Short Paper

Tyramine Formation from Hair Tail Meat in the Course of Enzymatic Digestion^{*1}Kunio Suetsuna^{*2} and Kazuyuki Kunihiro^{*3}

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Tyramine which is produced from tyrosine by the action of L-tyrosine decarboxylase distributes widely in animals and plants.^{1,2)} Fruits and vegetables such as banana, plum, tomato, eggplant and potato contain tyramine at a concentration of 0.1 to 6.5 mg/100 g.^{3,4)} Tyramine is used as medicine has the womb-contracting effect, the peripheral nervous system-contracting effect, the blood pressure-raising effect etc. and is also very important as a material for syntheses of certain medicines and for an ion sensor etc.. We found that tyramine was produced in fairly large quantity by the long time incubation of hair tail *Trichurus lepturus* meat with protease and can be easily isolated in a highly pure form. Five hundred grams of hair tail meat was homogenized with 5 l of deionized water. Ten grams of protease (Denazyme-AP, Nagase Biochemical Co. Ltd.) was added to the homogenate whose pH has been adjusted to 7.0 with 1 N-NaOH, and the mixture was incubated for 20 h at 37°C with stirring. After being cooled the reaction mixture was filtered through a filter paper with suction. Fifty grams of activated carbon powder (Carboraffin, Takeda Chemical Industries Ltd.) was added to the filtrate. After being stirred the mixture was filtered again with suction to obtain a clear filtrate. The filtrate was concentrated to 1 l under vacuum. To the concentrated filtrate 10 l of methanol was added. The mixture was left over night at a cool place and then resulting precipitates

were removed by filtration with suction. The filtrate was concentrated to 500 ml under vacuum and then pass through a cation exchange resin Dowex 50W [H⁺ form] ($\times 4$, 50–100 mesh, column size 4.2×15 cm) column. After column was washed sufficiently with deionized water to remove adsorbed impurities, the desired constituent was eluted with 0.3 N-NH₄OH of 2 l. After being concentrated to 200 ml under vacuum the eluate was left over night at a cool place to obtain colorless acicular crystals. These crystals were collected by filtration of a glass filter G-4 with suction and then dried in the air. Yield: 4.8 g of purified tyramine. Anal. Found: C, 69.74; H, 8.30; N, 10.23%. Calcd for C₈H₁₁NO: C, 70.07; H, 8.03; N, 10.22%. Infrared spectrum was in good agreement with that of authentic tyramine.

Tyramine formation during the incubation is presumed as follows: Tyrosine produced from hair tail meat proteins by protease action is converted into tyramine by L-tyrosine decarboxylase present as a contaminant in the protease preparation used. Further work is under way to elucidate the mechanism of tyramine formation.

References

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Fig. 1. Infrared spectrum of (B) Tyramine which was obtained from hair tail meat and (A) authentic tyramine.

^{*1} 酵素分解過程におけるタチウオ肉からのチラミンの生成.

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