Sensory analysis and amino acid evaluation of enzymatic hydrolysates of *Chelydraserpentina* meat

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Abstract. The *Chelydraserpentina* was raw material, the meats of its back, legs, neck and tail were hydrolyzed by alkaline protease, and the hydrolysates of four different parts of meats were obtained, which sensory score, composition and content difference of total amino acid and free amino acid in hydrolysates were studied. The results showed that the hydrolysate of neck meat has the best sensory quality, with an overall score of 90. The contents of total amino acids and essential amino acids in the hydrolysate of leg meat were the highest, which were 28254.6 μg/g and 11031.7 μg/g respectively. The total amount of free amino acids in neck meat hydrolysate was 4559.2 μg/g. The content of glutamic acid in the free amino acids of four parts meat hydrolysate was the highest. The contents of umami amino acids, bitter amino acids and aromatic amino acids in the hydrolysate of neck meat were the highest in the four parts of meat hydrolysates, while that of sweet amino acids was the highest in the hydrolysate of back nail meat. Glutamic acid, histidine and phenylalanine are the free amino acids of TAV>1 in the leg meat.

1. Introduction

The enzymatic hydrolysis products obtained by protein enzymatic hydrolysis technology have attracted more and more researchers' attention due to their good sensory quality, nutritional value and functional characteristics [1-2]. Enzymolysis products can be widely used in functional beverages, roasted products and condiments, and have great application prospects and economic benefits [3]. In recent years, the nutritional components and functional characteristics of hydrolysates of aquatic animals have attracted the attention of researchers. For example, oysters, tilapia and other aquatic animals have carried out a lot of enzymolysis researchs [4] Scientists urgently need to find new enzymatic resources.

*Chelydraserpentina* are delicate in texture, delicious in taste, high in protein and low in fat, cholesterol and calories. *Chelydraserpentina* can weigh more than 20 kg and have an average meat content of 40.10% [5-6]. In 2012, Guangdong province raised 108,000 *Chelydraserpentina*, which created an output value of 240 million [7]. *Chelydraserpentina* back, legs, neck and tail all contain more meat. The back and leg meat are easy to separate and are the main ingredients of fresh food. Most of the meat in the neck and tail is discarded except for a small amount of soup. At present, the *Chelydraserpentina* meat is less deeply processed, which seriously limits its economic value and efficient use of resources.
Chelydraserpentina has large yields, high meat production rates and protein content, and enzymatic hydrolysis using proteolysis technology is one of the important research directions of deep processing. Protein digestion is a complex process, which is affected by many factors, including the type of protease, substrate (type of protein, pretreatment method) and hydrolysis conditions (such as the amount of enzyme added, temperature, time and pH) [8]. There are large differences in the nutritional composition, tissue structure, nutritional value and processing characteristics of meat in different parts of animals [9]. Differences in protein content and structure will lead to enzymatic hydrolysis efficiency, resulting in different composition and content of free amino acids in the enzymatic hydrolysis products. A large number of studies have reported differences in volatile components of meat in different parts of aquatic products. For example, there are significant differences in volatile flavor components in mackerel back meat, belly meat and tail meat [10]. The difference in volatile flavor components in meat will inevitably affect the sensory quality of enzymatic hydrolysis products. Therefore, which part of the Chelydraserpentina's meat is suitable for enzymatic hydrolysis to prepare an enzymatic hydrolysates with high flavor and nutritional value requires in-depth research.

In this study, the alkaline protease was used to hydrolyze the meat of the Chelydraserpentina's back, legs, neck and tail. The application in the food industry provides a theoretical basis.

2. Materials and methods

2.1. Materials and instruments
Chelydraserpentina's meat was sampled at Kangyuan Aquaculture Farm in Sihui City, Zhaoqing, Guangdong, where it was slaughtered on the spot. The meat of 4 parts of back, legs, neck and tail was taken out, refrigerated at 4°C, and brought back to the laboratory within 12 hours, respectively. After the machine is crushed, it is frozen at -18°C; alkaline protease (enzyme activity 200,000 U/g) Chongqing Xinxiangxiangsheng Pharmaceutical Co., Ltd.; amino acid mixed standard US Sigma-Aldrich; other reagents are analytically pure.

BSA2202S electronic balance: Sartorius Scientific Instruments (Beijing) Co., Ltd.; FE22-Standard pH meter METTLER TOLEDO International Trade (Shanghai) Co., Ltd.; AMG199AM3-200 meat grinder: Zhongshan Opel Electric Co., Ltd.; DKZ-3B electric heating constant temperature oscillating tank Shanghai Yiheng Scientific Instrument Co., Ltd.; 3K15 desktop high-speed refrigerated centrifuge Sigma Germany; L8900 automatic amino acid analyzer Hitachi, Japan.

