

Determination of Alliin in Garlic

In ancient Egypt, Greece and China, garlic was eaten because it was considered to be a nutritious food, and even today, it enjoys popularity as a health food. The active compound alliin in garlic is quickly converted to alliin by the action of the enzyme alliinase. With the efficacy of these substances having been elucidated, they are currently marketed as health foods. The source of garlic's unique smell is attributed to the

various volatile sulfur-containing compounds of alliin. Since alliin is relatively odorless, it is preferred for use in health foods.

Alliin is an amino acid and can be analyzed using OPA (o-phthalaldehyde) as the reaction reagent with the post-column fluorescent derivitization method. Introduced here is an analysis of alliin in garlic using the Shimadzu amino acid analysis system.

■ Analytical Conditions

The structure of alliin is shown in Fig. 1. Alliin can be detected with high sensitivity and good selectivity in the same way as other amino acids, using post-column fluorescent derivitization with OPA reagent. After separation of the alliin using a Na ion exchange column, OPA reagent is added to give it fluorescence at 60°C, and detection is performed using a fluorescence detector.

Fig. 2 shows the result of a 10μL injection of alliin standard solution (7.43mg/L, 5% trichloroacetic acid aqueous solution). The analytical conditions used are shown in Table 1. The peak just before that of alliin becomes larger with the passage of time, so it is important to perform analysis rapidly after sample preparation.

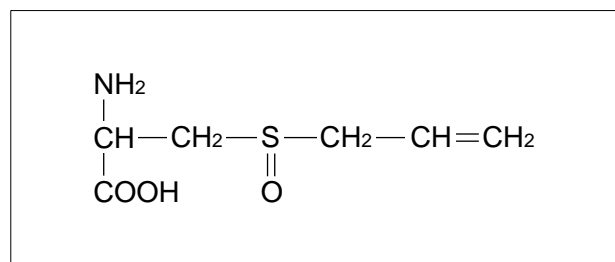


Fig.1 Structure of Alliin

Column	:Shim-pack Amino-Na (100mm L.×6.0mm I.D.)
Mobile Phase	:A 0.1M(Sodium)citrate Buffer (pH3.2) B 0.2M NaOH Step gradient 0-23 (min) A.Conc.100% 23-33 (min) B.Conc.100% 33-50 (min) A.Conc.100%
Flow Rate of Mobile Phase	:0.4mL/min
Column Temp.	:60°C
Reaction Reagent	:Amino Acid Reagent Kit B
Reaction Temp.	:60°C
Flow Rate of Reagent	:0.4mL/min
Detection	:RF-10AXL Ex at 350nm, Em at 455nm
Injection Volume	:10μL

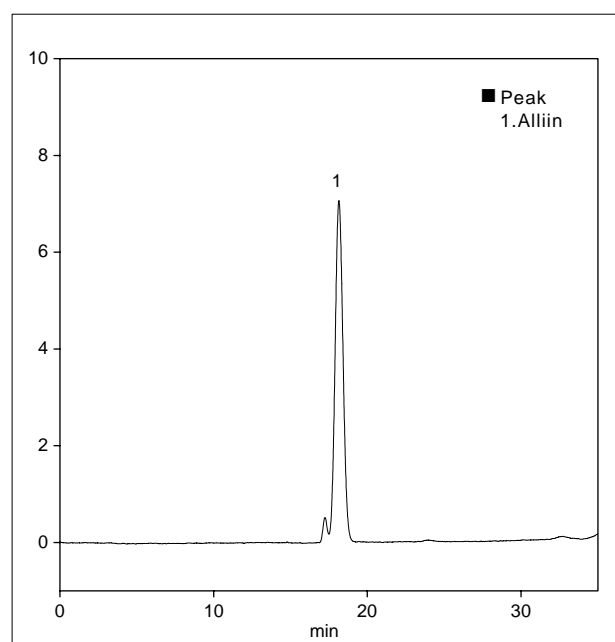


Fig.2 Chromatogram of Standard Alliin(7.43mg/L,10μL Inj.)

■ Analysis of Raw Garlic

After preparing the raw garlic sample as shown in Fig. 3, 10 μ L was injected. The analytical conditions

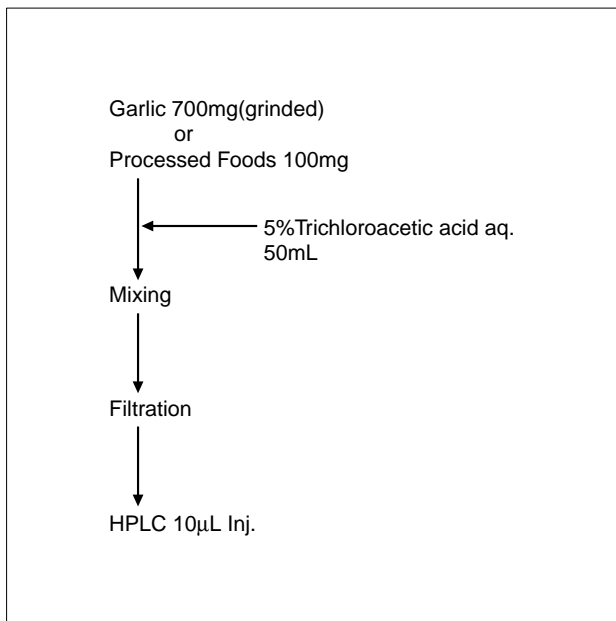


Fig.3 Sample Preparation

were the same as those shown in Table 1. (Fig. 4)

