# Effect of yeast cell wall on the reproductive performance of lactating sows

**Abstract**：In order to study the effect of yeast cell wall on the reproductive performance of lactating sows, 96 Landrace and Large White sows with similar body weight, parity (2-3 litters) and expected delivery date at 85 days of gestation were selected and randomly set as the control group, Experiment group I and Experiment group II was fed with basal diet supplemented with 0, 0.2% and 0.4% yeast cell wall respectively. The results of the test showed that the lactating sows of the experimental groups Ⅰ and Ⅱ had a slight shortening of the production process compared with the control group (P>0.05); the backfat thickness of the sows after delivery and weaning was significantly different from that of the control group (P <0.05). Compared with the control group, the weight of the weaning litter increased by 18.0% and 25.2% respectively (P<0.01). Compared with the control group, the average weight of the weaning litter increased by 14.09% (P<0.05) and 17.91% (P<0.01); and the total number of litters in the experimental group, the number of live births, the number of qualified litters (newborn weight ≥0.85kg), estrus interval, placental weight, piglet birth weight, average birth weight and number of weaned pigs compared with the control group, but the difference not significant (P>0.05); in the colostrum composition, the difference in fat, protein, and lactose in the test group was not significant (P>0.05), while the non-lipid substances in the test group Ⅱ increased by 7.4% compared with the control group (P<0.05) Compared with the control group, whole milk solids increased by 10.64% in the test group II, the difference was extremely significant (P<0.01); compared with the control group, the difference of these components in normal milk was not significant (P>0.05); Compared with the control group, the serum metabolic enzyme activity, total cholesterol and triglyceride content in the blood of the sows in the group were significantly reduced (P<0.05), and the blood serum total protein, albumin, globulin content and the number of white blood cells in the sows were significantly increased , Red blood cell count, and platelet count (P<0.05), but had no significant effect on

alkaline phosphatase, glucose content and hematocrit in the blood ($P>0.05$); serum alanine aminotransferase and aspartate aminotransferase in the blood of suckling piglets in the test group, the activity was extremely significantly reduced ($P<0.01$), the alkaline phosphatase activity was high and the difference was not significant ($p>0.05$), and the total protein, albumin and globulin content increased and the difference was not significant ($p>0.05$) , The content of glucose, total cholesterol and triglyceride was significant ($p>0.05$). The conclusion is that adding yeast cell wall to sows' diets during late pregnancy and lactation can improve the reproductive performance and lactation performance of sows, and improve the activity of serum metabolic enzymes in the blood, protein, blood sugar, blood lipids and whole blood cells, but it has no effect on milk components. For greater impact, 0.2% addition is appropriate in production.

## 1 Materials and methods

1.1 Yeast cell wall

The yeast cell wall used in the experiment was provided by Angel Yeast Co., Ltd.

1.2 Laboratory apparatus：

Backfat meter: manufactured by American Yungao, model: AC0127SH;

Milk composition analyzer (FT-120), manufactured by Ford;

Electronic platform: manufactured by China Kaifeng Group, model TCS-100;

Automatic animal blood cell analyzer : Prolon Medical, model XFA6130;

Automatic biochemical analyzer: BECKMAN COULTER, unicel DXC800.

1.3 Location and period

This experiment was carried out at Santai Lingxing Pig Farm in Mianyang City from July to mid-October 2014.

1.4 Test design

96 sows with similar body weight, similar parity (2-3 fetuses) and similar expected delivery date were selected from Landrace and Big White at 85 days of gestation. They were randomly set as the control group, test group I and test group II, and they were fed with yeast cell walls respectively. The basal ration is 0%, 0.2%,

0.4% (see Table 1 for the basal ration). Feeding is restricted during pregnancy, feeding is prohibited on the day of delivery, and free feeding afterwards. The nipple-type automatic drinker is used for free drinking. The temperature of the pregnancy house and workshop is kept at about 25℃. The pig house is disinfected with 2% sodium hydroxide spray every day. The sows were transferred to the farrowing room 2-3 days before farrowing, and the genitals and udders were wiped with warm water before farrowing. The entire feeding cycle is from 85d to 21d after pregnancy, until the start of estrus after weaning.