2.2. Experimental method

2.2.1. Preparation of Chelydraserpentina meat enzymatic hydrolysates. Refer to Li Guorong [11] et al.'s method to adjust slightly. After the frozen Chelydraserpentina’s meat is dissolved at room temperature, weigh about 50 g, add 5 times of distilled water, quickly beaten, adjust the pH of the slurry to 8.0, add 1% of the total weight of the alkaline alkaline protease, stir well, and place in a shaker. The enzyme was hydrolyzed at 60°C for 3 hours, boiled for 20 min to kill the enzyme, and the supernatant was obtained by centrifugation at 8 000 r / min for 20 min at 4°C.

2.2.2. Determination of amino acid. The composition and content of total amino acids and free amino acids were determined according to "GB 5009.124-2016 National Food Safety Standard Determination of Amino Acids in Foods" using L8900 automatic amino acid analyzer.

2.2.3. Sensory evaluation of enzymatic hydrolysates. The sensory evaluation of the enzymatic hydrolysates was carried out using sensory score and sensory description. The sensory evaluation team consisted of 10 trained college students (6 women and 4 men). Sensory evaluation is performed in the sensory laboratory, and the score table is shown in Table 1 [12].
Table 1. Sensory scoring criteria of enzymatic hydrolysates

| Scoring index                  | Scoring standard                                                                 | Score |
|-------------------------------|-----------------------------------------------------------------------------------|-------|
| Organization form (30 points) | The solution is clear, no impurities, no suspended matter, the color is light yellow or yellow | 20–30 |
|                               | The solution is clear, no impurities, a little suspended matter, the color is yellow or dark yellow | 10–20 |
|                               | The solution is turbid, with impurities and suspended matter, the color is dark yellow | 0–10  |
| Taste (40 points)             | Outstanding umami taste, soft taste, no bitterness, no astringency                 | 30–40 |
|                               | Fair taste, weak bitterness, no astringency                                       | 20–30 |
|                               | Fair taste, strong bitterness, weak astringency                                   | 10–20 |
|                               | Weak umami, stronger bitterness, stronger astringency                             | 0–10  |
| Flavor (30 points)            | Rare delicacy, fishy                                                              | 10–20 |
|                               | Rare delicacy, strong fishy                                                       | 0–10  |

2.2.4. Amino acid analysis. Total amino acid analysis: statistics of total amino acid content and essential amino acid content [13-14]. Analysis of free amino acids: statistics of the content of free amino acids and taste amino acids [15]. Analysis of amino acid taste characteristics: statistics of umami, sweet, bitter and tasteless amino acid content. Taste Activity Value (TAV) of free amino acids is the ratio of the content of each free amino acid to its threshold [16].

2.3. Data processing

All determinations were repeated 3 times and the average value was taken.

3. Results and analysis

3.1. Sensory evaluation of enzymatic hydrolysates of different parts of Chelydrasperpentina

Table 2. Sensory evaluation of enzymatic hydrolysates of different parts of Chelydrasperpentina

| Types of enzymatic hydrolysates | Sensory description                                                                 | Comprehensive score |
|---------------------------------|------------------------------------------------------------------------------------|---------------------|
| the hydrolysate of back meat    | The solution is turbid, umami taste, strong fishy smell.                            | 60                  |
| the hydrolysate of leg meat     | The solution was clear, with a weak umami taste, a strong bitter taste, and a slight fishy smell. | 67                  |
| the hydrolysate of neck meat    | The solution is clear, the color is light yellow, strong umami, no bitterness, no fishy smell. | 90                  |
| the hydrolysate of tail meat    | The solution is clear, the color is light yellow, the umami taste is general, and the fishy smell is light. | 71                  |

Table 2 shows that the sensory scores of the enzymatic hydrolysates of different parts of Chelydrasperpentina are quite different. The neck meat enzymatic hydrolysates has the best sensory quality, with a comprehensive score of 90. The enzymatic hydrolysate showed clear solution, light yellow color, strong umami taste, no bitter taste and no fishy smell. Backous meat enzymatic hydrolysates has the worst sensory quality and has a strong smell. The source of sensory differences may come from differences in the composition of meat in different parts. For example, there is a big difference in the content of fishy volatile components such as myristyl alcohol and hexanal contained in Chinese soft-shelled turtle leg meat and skirt, which will inevitably cause differences in the flavor of their meat and processed products [17].
3.2. Amino acid composition and nutrient evaluation of meat digestion solution in different parts of *Chelydrasperpentina*

