

Peptides (1. LF UK, NT)

Structure

- condensation (amino acids → peptides)

File:Formation of cyclic dipeptide.jpg

- binding of some amino acids in an unusual way (Glu distal group COOH = γ -peptide bond)
- bound D-amino acids
- unusual amino acids bound
 - β -alanine (3-aminopropionic) File:Beta-alanine.jpg, α -aminobutyric (2-aminobutyric) File:Alpha-aminobutyric.jpg, γ -aminobutyric (4-aminobutyric) File:Gamma-aminobutyric.jpg, taurine File:Taurine.jpg, 2-aminoacrylic (dehydroalanine) File:2-aminoacrylic.jpg, (E)-2-aminocroton (dehydrobutyrin) File:Dehydrobutyrin.jpg, pyroglutam File:Pyroglutam.jpg

Classification

Number of bound monomers (amino acids)

- oligopeptides (2–10 amino acids)
- polypeptides (formerly macropeptides, 11–100 amino acids)

String type

- linear
- cyclical

type of bonds

- homodet (peptide bonds only)
- heterodet (peptide and other bonds)
 - disulfide -S-S-, ester (depsipeptides) -CO-O-R

Bound folders

- homeomeric containing only amino acids
- heteromeric (peptoids) containing also other compounds
 - nucleopeptides – phosphopeptides
 - lipopeptides – chromopeptides
 - glycopeptides – metalloptides

Occurrence

- products of metabolism, natural peptides
- products of proteolysis, enzymatic or non-enzymatic hydrolysis
- synthetic peptides, substitute sweeteners

Properties

- biological activity
- sensory properties
- products of metabolism of lactic acid bacteria = bacteriocins
- nisin (*Streptococcus cremoris*, syn. *Lactococcus lactis* ssp. *Lactis*)
- preservative, stabilization of fermented products

Significant Peptides

Glutathione

(G-SH or G-S-S-G) γ -L-glutamyl-L-cysteinylglycine (γ -amide bond) File:Glutathione.jpg

Occurrence

- microorganisms, plants, animals
 - wheat flour (10–15 mg/kg)
 - meat (300–1500 mg/kg)

Function

- detoxification of toxic forms of oxygen

- transport (transfer) of amino acids into cells
- metabolic processes (leukotriene biosynthesis)
- stabilization of the oxidation state of SH-proteins (substrate of peroxidase, glutathione reductase)
- technology

Chorleywood method of white bread production, ascorbic acid

- $\text{H}_2\text{A} + \frac{1}{2} \text{O}_2 \rightarrow \text{A} + \text{H}_2\text{O}$ (ascorbase)
- $\text{A} + 2 \text{G-SH} \rightarrow \text{H}_2\text{A} + \text{G-S-S-G}$ (glutathione dehydrogenase)
- G-S-S-G – without affecting the rheological properties of the dough
- G-SH – negative effect (gluten protein depolymerization)
- $\text{P-S-S-P} + \text{G-SH} \rightarrow \text{P-S-S-G} + \text{P-SH}$

β-alanylhistidine dipeptides

- carnosine File:Karnosine.jpg, anserin File:Anserin.jpg, balenin File:Balenin.jpg

Occurrence

- in meat

Function

- participation in contraction of skeletal muscle
- buffering capacity of the muscle
- organoleptic properties

Products of proteolysis

- spontaneous proteolysis (autolysis)
 - desired maturation of meat (consistency, aroma), production of yeast autolysates (additives)
 - undesirable
- intentional proteolysis
 - cheese production (desired consistency, aroma)
 - production of malt (stabilization of beer foam)
 - production of protein hydrolysates
 - Enzymatic:
 - soy sauce
 - hydrolysates of waste proteins (blood, whey, caseins)
 - sour: soup spices and other preparations

Bitter peptides of enzyme hydrolysates and foods

- hydrophobic amino acids: Val, Leu, Ile, Phe, Tyr, Trp (M < 6000 Da)

Synthetic Peptides

- substitute sweetener Aspartame (Asp-Phe) File:Aspartame.jpg

Links

Related Articles

- Amino acids
- Proteins
- Amino acids, peptides, proteins

Source

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