

## Product introduction

### Edible dried mealworms



1. It's a kind of high quality and high protein food. Mealworm larvae contain more than 50% crude protein and are rich in 18 essential amino acids, known as the "king of protein" among insects.

2. It's a kind of nutritious green food. Mealworm is not only rich in high protein, but also contains macro-mineral elements such as calcium, potassium, sodium and magnesium , as well as trace mineral elements such as iron, zinc, copper, manganese, cobalt, chromium, selenium, boron and iodine. Most importantly, this product integrates "animal protein, vegetable oil and chitin", truly achieving a "reasonable diet and balanced nutrition.

3. The fat of mealworm is rich in unsaturated fatty acids, which can improve the anti-wrinkle function of the skin. Its anti-aging, anti-wrinkle, whitening, and beauty effects are also better than existing products on the market.

4. The unique chitin and antibacterial peptides in mealworm have multiple

functions, such as reducing blood pressure ,improving immunity, activating cells, lowering blood lipids, regulating blood glucose and regulating the body environment and so on .

5.Yellow mealworm has nutritional and health-care functions of promoting growth, educational,anti-fatigue and anti- tissue hypoxia.

6. Yellow mealworm can assist in the treatment of myelodysplastic anemia, secondary anemia, thrombocytopenia. It can increase the remission rate of leukemia and prolong the survival period.

7.In the treatment of tumor and the use of chemotherapy drugs, eating yellow mealworms can improve the immune function of the body, reduce the toxic and side effects of chemotherapy drugs, and enhance the inhibitory effect on tumor.





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## Analytical Report

|                 |                    |             |             |
|-----------------|--------------------|-------------|-------------|
| Sample Code     | 128-2022-00000398  | Report date | 25-Aug-2022 |
| Certificate No. | AR-22-VV-002381-04 |             |             |

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Yunzhou Modern Agricultural Industry Demonstration

|                          |                                       |               |      |
|--------------------------|---------------------------------------|---------------|------|
| Our reference:           | 128-2022-00000398/ AR-22-VV-002381-04 |               |      |
| Client Sample Code:      | 20211227-1                            |               |      |
| Sample described as:     | Dried Tenebrio molitor                |               |      |
| Sample Packaging:        | Sealed plastic bag                    |               |      |
| Sample reception date:   | 04-Jan-2022                           |               |      |
| Analysis Starting Date:  | 04-Jan-2022                           |               |      |
| Analysis Ending Date:    | 14-Jan-2022                           |               |      |
| Arrival Temperature (°C) | 19.2                                  | Sample Weight | 935g |
| Sample Type              | Solid                                 |               |      |

|                                                                                      | Results      | Unit     | LOQ   | LOD |
|--------------------------------------------------------------------------------------|--------------|----------|-------|-----|
| △ VV001 Aerobic plate count Method: GB 4789.2-2016                                   |              |          |       |     |
| Aerobic plate count                                                                  | 60           | cfu/g    |       |     |
| △ VV003 Coliforms Method: GB 4789.3-2016 First Method                                |              |          |       |     |
| Coliforms                                                                            | <3.0         | MPN/g    |       |     |
| △ VV004 Yeasts and moulds Method: GB 4789.15-2016 First method                       |              |          |       |     |
| Moulds                                                                               | <10          | cfu/g    |       |     |
| △ VV006 Salmonella Method: GB 4789.4-2016                                            |              |          |       |     |
| Salmonella                                                                           | Not Detected | /25 g    |       |     |
| △ VV00W Staphylococcus aureus Method: GB 4789.10-2016 First Method                   |              |          |       |     |
| Staphylococcus aureus                                                                | Not Detected | /25 g    |       |     |
|                                                                                      | Results      | Unit     | LOQ   | LOD |
| ☆ SU087 Phosphorus (ICP-OES) Method: GB 5009.268-2016 Second Method                  |              |          |       |     |
| Phosphorus                                                                           | 7820         | mg/kg    | 3     |     |
| △ VV1TY Sodium(Na)(F-AAS) Method: GB 5009.91-2017 1st Method                         |              |          |       |     |
| Sodium (Na)                                                                          | 155          | mg/100 g | 3     |     |
| △ VV1TZ Chromium(Cr)(GF-AAS) Method: GB 5009.123-2014                                |              |          |       |     |
| Chromium (Cr)                                                                        | 0.035        | mg/kg    | 0.03  |     |
| △ VV1TL Total Mercury(Hg)(HG-AFS) Method: GB 5009.17-2021 First chapter first method |              |          |       |     |
| Total Mercury(Hg)                                                                    | <0.01        | mg/kg    | 0.01  |     |
| △ VV1TJ Total Arsenic(As)(HG-AFS) Method: GB 5009.11-2014 Chapter one, Second method |              |          |       |     |
| Total Arsenic(As)                                                                    | 0.093        | mg/kg    | 0.04  |     |
| △ VV1TG Lead (Pb) (GF-AAS) Method: GB 5009.12-2017 First method                      |              |          |       |     |
| Lead (Pb)                                                                            | <0.04        | mg/kg    | 0.04  |     |
| △ VV1TN Cadmium(Cd)(GF-AAS) Method: GB 5009.15-2014                                  |              |          |       |     |
| Cadmium (Cd)                                                                         | 0.048        | mg/kg    | 0.003 |     |
|                                                                                      | Results      | Unit     | LOQ   | LOD |
| △ VV156 Carbohydrates Method: GB 28050-2011                                          |              |          |       |     |
| Total carbohydrates                                                                  | 10.7         | g/100 g  |       |     |
| △ VV151 Total fat Method: GB 5009.6-2016 Second method                               |              |          |       |     |
| Total fat                                                                            | 30.0         | g/100 g  | 0.1   |     |