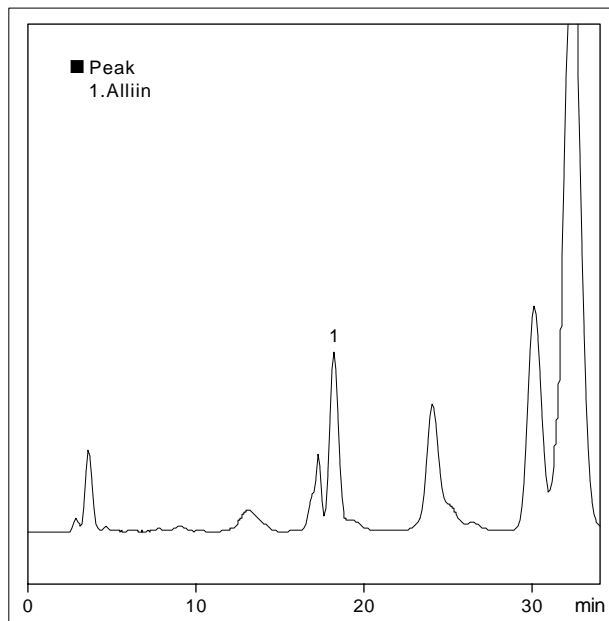


Fig.4 Analysis of Garlic Sample

■ Analysis of Processed Garlic Food Products

Garlic processed foods in the form of tablets and powder were analyzed with preparations outlined in

Fig. 3. The analytical conditions were the same as those shown in Table 1. (Fig. 5, Fig. 6)

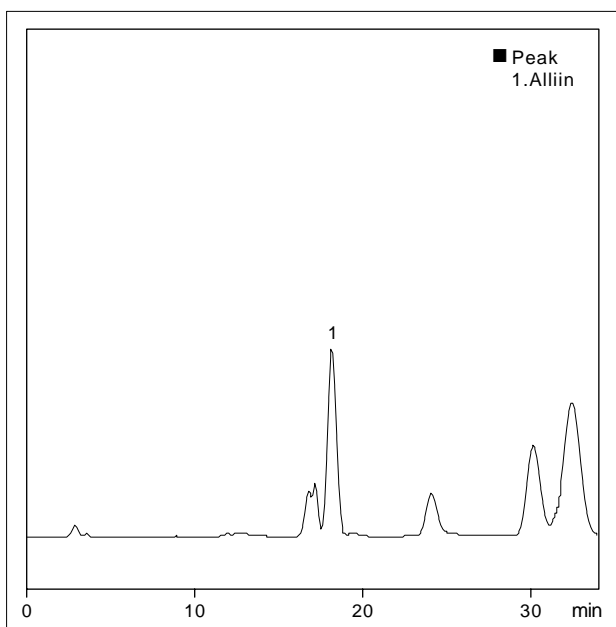


Fig.5 Analysis of Processed Food (Tablet)

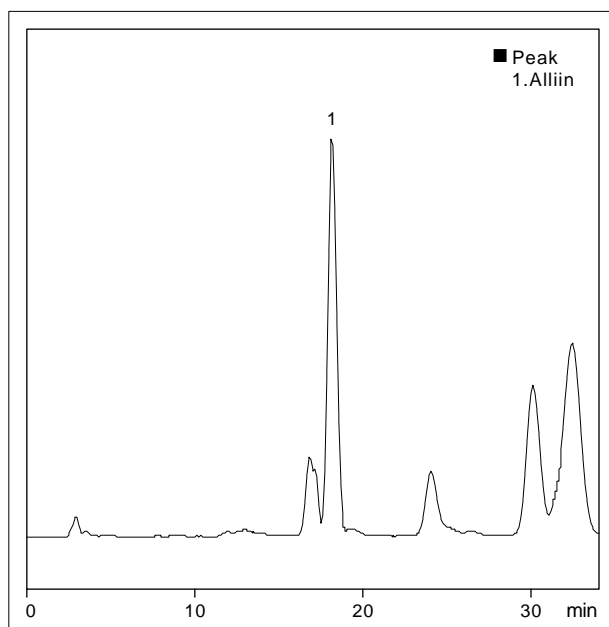


Fig.6 Analysis of Processed Food (Powder)