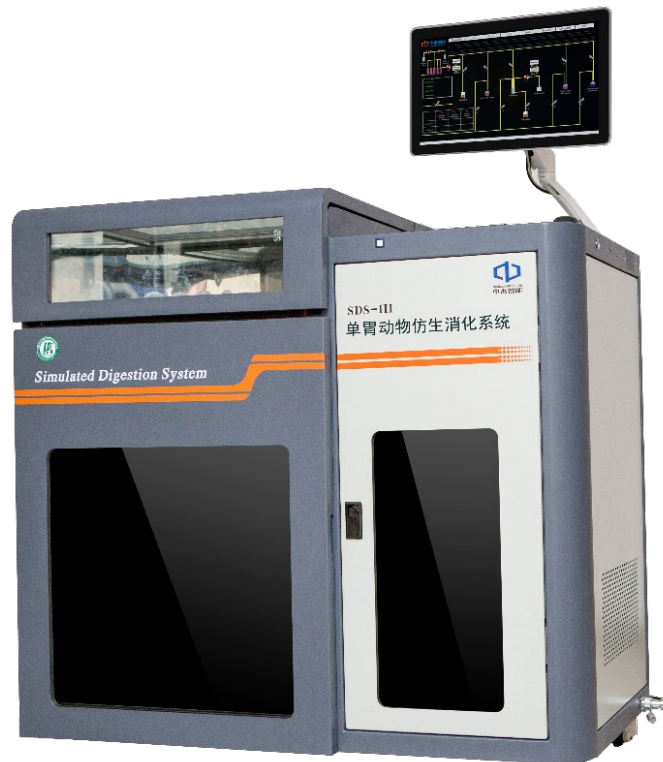The most cutting-edge technology of simulated digestion for monogastric animals

Developed by CAAS + Zhongben

Simulated Digestion System （SDS Ⅲ）

How to evaluate the nutritive value of feed ingredients accurately, quickly and repeatably?

How to evaluate the enzymolysis effect of different single enzymes on various feed materials?

How to quickly evaluate the compound enzyme preparations from the market and screen the most suitable compounding enzyme products?

Animal experiments need long cycle and high cost, and the experimental data are susceptible to many uncertain factors such as climatic conditions, animal body conditions, and feeding conditions. How to solve this problem?

SDS III Simulated Digestive System provides reliable solution globally!

SDS III simulated digestive system for monogastric animals is jointly developed by Institute of Animal Science, Chinese Academy of Agricultural Sciences and Hunan Zhongben Intelligent Technology Development Co., LTD. It is a patented technical solution to full-automatically simulate the digestive system of monogastric animals, based on bionic principles. SDS III includes a device that can simulate the digestion and absorption process of feed in the digestive tract, and a matching kit of simulated digestive solution for pig and poultry. SDS III system uses feed as substrate to simulate the digestion and absorption process of stomach and tract in vivo with high fidelity and repetition. Compared with the in vitro method, in situ method and in vivo method, SDS III system can accurately and quickly determine the effective energy value of feed, and realize the standardization, data and automation of the simulated digestion method.

100 +

Agricultural and Animal Husbandry Enterprises

150 +
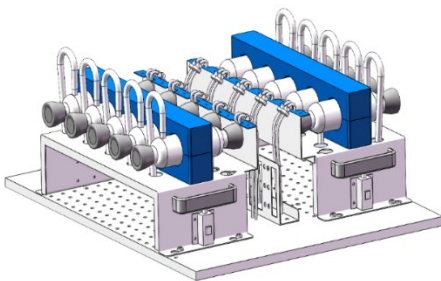
Serves Million Tons of Feed Production

SDS III

Serves Feed Industry Globally

Automatic Simulated Digestion System （SDS Ⅲ）

- **PC-based Automatic Control**
- **Dual-modules Compatibility: Vertical and Horizontal**

Horizontal Digestion Module

- Automatically to operate the digestion step of stomach, small intestine and large intestine; Automatically for enzyme addition and automatic cleaning;

- Overcome the residual problem of chyme metastasis, sample migration is unnecessary.

- Highly simulated animal temperature environment: temperature variation range is less than 0.4℃;

- High simulation fidelity: repeated test CV < 1.5%;

- Measure the biological utilization of nutrients by simulating the absorption process of nutrients in the stomach, intestine and tract of animals

Vertical Digestion Module

- Independent motor, mixing speed adjustable;

- Double glass structure reaction tube, circulating water - constant temperature, temperature variation is less than 0.4℃;

- High stability and experimental parallelism;

- Suitable for in vitro digestion evaluation of feeding enzymes;
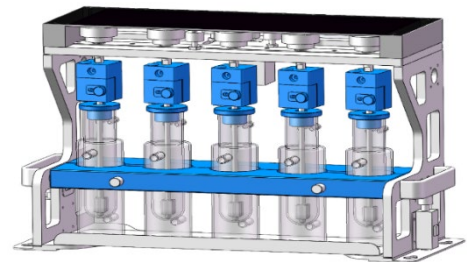
- **Simulated Digestive Kits For Swine and Poultry**