Table 1 Diet composition and nutrition level（%）

| Composition | Control | Experiment group I | Experiment group II |
|---|---|---|---|
| Corn | 39.8 | 39.6 | 39.4 |
| Soyabeen（43%） | 15.5 | 15.5 | 15.5 |
| DDGS | 12 | 12 | 12 |
| Wheat | 15 | 15 | 15 |
| Wheat bran | 6 | 6 | 6 |
| Rice bran | 5 | 5.5 | 5.5 |
| Soya oil | 2.3 | 2.3 | 2.3 |
| Primix | 4.4 | 4.4 | 4.4 |
| YeaMOS | 0 | 0.2 | 0.4 |

1.5 Feeding management

The test sows were fed normally according to the feeding time of the farm, fed twice a day, at about 6 am and 3 pm. During the test, normal immunization procedures were performed. The piglets were weaned on the 21st, and iron supplements, short tails, teeth and ears were given to them on the first day after birth. Pseudorabies vaccine was immunized by intranasal drops within 3 days after birth. Circovirus disease and blue ear vaccine injections were performed 3 days before weaning, and the boars were castrated.

1.6 Test indicators and methods

1.6.1 Feed intake

During pregnancy, restricted feeding was adopted in the early stage and gradually increased in the later stage. The daily feed intake of each group of sows was recorded, and the average value was taken as the average daily feed intake of each sow. Fasting on the day of farrowing, and ad libitum feeding on the second day after farrowing. The daily feed intake of each sow per day shall be recorded on the basis of a full meal. The statistical time is the entire test period.

1.6.2 The production performance index of the sow

The birth process: the time from the first piglet to the last piglet, the total number of litters, the number of live births, and the number of qualified piglets: except for piglets with deformities and weighing less than 0.8kg, Stillbirth, mummified fetus, placenta weight: all the placenta expelled are collected and weighed. Postpartum backfat thickness: P2 backfat thickness and estrus interval are measured on the second day of postpartum and the second day of weaning when the sow is standing naturally.

1.6.3 Piglet growth performance indicators

Newborn litter weight: total weight of newborn piglets without colostrum after the last piglet has given birth, average newborn weight, number of weaned heads, weaned litter weight, average weaned weight.

1.6.4 Milk composition

Colostrum: the milk of a sow within 12 hours after delivery. The sampling time is concentrated between the break of the sow’s amniotic fluid and the completion of farrowing. The operator wears sterile rubber gloves and wipes the sow’s udders with a veil dipped in warm water. In the milk duct. Store in a refrigerator at 4°C. Ordinary milk: On the 14th day of lactation, using the method of collecting colostrum, one person slowly pushes 1ml of oxytocin from the ear vein. While pushing the medicine, the other two collect the sow's regular milk, collect 30ml and pack it into sterilization. Store in the milk collection tube in a refrigerator at 4°C. Detection of milk components: fat, protein, lactose, non-fat and whole milk solids.

1.6.5 Blood indicators

5ml of anterior vena cava blood was drawn at 7 days, 14 days, 21 days after delivery and piglets at 7 days, 14 days, and 21 days of age, 3ml of which was placed in a coagulation tube and kept in a refrigerator on the day of cryopreservation Submitted for inspection for serum total protein (TP), albumin (ALB), globulin (GLB), glucose (GLU), triglyceride (TG), total cholesterol content (TC), alanine aminotransferase (ALT), aspartate aminotransferase (AST), alkaline phosphatase (ALP) activity and other biochemical project analysis, and the other 2ml is installed in the EDTA anticoagulation tube and immediately used the automatic animal blood cell analyzer to perform red blood cell (RBC), white blood cell (WBC), platelet (PLT), Hematocrit (HCT) and other blood physiological indicators analysis.

1.7 Statistical analysis

The data uses Excel2007 to organize the data, and the SPSS19.0 statistical software performs single-factor analysis of variance and multiple comparisons on the data. P<0.05 (significant difference) and P<0.01 (extremely significant difference) are used as the criterion for judging the significance of the difference. The test results are expressed as "mean ± standard deviation".

