魚肉エキスの酸加水分解中におけるプリン誘導体からのグリシンの生成

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Short Paper

Formation of Glycine from Purine Derivatives in the Fish Muscle Extracts during Acid Hydrolysis*

So far as examined, fish muscle extracts were found to liberate much more glycine than other amino acids when hydrolyzed with acid for estimation of peptides.[1,2] We have also recognized recently that, in 8 species of fish analyzed, 40–70 mg of free glycine appeared on acid hydrolysis of trichloroacetic acid extracts from 100 g of the white muscle (unpublished data). The origin of glycine has been postulated so far to be peptides rich in glycine. It is however considered that the increase of free glycine may not be simply attributable to peptides, since some natural products having an adenyl residue were shown to afford glycine when hydrolyzed with 6 N HCl at 110°C for 8–11 hr. For example, HATANO and HASHIMOTO (*Toxicon*, in press) reported the formation of glycine from dinogunellin and TOKITA *et al.*[3] that from eritadenine and its derivative. We attempted therefore to hydrolyze a series of purine derivatives common in the fish muscle extracts, such as ATP, AMP, IMP, inosine and hypoxanthine, in order to see whether these compounds can be the origin of glycine or not.

A 2-ml portion containing each of these compounds (3–20 μmoles) in 6 N HCl was heated at 110°C for 16 hr in an evacuated sealed tube. After removal of HCl by repeated evaporations *in vacuo*, the residue was taken up in a small amount of water and subjected to thin layer chromatography with cellulose (Avicel SF) plates and two different solvent systems, 1-butanol-acetic acid-water (4: 1: 2) and methanol-formic acid-water (85: 15: 5). Each of the hydrolyzates gave a spot with ninhydrin at Rf 0.22 in the former solvent and at Rf 0.55 in the latter solvent, the values coinciding well with those of authentic glycine. When applied to an automatic amino acid analyzer (Hitachi KLA-3B), the hydrolyzates revealed a distinct peak of glycine. The yield of glycine is shown in Table 1. It is apparent that all of the compounds tested give rise to glycine under the conditions adopted here and IMP, inosine and hypoxanthine afford nearly equimolar glycine.

Table 1. Formation of glycine from purine derivatives during acid hydrolysis (μmoles)

Compounds		Glycine formed
ATP	4.7	3.5
AMP	3.8	2.0
IMP	4.9	4.9
Inosine	20.0	19.8
Hypoxanthine	3.0	2.8

These results strongly suggest that, if not all, the greater part of free glycine appearing on acid hydrolysis of the fish muscle extracts is derived not from peptides but from purine nucleotides and their related compounds.

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