Table 3 shows that the enzymatic hydrolysates of *Chelydrasperpentina* back, legs, neck and tail contains 16 kinds of amino acids, but the contents are different. The amino acid content in the back digestion solution ranges from 702.4 μg/g to 3875.7 μg/g, and the content of 11 kinds of amino acids is greater than 1000 μg/g. The highest amino acid content is glutamic acid (3875.7 μg/g), followed by lysine (2261.3 μg/g) and aspartic acid (2355.6 μg/g). The content of methionine is the lowest at 702.1 μg/g. The content of amino acids in the digestion liquid of leg meat is between 837.0 μg/g~4559.2 μg/g, and the content of 13 kinds of amino acids is more than 1000 μg/g. The highest amino acid content is glutamic acid (4559.2 μg/g), followed by aspartic acid (2816.7 μg/g) and lysine (2677.3 μg/g). The content of methionine is the lowest, 837.0 μg/g. The content of amino acids in the enzymatic hydrolysates of neck meat is between 796.9 μg/g~4296.6 μg/g, and the content of 13 kinds of amino acids is more than 1000 μg/g. The highest amino acid content is glutamic acid (4296.6 μg/g), followed by aspartic acid (2686.2 μg/g) and lysine (2530.0 μg/g). The content of tyrosine is the lowest, 796.9 μg/g. The amino acid content in the enzymatic hydrolysates of tail meat ranges from 748.4 μg/g to 4174.8 μg/g, and the content of 13 kinds of amino acids is more than 1000 μg/g. The highest amino acid content is glutamic acid (4174.8 μg/g), followed by aspartic acid (2601.5 μg/g) and lysine (2384.3 μg/g). The content of methionine was the lowest at 748.4 μg/g.

The total amount of amino acids in the enzymatic hydrolysates of the four parts of the *Chelydrasperpentina* is the highest in the enzymatic hydrolysates of the leg meat, with a total amount of 28254.6 μg/g; the enzymatic hydrolysates of the tail meat and neck meat is the second, and the total amount of amino acids is 26576.9 μg/g and 26183.0 μg/g respectively; the back meat digestion solution is the lowest, with a total of 23452.4 μg/g amino acids. Essential amino acids are conducive to human body absorption and utilization. The higher the content, the higher the nutritional value. *Chelydrasperpentina* contain 7 kinds of essential amino acids in the 4 parts of the enzyme digestion solution. The content of essential amino acids in the digestion solution of back meat is the highest, its content is 11031.7 μg/g; the digestion solution of neck meat is the second, 10491.4 μg/g. The percentages of amino acids in the enzymatic hydrolysates of *Chelydrasperpentina* back, legs, neck and tail were 40.21%, 39.08%, 40.07% and 37.47% respectively.

Table 3. The total amino acid composition of the enzymatic hydrolysates of different parts of *Chelydrasperpentina*