## 2 Results

2.1 Effects of YeaMOS on the reproduction performance for sows

Table 2 showed that after adding 0.2% and 0.4% yeast cell wall to the diet, there was no significant difference between the sows' labor, total number of litters, number of live births, qualified piglets, and placental weight compared with the control group (P> 0.05). For thick backfat (postpartum) between control group and experimental group II have no significant difference (P>0.05), but experimental group I and control group are significantly different (P<0.05), and experimental group II is extremely different (P<0.01); Thick backfat after weaning the difference between the experimental group II, the control group and the experimental group I was significant (P<0.05), and the difference between the control group and the experimental group I was not significant (P>0.05); The fat thickness difference of control group is about 4.42mm, the difference of test group I is about 2.79mm, and the difference of test group II is about 2.94mm after delivery and weaning. The estrus interval of sows was not significantly different between the experimental group and the control group (p>0.05), and the estrus interval between the experiment group I and the experiment group II was significantly different (P<0.05), indicating that 0.2% yeast cell wall is beneficial to shorten the sow's estrus interval.

Table 2 Effects of YeaMOS on the reproduction performance for sows

| Item | Control group | Experiment group **I** | Experiment group **II** |
|---|---|---|---|
| Sows' labor /min | 223.33±27.17 | 226.79±27.64 | 219.00±21.95 |
| Number of litters/head | 11.43±1.29 | 11.24±1.53 | 11.21±1.66 |
| Number of live brith/head | 10.73±1.50 | 10.52±1.28 | 10.48±1.25 |
| Qualified piglets/head | 10.57±1.33 | 10.33±1.62 | 10.54±1.67 |
| Thick of backfat after delivery/mm | 18.14±2.35 $^{b}$ | 16.36±2.59 $^{aA}$ | 18.38±2.31 $^{bB}$ |
| Thick of backfat after weaning /mm | 13.72±2.78 $^{b}$ | 13.57±1.40 $^{b}$ | 15.44±2.00 $^{a}$ |
| Placenta weight /kg | 3.14±1.25 | 3.10±1.47 | 3.05±0.14 |
| Estrus interval /d | 4.61±0.84 | 4.32±0.56$^{b}$ | 4.66±0.44$^{a}$ |

2.2 Effects of YeaMOS on the growth performance for piglets

Table 3 showed that there is no significant difference between the experiment group and the control group in newborn litter weight, average newborn weight, and number of weaned heads (P>0.05). The difference in weaning litter weight between the experimental group and the control group was extremely significant (P<0.01); while the average weaning weight, the control group was significantly different from the experimental group I (P<0.05), and the difference from the experimental group II was extremely significant (P<0.01).

Table 3 Effects of YeaMOS on the growth performance for piglets

| Item | Control group | Experiment group Ⅰ | Experiment group Ⅱ |
|---|---|---|---|
| Litter weight /kg | 16.68±2.34 | 16.19±2.74 | 15.80±1.48 |
| Average newborn weight /kg | 1.47±0.24 | 1.49±0.40 | 1.54±0.28 |

| | | | |
|---|---|---|---|
| Number of weaned piglets/head | 9.23±0.83 | 8.86±0.86 | 9.33±0.69 |
| Weaned litter weight /kg | 44.72±7.52$^{B}$ | 52.76±6.94$^{A}$ | 55.95±7.50$^{A}$ |
| Average weaned weight /kg | 5.08±0.83$^{Bb}$ | 5.79±0.89$^{a}$ | 5.99±1.08$^{A}$ |

2.3 Effects of YeaMOS on milk composition of lactating Sows

Table 4 showed that the fat, protein and lactose in the colostrum of the experiment groups were not significantly different from the control group ($P>0.05$), and the non-lipid content of the experiment group I and control group was significantly different from the experiment group II ($P<0.05$). The difference in total milk solids was extremely significant ($P<0.01$), indicating that the addition of 0.2% and 0.4% yeast cell wall to the sow diet in the late pregnancy had no effect on the fat, protein and lactose in the colostrum, but it had significant effect on the colostrum as well as whole milk solids.

