |
| Orn | Ornithine | 132.2 | 2 |
| Lys | Lysine | 146.2 | 2 |
| 1Mehis | 1-Methylhistidine | 169.2 | 2 |
| His | Histidine | 155.2 | 2 |
| 3Mehis | 3-Methylhistidine | 169.2 | 2 |
| Ans | Anserine | 240.3 | 2 |
| Car | Carnosine | 226.2 | 2 |
| Arg | Arginine | 174.2 | 2 |

NOTE: All data on this report are examples of measurement; the individual values are NOT guaranteed.