| Type of amino acid | the hydrolysate of back meat | the hydrolysate of leg meat | the hydrolysate of neck meat | the hydrolysate of tail meat |
|-------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                   | Content (μg/g) | Percentage (%) | Content (μg/g) | Percentage (%) | Content (μg/g) | percentage (%) | Content (μg/g) | Percentage (%) |
| Asp               | 2355.6±4.5    | 10.04          | 2816.7±4.2    | 9.97           | 2686.2±2.8    | 10.26          | 2601.5±4.6    | 9.80          |
| Glu               | 3875.7±5.4    | 16.52          | 4559.2±6.9    | 16.14          | 4296.6±0.3    | 16.41          | 4174.8±7.7    | 15.72          |
| Lysa              | 2261.3±3.5    | 9.64           | 2677.3±3.4    | 9.48           | 2530.0±2.8    | 9.66           | 2384.3±4.0    | 8.98           |
| Thr               | 1215.1±5.1    | 5.18           | 1429.5±1.5    | 5.06           | 1345.7±1.5    | 5.14           | 1319.0±10.7   | 4.97           |
| Ser               | 1182.7±1.2    | 5.04           | 1424.2±1.6    | 5.04           | 1315.5±1.0    | 5.02           | 1369.4±2.8    | 5.16           |
| Pro               | 893.0±0.1     | 3.81           | 1189.9±1.8    | 4.21           | 1001.5±0.2    | 3.82           | 1273.0±1.8    | 4.79           |
| Gly               | 1309.5±4.9    | 5.58           | 1827.2±2.1    | 6.47           | 1574.7±0.5    | 6.01           | 2071.2±0.6    | 7.80           |
| Ala               | 1415.1±2.1    | 6.03           | 1764.9±4.4    | 6.25           | 1593.9±0.1    | 6.09           | 1714.2±9.9    | 6.46           |
| His               | 829.1±0.8     | 3.53           | 969.4±1.6     | 3.43           | 891.8±0.2     | 3.41           | 873.6±1.8     | 3.29           |
| Valb              | 1224.8±12.9   | 5.22           | 1392.5±2.1    | 4.93           | 1304.5±0.7    | 4.98           | 1257.8±1.8    | 4.74           |
| Metb              | 702.1±0.5     | 2.99           | 837.0±2.8     | 2.96           | 802.9±3.1     | 3.07           | 748.0±0.8     | 2.82           |
| Ile               | 1112.7±5.9    | 4.74           | 1288.7±26.3   | 4.56           | 1205.3±1.4    | 4.60           | 1143.2±9.4    | 4.31           |
| Leuc              | 1920.9±2.4    | 8.19           | 2255.9±2.8    | 7.99           | 2143.8±1.4    | 8.19           | 2031.9±3.0    | 7.65           |
| Arg               | 1438.2±0.9    | 6.13           | 1821.0±2.1    | 6.45           | 1534.7±1.7    | 5.86           | 1758.6±4.2    | 6.62           |
| Tyr               | 726.0±0.5     | 3.09           | 837.8±2.0     | 2.97           | 796.9±0.6     | 3.04           | 766.7±1.4     | 2.89           |
| Pheb              | 996.4±0.9     | 4.25           | 1160.4±0.4    | 4.11           | 1161.0±1.5    | 4.43           | 1066.4±1.2    | 4.02           |
| TAA               | 23452.4       | 100%           | 28254.6       | 100%           | 26183.0       | 100%           | 26576.9       | 100%           |
| EAA               | 9421.5        | 40.21%         | 11031.7       | 39.08%         | 10491.4       | 40.07%         | 9953.0        | 37.47%         |

Note: # essential amino acid.
3.3. Analysis of composition and taste of free amino acids in the enzymatic hydrolysates of different parts of Chelydraserpentina

3.3.1. Analysis of the composition of free amino acids in the enzymatic hydrolysates of different parts of Chelydraserpentina. Table 4 shows that the four parts of the Chelydraserpentina meat digestion solution contain 16 free amino acids. The content of free amino acids in the back digestion solution ranges from 21.5 μg/g to 898.7 μg/g, and all 16 free amino acids are less than 1000 μg/g. The highest amino acid content is phenylalanine (898.7 μg/g), followed by glutamic acid (391.7 μg/g) and leucine (338.9 μg/g). The content of proline is the lowest at 21.5 μg/g. The content of free amino acids in the digestion liquid of leg meat is between 28.0 μg/g to 865.6 μg/g, and all 16 free amino acids are less than 1000 μg/g. The highest amino acid content is phenylalanine (865.6 μg/g), followed by glutamic acid (323.2 μg/g) and tyrosine (312.0 μg/g). The content of proline is the lowest at 28.0 μg/g. The content of free amino acids in the enzymatic hydrolysate of neck meat ranges from 26.0 μg/g to 992.6 μg/g, and all 16 free amino acids are less than 1000 μg/g. The highest amino acid content is phenylalanine (992.6 μg/g), followed by glutamic acid (441.6 μg/g) and leucine (379.0 μg/g). The content of proline is the lowest at 26.0 μg/g. The content of free amino acids in the enzymatic hydrolysate of neck meat ranges from 26.0 μg/g to 992.6 μg/g, and all 16 free amino acids are less than 1000 μg/g. The highest amino acid content is phenylalanine (992.6 μg/g), followed by glutamic acid (441.6 μg/g) and leucine (379.0 μg/g). The content of proline is the lowest at 26.0 μg/g. The content of free amino acids in the enzymatic hydrolysates of tail meat ranges from 32.0 μg/g to 904.0 μg/g, and all 16 free amino acids are less than 1000 μg/g. The highest amino acid content is phenylalanine (904.0 μg/g), followed by glutamic acid (339.3 μg/g) and tyrosine (333.3 μg/g). The content of proline is the lowest at 32.0 μg/g. The amino acid with the highest percentage of free amino acids in the four parts of the Chelydraserpentina meat digestion solution is phenylalanine. The highest total free amino acids in the four parts of the meat digestion solution were the neck meat digestion solution (3984.5 μg/g) and the lowest were the leg meat digestion solution (3202.8 μg/g).

