PROTEIN ACIDIC HYDROLYSIS FOR AMINO ACIDS ANALYSIS IN FOOD - PROGRESS OVER TIME: A SHORT REVIEW

Gabriel Mustățea[1*], Elena L. Ungureanu[1], Enuța Iorga[1]

[1]National R&D Institute for Food Bioresources - IBABucharest, Ancuta Baneasa Street 5, 020323 Bucharest, Romania

[*]e-mail:gabi.mustatea@bioresurse.ro

Abstract

Hydrolysis methods are used for liberate amino acids from protein substrate and quantitatively recover them in the hydrolysate. Due to a large number of factors (such as temperature, time, hydrolysis agent, additives) there is no hydrolysis method that can completely accomplish this task.

Hydrolysis can be performed by either chemical or enzymatic means, while chemical hydrolysis can be performed under either acidic or basic conditions. The earliest experiments on the acid hydrolysis of proteins were performed in 1820, while amino acid analysis was first developed in the early of 1950s by using 6M HCl acid hydrolysis in an oxygen-free environment at 110 ^{0}C for 22 hours to liberate amino acids from pure proteins. Since then, the majority of analysis methods use hydrolysis of the peptide bond in proteins using 6M HCl under vacuum and heating at 100 - 160 ^{0}C for 18 to 72 hours. The major challenge for the researchers was to help address the perceived weaknesses of the hydrolysis (long hydrolysis times, low yields, instability of some amino acids, etc.).

Acidic hydrolysis is the most important technique used to cleave the peptide bond in proteins. Although it was developed more than 60 years ago, acid hydrolysis in 6M HCl at 110 ^{0}C for 24 hours is still the most commonly used hydrolysis technique. Over the past decades, numerous articles have been published on acidic hydrolysis of proteins related to amino acids analysis, in which various hydrolysis agents have been used, hydrolysis time and temperature have been varied, in order to increase the amino acids recovery yield. Until now, no hydrolysis method can completely liberate all amino acids from a protein substrate and recover them with 100% yield.

***Key words**: Amino acids, Protein, Acidic hydrolysis.*