  - Patented technology for production of target animal-derived digestive enzymes;

  - 1:1 simulation of digestive enzyme activity in vivo;

  - Breed specialization;
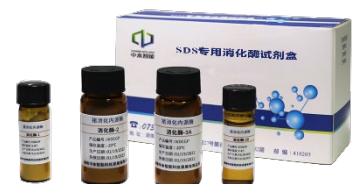
Outstanding Application

Explore The Application Of SDS III

- Feed Energy Evaluation, Establish Feed Database.

  Assessing the biological value of feed raw materials is the key scientific decision basis for determining the nutritional value of feed raw materials and optimizing feed formula, and is an important means to improve feed utilization, reduce feed cost and save energy.

- Amino Acid Biological-value Evaluation

- Effectiveness Evaluation of Feed Enzyme

- Enzymology Properties Research of Feed Enzyme

- Rapid Screening of Feed Enzyme Formulations

  SDS III system is used to quickly identify enzyme combinations that are suitable for different feed ingredients, to reduce feed cost and improve feed utilization.

- Products Research/Develop/Effect Verification For Improving The Digestion of Feed Nutrients

- Research of Dynamic Nutrient Requirements - Formulation of Feeding Standards
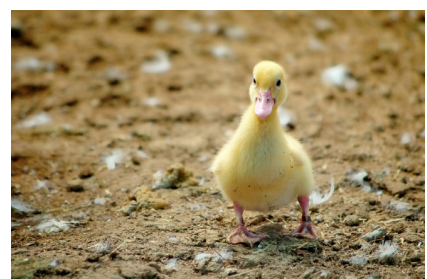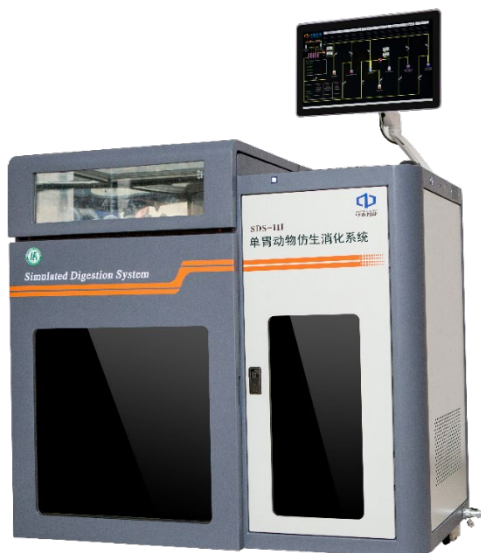
Technical Standards

1. Gastrointestinal simulation device based on extracorporeal hydrolysis system.
   - *Through computer program control, the corresponding digestive juice enzyme activity, pH and hydrolysis environment are simulated according to the physiological conditions of the stomach, small intestine and large intestine;*
   - *Simulates enzymatic digestion of the stomach, small intestine and large intestine*
   - *Simulate the secretion process of digestive juices in the body*
   - *Simulates the ambient temperature and chyme mixing process in the digestive tract*

2. Ability to perform simulated digestion based on digestion substances analysis.
   - *Simulate the mixing process of chyme in the digestive tract by the ways of shaking and stirring; The stirring speed can be precisely controlled;*
   - *After the entire digestion process, the liquid evaporation volume of the reaction system is less than 1.0%*
   - *Computer program-controlled system with digestive juice secretion, constant temperature control, and digestive process control;*

3. Able to perform simulated digestion and absorption based on analysis of undigested substances.
   - *Simulate the digestion and absorption of nutrients in the gastrointestinal tract*
   - *Overcome the residual problem by traditional methods in chyme transfer, and the sample does not need to be transferred after loading;*
   - *Automatically carry out various stages of digestion in the stomach, small intestine and large intestine; Automatically clean substances and reduce system errors caused by manual operations;*
   - *Computer program-controlled system with digestive juice secretion, hydrolysates cleaning, constant temperature control, and digestion process control.*

4. The deviation of the coefficient of variation of the determination of 5 repeated samples does not exceed 1.5%.

5. Use a constant temperature water bath and a constant temperature air bath to control the temperature to simulate the environmental temperature of the digestive organs. The temperature variation range can be accurately controlled within 0.4°C within 30 to 45°C.

6. The shaking frequency is controllable from 100 to 200 rpm, with an accuracy of ±5 rpm.

7. The flow rate of product cleaning buffer is controllable within 10-500mL/min, with an accuracy of ±20mL/min.

8. The secretion flow rate of digestive juice is controllable within 0.5-10mL/min, with an accuracy of ±0.1mL/min.

9. The loading capacity of the simulated digester: vertical digestion module ≥0.5g; horizontal digestion module ≥1.0g. Each digestion experiment can measure 2 samples at the same time, and each sample can obtain 5 repeated test data.

