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**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

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Aquatic feed - Part 11: Formula feed for loach

水产配合饲料 第11部分:泥鳅配合饲料

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1 Scope

The document defines the terms and definitions for formula feed for loach, gives the product classification, lays down the technical requirements, the inspection rules and the labelling, packaging, transport, storage and shelf life, and describes the matching sampling and test methods.

It applies to the production and use of formula feed for loach.

3 Terms and definitions

The terms and definitions of GB/T 10647 apply, together with the following.

3.1 Loach: the collective name for fish of the class Osteichthyes, order Cypriniformes, family Cobitidae, genus *Misgurnus* and genus *Paramisgurnus*. The note adds that the kinds commonly farmed are *Misgurnus anguillicaudatus* and *Paramisgurnus dabryanus*, the latter including the Taiwan loach.

4 Product classification

Products are divided by the growth stage of the loach into fry feed, fingerling feed and grow-out feed.

Table 1 gives the classification, pairing each of the three product classes with the feeding stage expressed as the body weight of the fish being fed, in grams per fish: below 2.5 g for fry feed, from 2.5 g up to but not including 10 g for fingerling feed, and 10 g and above for grow-out feed.

5 Technical requirements

5.1 Appearance and condition. The product is a powder, a crumble, or pellets even in size, uniform in colour and regular in shape. It is free of mould, caking, off-odour and insect infestation.

5.2 Processing quality. Table 2 sets the requirements, in percent, for four product forms: powdered feed, crumbled feed, pelleted feed and extruded pelleted feed. The four items are mixing uniformity expressed as the coefficient of variation CV, powder content, water stability expressed as the loss rate, and moisture. In the extraction several rows of the table carry fewer cells than there are product columns, because cells are merged across forms, so the values cannot be assigned to the product forms with certainty and are not reproduced here.

5.3 Physical and chemical requirements. Table 3 sets the requirements for the three product classes, fry feed, fingerling feed and grow-out feed. The items are crude protein, crude fat, crude fibre, crude ash, total phosphorus, lysine, the ratio of lysine to crude protein, all in percent, and malondialdehyde calculated on the crude fat contained in the feed, in mg/kg. Crude protein is bounded above and below by a range for each of the three classes; the other rows carry fewer cells than there are class columns because cells are merged, so those values are not assigned to classes here.

5.4 Hygiene requirements follow GB 13078.

6 Sampling

Sampling is carried out according to GB/T 14699.1.

7 Test methods

7.1 Appearance and condition: a suitable amount of sample is placed in a clean dry white porcelain tray and assessed by the senses under normal lighting, in a well ventilated place free of off-odours.

7.2 Mixing uniformity as the coefficient of variation: GB/T 5918.

7.3 Powder content: Annex A of NY/T 4128-2022.

7.4 Water stability as the loss rate: Annex C of NY/T 4128-2022, with a soaking time of 5 min for pelleted feed and 20 min for extruded feed.

7.5 Moisture: GB/T 6435 or GB/T 18868, GB/T 6435 being the arbitration method.

7.6 Crude protein: GB/T 6432 or GB/T 18868, GB/T 6432 being the arbitration method.

7.7 Crude fat: GB/T 6433 or GB/T 18868, GB/T 6433 being the arbitration method.

- 7.8 Crude fibre: GB/T 6434 or GB/T 18868, GB/T 6434 being the arbitration method.
- 7.9 Crude ash: GB/T 6438.
- 7.10 Total phosphorus: GB/T 6437.
- 7.11 Lysine: GB/T 18246.
- 7.12 Ratio of lysine to crude protein: Annex C of SC/T 1074-2022.
- 7.13 Malondialdehyde calculated on the crude fat contained in the feed: Annex A of the document.
- 7.14 Hygiene items: GB 13078.