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|                                                                                     |                                                                     | Results | Unit       | LOQ   | LOD |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------|---------|------------|-------|-----|
| △ VV155                                                                             | Energy(Mainland) Method: GB 28050-2011                              |         |            |       |     |
|                                                                                     | Energy kcal (calculated)                                            | 528     | kcal/100 g |       |     |
|                                                                                     | Energy kJ (calculated)                                              | 2208    | kJ/100 g   |       |     |
| △ VV134                                                                             | Moisture (Direct drying method) Method: GB 5009.3-2016 First method |         |            |       |     |
|                                                                                     | Moisture                                                            | 1.76    | g/100 g    | 0.1   |     |
| △ VV14W                                                                             | Ash Method: GB 5009.4-2016 First method                             |         |            |       |     |
|                                                                                     | Ash                                                                 | 3.6     | g/100 g    | 0.01  |     |
| △ VV14Y                                                                             | Protein Method: GB 5009.5-2016 First method                         |         |            |       |     |
|                                                                                     | Protein                                                             | 53.9    | g/100 g    | 0.5   |     |
|                                                                                     | Protein Factor                                                      | 6.25    |            |       |     |
| ☆ SU22H                                                                             | Total sugar Method: GB 5009.8-2016 Second method                    |         |            |       |     |
|                                                                                     | Total sugars                                                        | <0.25   | g/100 g    | 0.25  |     |
| ☆ SU23E                                                                             | Fatty acid profile Method: GB 5009.168-2016 Third Method            |         |            |       |     |
|                                                                                     | saturated fatty acids total                                         | 7.19    | %          | 0.1   |     |
|                                                                                     | total of trans fatty acids                                          | <0.1    | %          | 0.1   |     |
| ☆ SU573                                                                             | Amino acid Method: GB 5009.124-2016                                 |         |            |       |     |
|                                                                                     | Aspartic acid (Asp)                                                 | 4.51    | g/100 g    | 0.005 |     |
|                                                                                     | Threonine (Thr)                                                     | 2.37    | g/100 g    | 0.005 |     |
|                                                                                     | Serine (Ser)                                                        | 2.86    | g/100 g    | 0.005 |     |
|                                                                                     | Glutamic Acid (Glu)                                                 | 8.37    | g/100 g    | 0.005 |     |
|                                                                                     | Glycine (Gly)                                                       | 3.01    | g/100 g    | 0.005 |     |
|                                                                                     | Alanine (Ala)                                                       | 3.94    | g/100 g    | 0.005 |     |
|                                                                                     | Valine (Val)                                                        | 3.27    | g/100 g    | 0.005 |     |
|                                                                                     | Methionine (Met)                                                    | 1.08    | g/100 g    | 0.005 |     |
|                                                                                     | Isoleucine (Ile)                                                    | 2.85    | g/100 g    | 0.005 |     |
|                                                                                     | Leucine (Leu)                                                       | 5.16    | g/100 g    | 0.005 |     |
|                                                                                     | Tyrosine (Tyr)                                                      | 3.30    | g/100 g    | 0.005 |     |
|                                                                                     | Phenylalanine (Phe)                                                 | 1.83    | g/100 g    | 0.005 |     |
|                                                                                     | Lysine (Lys)                                                        | 3.08    | g/100 g    | 0.005 |     |
|                                                                                     | Histidine (His)                                                     | 1.55    | g/100 g    | 0.005 |     |
|                                                                                     | Arginine (Arg)                                                      | 2.70    | g/100 g    | 0.005 |     |
|                                                                                     | Proline (Pro)                                                       | 3.50    | g/100 g    | 0.05  |     |
|                                                                                     | Total Amino acids                                                   | 53.3    | g/100 g    |       |     |
| △ VV661                                                                             | Crude Fiber Method: GB/T 5515-2008                                  |         |            |       |     |
|                                                                                     | Crude Fiber                                                         | 6.4     | %          |       |     |
| ☆ SU59X                                                                             | Tryptophan Method: GB/T 15400-2018                                  |         |            |       |     |
|                                                                                     | Tryptophan                                                          | 0.643   | %          | 0.2   |     |
| <b>Revision Notes</b>                                                               |                                                                     |         |            |       |     |
| Modifies client information                                                         |                                                                     |         |            |       |     |
| <b>SIGNATURE</b>                                                                    |                                                                     |         |            |       |     |
|  |                                                                     |         |            |       |     |
| Kevin Fu                                                                            |                                                                     |         |            |       |     |
| Authorized Signatory                                                                |                                                                     |         |            |       |     |