| Type of amino acid | The hydrolysate of back meat | The hydrolysate of leg meat | The hydrolysate of neck meat | The hydrolysate of tail meat |
|------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
|                  | Content (μg/g) | Percentage (%) | Content (μg/g) | Percentage (%) | Content (μg/g) | Percentage (%) | Content (μg/g) | Percentage (%) |
| Asp              | 71.4±0.0       | 1.90            | 48.3±0.1       | 1.51            | 107.2±0.0       | 2.69            | 44.3±0.1       | 1.24            |
| Glu              | 391.7±0.1      | 10.45           | 323.2±0.1      | 10.09           | 441.6±0.1       | 11.08           | 339.3±0.0      | 9.53            |
| Lys              | 173.3±0.1      | 4.62            | 122.6±0.0      | 3.83            | 179.8±0.0       | 4.51            | 148.4±0.0      | 4.17            |
| Thr              | 131.8±0.1      | 3.51            | 107.4±0.1      | 3.35            | 132.0±0.0       | 3.31            | 107.2±0.1      | 3.01            |
| Ser              | 143.3±0.1      | 3.82            | 117.3±0.0      | 3.66            | 142.7±0.0       | 3.58            | 130.8±0.0      | 3.67            |
| Pro              | 21.5±0.7       | 0.57            | 28.0±0.0       | 0.87            | 26.0±0.0        | 0.65            | 32.0±0.0       | 0.90            |
| Gly              | 95.6±0.1       | 2.55            | 97.7±0.0       | 2.91            | 96.8±0.1        | 2.43            | 110.5±0.0      | 3.10            |
| Ala              | 265.4±0.1      | 7.08            | 231.0±0.1      | 7.21            | 270.5±0.0       | 7.69            | 256.9±0.0      | 7.21            |
| His              | 187.6±0.1      | 5.00            | 193.9±0.1      | 6.05            | 137.6±0.0       | 3.45            | 177.0±0.0      | 4.97            |
| Val              | 260.6±0.1      | 6.95            | 109.5±0.1      | 3.42            | 260.9±0.1       | 6.55            | 270.8±0.0      | 7.60            |
| Met              | 169.7±0.1      | 4.53            | 145.0±0.0      | 4.53            | 185.5±0.0       | 4.66            | 150.9±0.0      | 4.24            |
| Ile              | 48.9±0.0       | 1.30            | 42.4±0.1       | 1.32            | 53.1±0.0        | 1.33            | 53.6±0.0       | 1.51            |
| Leu              | 338.9±0.1      | 9.04            | 243.0±0.1      | 7.59            | 379.0±0.1       | 9.51            | 252.8±0.0      | 7.10            |
| Arg              | 221.7±0.1      | 6.03            | 216.4±0.1      | 6.75            | 230.1±0.1       | 5.77            | 248.9±0.0      | 6.99            |
| Tyr              | 328.9±0.1      | 8.77            | 312.0±0.1      | 9.74            | 349.3±0.0       | 8.77            | 333.3±0.1      | 9.36            |
| Phe              | 898.7±0.4      | 23.97           | 865.6±0.3      | 27.02           | 992.6±0.1       | 24.91           | 904.0±0.2      | 25.38           |
| FAA              | 3748.6         | 100%            | 3202.8         | 100%            | 3984.5          | 100%            | 3560.5         | 100%            |

3.3.2. Analysis of taste characteristics of free amino acids in enzymatic hydrolysates of Chelydraserpentina meat. The taste characteristics of free amino acids are divided into umami, sweet, bitter and tasteless. Unscented amino acids are generally considered to be aromatic amino acids. Table 4 shows that the meat digestion solution of 4 parts of Chelydraserpentina contains 3 kinds of umami amino acids (aspartic acid, glutamic acid and lysine) and 6 kinds of sweet amino acids (threonine, serine, proline acid, glycine, alanine and histidine), 5 bitter amino acids (valine, methionine, isoleucine, leucine, alanine and histidine).
and arginine) and 2 aromatic amino acids (tyrosine and phenylalanine). As can be seen from Figure 1, the highest content of umami, bitter and aromatic amino acids in the four parts of the meat digestion solution is the neck meat digestion solution, and the sweetest amino acid content is the back meat digestion solution.