8 Inspection rules

- 8.1 Lot: products of one specification made from the same raw materials, to the same production formula, by the same process and under the same production conditions, produced continuously or in one shift, form one lot; a lot does not exceed 120 t.
- 8.2 Delivery inspection covers appearance and condition, moisture and crude protein.
- 8.3 Type inspection covers all the items of Clause 5. Under normal production it is carried out at least once every six months. It is also carried out when the product goes into production after being finalized; when the process, the formula or the source of a main raw material changes materially in a way that may affect quality; when production resumes after a stoppage of three months or more; when a delivery inspection result differs materially from the last type inspection result; and when the feed administration authority calls for it.
- 8.4.1 Where every item inspected passes, the lot passes.
- 8.4.2 Where any item fails, a doubled sample is drawn afresh from the same lot for re-inspection; if any item still fails, the lot fails. Microbiological items are not re-inspected.
- 8.4.3 Limit values are judged by the rounded value comparison method of GB/T 8170.
- 8.4.4 Permitted errors in judging results for moisture, the physical and chemical items and the hygiene items follow GB/T 18823, except for items GB/T 18823 does not cover.
- 8.4.5 Permitted errors in judging results for powder content and water stability follow Annexes A and C of NY/T 4128-2022, and for malondialdehyde Annex A of the document.

9 Labelling, packaging, transport, storage and shelf life

- 9.1 Labelling follows GB 10648.
- 9.2 Packaging materials are clean and hygienic, non-toxic and free of contamination, and resist damp, leakage and tearing.

9.3 Transport vehicles are clean and hygienic; the feed is not loaded or carried together with toxic or harmful goods, and is protected from sun, rain and damage in transit.

9.4 The product is stored in a ventilated dry place, protected from rodents and insects, and not stored together with toxic or harmful goods.

9.5 For unopened packages kept under the packaging, transport and storage conditions above, the shelf life is the one declared on the label.

A Annex A (normative) Determination of malondialdehyde

A.1 Principle: the crude fat in the test portion is extracted with petroleum ether, the malondialdehyde in that crude fat is then extracted with trichloroacetic acid solution, it reacts with thiobarbituric acid to form a pink complex, and the complex is measured by high performance liquid chromatography and quantified against an external standard.

A.2 Reagents. Unless otherwise stated the reagents are analytical grade. Water is grade one to GB/T 6682. Petroleum ether has a boiling range of 30 °C to 60 °C. Acetonitrile is chromatographic grade. Anhydrous sodium sulfate is used. Potassium dihydrogen phosphate solution at 50 mmol/L is made by weighing 6.804 g to 0.001 g, dissolving in water and making up to 1 000 mL. Thiobarbituric acid solution at 0.02 mol/L is made by weighing 0.288 g to 0.001 g into a beaker, adding a suitable amount of water, heating to dissolve, cooling and making up to 100 mL. The mixed trichloroacetic acid solution is made by weighing 75.0 g of trichloroacetic acid and 1.0 g of disodium EDTA to 0.01 g, dissolving in water and diluting to 1 000 mL. The malondialdehyde standard stock solution at 100 micrograms per millilitre is made by weighing 0.315 g to 0.0001 g of 1,1,3,3-tetraethoxypropane, CAS 122-31-6, of purity not below 97 percent, dissolving in water and diluting to 1 000 mL; it is kept at 2 °C to 8 °C and is valid for three months. The intermediate standard solution at 1 microgram per millilitre is made by taking 1 mL of the stock solution and diluting to 100 mL with the mixed trichloroacetic acid solution; it is kept at 2 °C to 8 °C and is valid for two weeks. The standard series is made by taking 0 mL, 1.0 mL, 2.0 mL, 4.0 mL, 8.0 mL and 10.0 mL of the intermediate solution into 50 mL volumetric flasks and making up with the mixed trichloroacetic acid solution, giving mass concentrations of 0, 0.02, 0.04, 0.08, 0.16 and 0.20 micrograms per millilitre; it is made up fresh before use. Quantitative filter paper of the rapid type and a 0.45 micrometre aqueous membrane filter are also used. In the printed text the paragraph making the standard series cites the stock solution reference number rather than the intermediate solution it names in words.

A.3 Apparatus: a high performance liquid chromatograph fitted with a fluorescence detector; an analytical balance accurate to 0.01 g, 0.001 g and 0.0001 g; a reciprocating shaker running at not less than 180 strokes per minute and able to hold 25 °C +/- 1 °C; a thermostatic water bath able to hold 90 °C +/- 1 °C; a refrigerated centrifuge, described in the printed text as having a centrifugal force of not less than 12 000 revolutions per minute;