## Comparison of elements between dried mealworm and different food ingredients

(Except for those related to mealworms, the data sources are from the 6th Edition, Volumes 1 and 2 of *Chinese Food Composition Tables*)

| Comparison of Ingredients (per 100g edible portion) |                             |       |      |          |          |      |      |      |         |      |         |       |                  |      |       |
|-----------------------------------------------------|-----------------------------|-------|------|----------|----------|------|------|------|---------|------|---------|-------|------------------|------|-------|
| Ingredient<br>Nutrition Content                     | Edible<br>Dried<br>Mealworm | Wheat | Rice | Cabbages | Tomatoes | Pork | Beef | Lamb | Chicken | Fish | Shrimps | Crabs | Sea<br>cucumbers | Milk | Eggs  |
| Moisture (g)                                        | 5.76                        | 10    | 13.3 | 94.4     | 95.6     | 54.9 | 69.8 | 72.5 | 70.5    | 78.8 | 77.6    | 69.3  | 77.1             | 87.6 | 75.2  |
| Protein (g)                                         | 53.9                        | 11.9  | 7.9  | 1.6      | 0.6      | 15.1 | 20   | 18.5 | 20.3    | 17.6 | 18.9    | 21    | 16.5             | 3.3  | 13.1  |
| Total fat (g)                                       | 30                          | 1.3   | 0.9  | 0.2      | 0.1      | 30.1 | 8.7  | 6.5  | 6.7     | 4.2  | 1.1     | 7.7   | 0.2              | 3.6  | 8.6   |
| Carbohydrates (g)                                   | 10.7                        | 75.2  | 77.2 | 3.4      | 3.2      | 0    | 0.5  | 1.6  | 0.9     | 0    | 1       | 0.6   | 2.5              | 4.9  | 2.4   |
| DF(dietary fiber) (g)                               | 5.36                        | 10.8  | 0.6  | 0.9      | 0.8      | 0    | 0    | 0    | 0       | 0    | 0       | 0     | 0                | 0    | 0     |
| Ca(Calcium)(mg)                                     | 47.6                        | 34    | 8    | 57       | 15       | 6    | 5    | 16   | 13      | 431  | 21      | 15    | 285              | 107  | 56    |
| K(Potassium)(mg)                                    | 1260                        | 289   | 112  | 134      | 163      | 218  | 212  | 300  | 249     | 361  | 257     | 224   | 43               | 180  | 154   |
| Na (Sodium)(mg)                                     | 197                         | 6.8   | 1.8  | 69       | 8.3      | 56.8 | 64.1 | 89.9 | 62.8    | 246  | 190     | 188   | 503              | 63.7 | 131.5 |
| Mg(Magnesium)(mg)                                   | 327                         | 4     | 31   | 12       | 9        | 16   | 22   | 23   | 22      | 30   | 22      | 4     | 149              | 11   | 10    |
| Se(Selenium) (μg)                                   | 15                          | 4     | 2    | 0.57     | 0.12     | 7.9  | 3.15 | 5.95 | 11.92   | 26.6 | 39.4    | 0.1   | 64               | 1.34 | 13.96 |
| Zn(Zinc)(mg)                                        | 16.9                        | 2.33  | 1.54 | 0.46     | 0.14     | 1.78 | 4.7  | 3.52 | 1.46    | 2.2  | 2.8     | 3.4   | 0.6              | 0.28 | 0.89  |
| Cu(Copper)(mg)                                      | 2.67                        | 0.43  | 0.25 | 0.06     | 0.45     | 0.12 | 0.05 | 0.13 | 0.09    | 0.07 | 0.5     | —     | 0.1              | 0.01 | 0.19  |
| Mn(Manganese)(mg)                                   | 1.6                         | 3.1   | 1.13 | 0.19     | 0.06     | 0.03 | 0.03 | 0.06 | 0.05    | 0.09 | Tr      | 2.1   | 0.8              | 0.01 | 0.03  |
| Fe(Iron)(mg)                                        | 28.5                        | 5.1   | 1.1  | 0.8      | 0.4      | 1.3  | 1.8  | 3.9  | 1.8     | 1.1  | 1.3     | 3.2   | 13.2             | 0.3  | 1.6   |