![Figure 1: The content of tasted amino acids in the free amino acids of different parts of the Chelydraserpentina](attachment:image)

The taste threshold of free amino acids has an important influence on the taste of the enzymatic hydrolysis solution. When TAV>1, it indicates that this free amino acid has an important contribution to the taste of the enzymatic hydrolysates, and the larger the value, the greater the contribution [18]. Table 5 shows that the number of free amino acids with TAV>1 in the enzymatic hydrolysates of Chelydraserpentina back, legs, tail and neck is small. The free amino acids with TAV>1 in the enzymatic hydrolysates of back, neck and tail meat are only glutamic acid and phenylalanine. The free amino acids with TAV>1 in the digestion solution of leg meat include glutamic acid, histidine and phenylalanine. Glutamic acid has a umami taste, histidine has a sweet taste, and phenylalanine has no taste. It shows that glutamic acid and histidine have a certain contribution to the good taste of the enzymatic hydrolysates.

Table 5. TAV of free amino acids in different parts of Chelydraserpentina meat

| Type of AA | Taste characteristics | TAV [19] (μg/g) | The hydrolysate of back meat | The hydrolysate of leg meat | The hydrolysate of neck meat | The hydrolysate of tail meat |
|------------|-----------------------|----------------|-----------------------------|-----------------------------|----------------------------|----------------------------|
| Asp        | Umami                 | 1000.0         | 0.1                         | 0.0                         | 0.1                        | 0.0                        |
| Glu        |                       | 300.0          | 1.3                         | 1.1                         | 1.5                        | 1.1                        |
| Lys        |                       | 500.0          | 0.7                         | 0.3                         | 0.4                        | 0.3                        |
| Thr        |                       | 2600.0         | 0.1                         | 0.0                         | 0.1                        | 0.1                        |
| Ser        | Sweet                 | 1500.0         | 0.1                         | 0.1                         | 0.1                        | 0.1                        |
| Pro        |                       | 3000.0         | 0.0                         | 0.0                         | 0.0                        | 0.0                        |
| Gly        |                       | 1200.0         | 1.0                         | 1.0                         | 1.0                        | 1.0                        |
| Ala        |                       | 400.0          | 0.3                         | 0.4                         | 0.4                        | 0.4                        |
| His        |                       | 200.0          | 0.9                         | 1.0                         | 0.7                        | 0.9                        |
| Val        |                       | 400.0          | 0.7                         | 0.3                         | 0.7                        | 0.7                        |
| Met        | Bitter                | 300.0          | 0.6                         | 0.5                         | 0.6                        | 0.5                        |
| Ile        |                       | 900.0          | 0.1                         | 0.0                         | 0.1                        | 0.1                        |
| Leu        |                       | 1900.0         | 0.2                         | 0.2                         | 0.1                        | 0.1                        |
| Arg        |                       | 500.0          | 0.4                         | 0.4                         | 0.5                        | 0.5                        |
| Tyr        | Aromatic              | 2600.0         | 0.13                        | 0.1                         | 0.1                        | 0.1                        |
| Phe        |                       | 900.0          | 1.00                        | 1.0                         | 1.1                        | 1.0                        |
4. Conclusion
The sensory scores of the enzymatic hydrolysates of different parts of *Chelydraserpentina* are quite different. The neck meat enzymatic hydrolysates has the best sensory quality, with a comprehensive score of 90. Backous meat enzymatic hydrolysates has the worst sensory quality and has a strong smell. The total amino acid content and the total amount of essential amino acids were the highest in the digestion solution of leg meat. The highest content of free amino acids in the meat digestion solution of the back, legs, neck and tail was glutamic acid, the contents were 3875.7 μg/g, 4559.2 μg/g, 4296.6 μg/g and 4174.8 μg/g, respectively. The total amount of free amino acids in the enzymatic hydrolysates of neck meat was the highest (3984.5 μg/g). The highest content of umami, bitter and aromatic amino acids in the four parts of the meat digestion solution is the neck meat digestion solution, and the sweetest amino acid content is the back digestion solution. The free amino acids with TAV>1 in the enzymatic hydrolysates of back, neck and tail meat are only glutamic acid and phenylalanine. The free amino acids with TAV>1 in the digestion solution of leg meat include glutamic acid, histidine and phenylalanine. Based on the above analysis, *Chelydraserpentina* neck meat is the most suitable for enzymatic hydrolysis to obtain an enzymatic hydrolysates with good sensory quality and nutritional value.

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