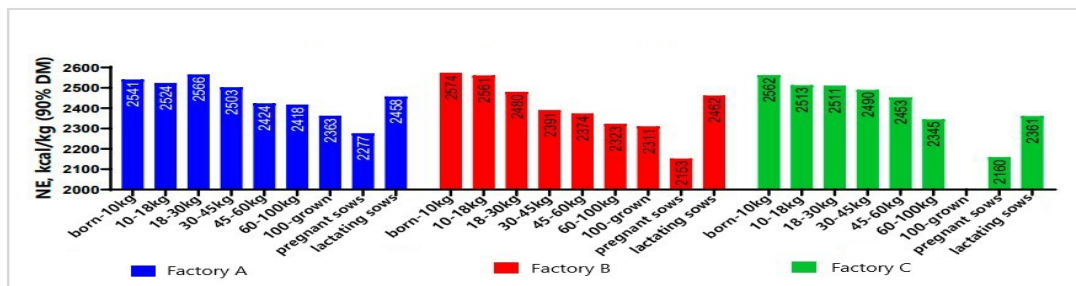10. Function of automatic cleaning of the digestive tract.
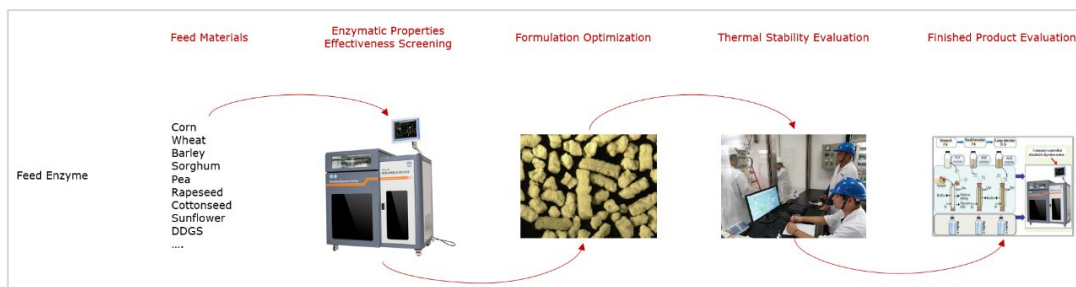
- **Establishment Of Dynamic Database For Feed Ingredients**
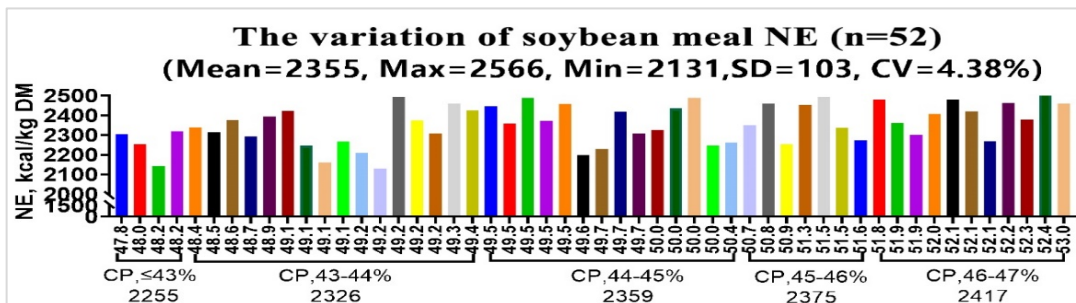
- **Quality Monitoring Of Feed Materials**
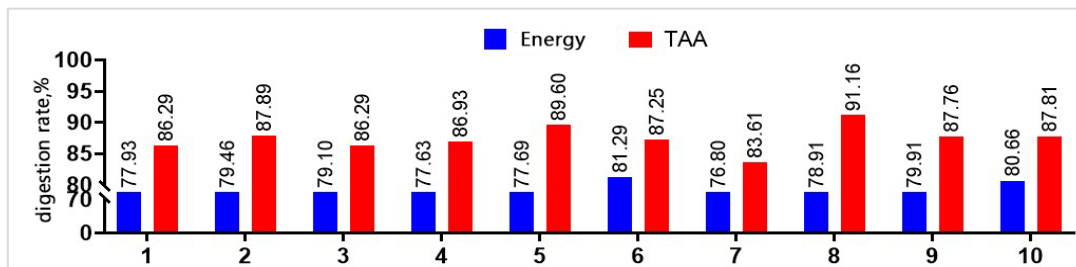
- **Nutrition Quality Monitoring**

- **Effectiveness Evaluation of Feed Enzyme**

Explore Your Future Successes

Together With SDS III

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