| Amino Acid Comparison of Ingredients (per 100g edible portion) |                             |       |      |          |          |      |      |      |         |      |         |       |                  |               |      |
|----------------------------------------------------------------|-----------------------------|-------|------|----------|----------|------|------|------|---------|------|---------|-------|------------------|---------------|------|
| Ingredient<br>amino acid                                       | Edible<br>Dried<br>Mealworm | Wheat | Rice | Cabbages | Tomatoes | Pork | Beef | Lamb | Chicken | Fish | Shrimps | Crabs | Sea<br>cucumbers | Cubillo<br>se | Eggs |
| Isoleucine (mg)                                                | 2850                        | 402   | 319  | 36       | 13       | 632  | 850  | 835  | 866     | 660  | 860     | 912   | 183              | 1602          | 146  |
| Leucine (mg)                                                   | 5160                        | 837   | 611  | 55       | 20       | 1221 | 1563 | 1541 | 1620    | 1220 | 1509    | 1620  | 271              | 3778          | 291  |
| Lysine (mg)                                                    | 3080                        | 271   | 260  | 51       | 23       | 1322 | 1722 | 1713 | 1760    | 1380 | 1745    | 1760  | 157              | 2070          | 230  |
| Methionine (mg)                                                | 1080                        | 174   | 162  | 12       | 6        | 347  | 248  | 389  | 428     | 530  | 569     | 178   | 63               | 418           | 70   |
| Cystine (mg)                                                   | 450                         | 286   | 170  | 20       | 11       | 207  | 265  | 257  | 291     | 180  | 243     | 675   | 46               | 1542          | 22   |
| Phenylalanine (mg)                                             | 1830                        | 611   | 421  | 44       | 20       | 611  | 789  | 755  | 706     | 580  | 837     | 978   | 162              | 3365          | 140  |
| Tyrosine (mg)                                                  | 3300                        | 335   | 302  | 26       | 14       | 595  | 671  | 693  | 648     | 560  | 753     | 900   | 165              | 3088          | 114  |
| Threonine (mg)                                                 | 2370                        | 337   | 262  | 41       | 20       | 704  | 893  | 932  | 882     | 730  | 772     | 978   | 323              | 3513          | 132  |
| Tryptophan (mg)                                                | 643                         | 123   | 124  | 11       | 5        | 125  | 125  | 143  | 206     | 100  | 258     | —     | 31               | 928           | 54   |
| Valine (mg)                                                    | 3270                        | 510   | 426  | 53       | 15       | 727  | 936  | 992  | 912     | 760  | 931     | 1006  | 245              | 3927          | 178  |
| Arginine (mg)                                                  | 2700                        | 451   | 570  | 57       | 18       | 1012 | 1262 | 1225 | 1350    | 920  | 2163    | 1926  | 617              | 3547          | 94   |
| Histidine (mg)                                                 | 1550                        | 234   | 161  | 20       | 12       | 563  | 692  | 556  | 583     | 300  | 460     | 572   | 114              | 2149          | 78   |
| Alanine (mg)                                                   | 3940                        | 391   | 420  | 66       | 17       | 914  | 1152 | 1248 | 1197    | 1020 | 1029    | 1356  | 480              | 1412          | 94   |
| Aspartic acid (mg)                                             | 4510                        | 529   | 650  | 105      | 84       | 1380 | 1725 | 1832 | 1845    | 1580 | 1905    | 2070  | 692              | 4840          | 229  |
| Glutamic acid (mg)                                             | 8370                        | 4074  | 1250 | 369      | 311      | 2280 | 2832 | 2974 | 3080    | 2360 | 3200    | 3134  | 963              | 3956          | 639  |
| Glycine (mg)                                                   | 3010                        | 460   | 305  | 40       | 14       | 776  | 988  | 1026 | 926     | 800  | 796     | 1145  | 1185             | 2123          | 54   |
| Proline (mg)                                                   | 3500                        | 1369  | 324  | 42       | 17       | 653  | 754  | 852  | 944     | 570  | 660     | 1084  | 606              | 3576          | 289  |
| Serine (mg)                                                    | 2860                        | 573   | 360  | 49       | 23       | 639  | 790  | 768  | 868     | 650  | 744     | 893   | 326              | 3780          | 166  |