Table 4 Effects of YeaMOS on colostrum composition of lactating sows（%）

| Item | Control group | Experiment group Ⅰ | Experiment group Ⅱ |
|---|---|---|---|
| Fat | 3.99±0.32 | 4.12±0.10 | 4.57±0.07 |
| Protein | 15.84±0.44 | 16.09±0.80 | 16.92±0.45 |
| Lactose | 2.49±0.42 | 2.60±0.35 | 2.69±0.25 |
| Non-lipid substances | 19.97±2.37$^{b}$ | 20.06±2.05$^{b}$ | 21.44±1.28$^{a}$ |
| Milk solids | 25.65±3.04$^{B}$ | 25.73±3.35$^{B}$ | 28.38±1.94$^{A}$ |

Table 5 showed that the fat, protein, lactose, non-lipid, and whole milk solids of ordinary milk in the experiment group were not significantly different from those in the control group ($P>0.05$). The experimental results show that adding 0.2% and 0.4% yeast cell wall to the diet in the late pregnancy has no effect on the fat, protein, lactose, non-fat and whole milk solids in the normal milk of the test group.

Table 5 Effects of YeaMOS on ordinary milk composition of lactating sows（%）

| Item | Control group | Experiment group Ⅰ | Experiment group Ⅱ |
|---|---|---|---|
| Fat | 7.32±0.52 | 7.34±0.09 | 7.89±0.57 |

| | | | |
|---|---|---|---|
| Protein | 4.62±0.21 | 4.79±0.32 | 4.75±0.46 |
| Lactose | 5.33±0.08 | 5.38±0.10 | 5.39±0.17 |
| Non-lipid substances | 18.8±1.69 | 19.13±0.79 | 19.32±0.71 |
| Milk solids | 10.49±0.30 | 10.46±0.14 | 10.57±0.32 |

2.4 Effects of YeaMOS on blood index of sows

2.4.1 Effect of YeaMOS on the activity of serum metabolizing enzymes in Sows

Table 6 showed that the alanine aminotransferase activity is: at 7 days of delivery, the experiment group was extremely significantly lower than the control group (P<0.01); at 14 days of delivery, the experiment group II was extremely significantly lower than the control group (P<0.01) The experiment group I was significantly lower than the control group (P<0.05); at 21 days after delivery, the experiment group II was significantly lower than the control group (P<0.05), the experiment group I was not significantly different from the control group (P>0.05); aspartate aminotransferase Activity: at 7 days and 14 days after delivery, the experiment group was significantly lower than the control group (P<0.01); at 21 days after delivery, the experiment group II was extremely significantly lower than the control group (P<0.01), and the experiment group I was significantly lower than the control group (P<0.01). There was no significant difference in alkaline phosphatase activity between the experimental group and the control group at 7, 14, and 21 days after delivery (P>0.05).

Table 6 Effect of YeaMOS on the activity of serum metabolizing enzymes in Sows

| Time | Item (U/L) | Group | | |
|---|---|---|---|---|
| | | Control | Experiment group Ⅰ | Experiment group Ⅱ |
| 7d | ALT | $48.53±4.43^{A}$ | $33.71±3.05^{B}$ | $33.82±3.60^{B}$ |
| | AST | $44.12±4.15^{A}$ | $33.75±3.14^{B}$ | $33.27±4.22^{B}$ |
| | ALP | 98.5±17.11 | 82.00±13.30 | 75.29±12.57 |
| 14d | ALT | $46.07±6.13^{Aa}$ | $38.00±7.13^{ABb}$ | $33.16±5.26^{Bb}$ |
| | AST | $42.69±8.17^{A}$ | $33.38±5.18^{B}$ | $32.41±8.68^{B}$ |

| | | | | |
|---|---|---|---|---|
| | ALP | 65.00±9.11 | 76.00±10.74 | 76.23±10.65 |
| 21d | ALT | 58.28±5.50[a] | 52.07±7.43[a] | 44.67±6.34[b] |
| | AST | 38.82±4.18[Aa] | 32.56±6.66[ABb] | 29.50±4.27[Bb] |
| | ALP | 60.94±14.95 | 66.83±13.70 | 57.55±15.44 |

2.4.2 Effect of YeaMOS on the activity of serum protein components of in Sows

Table 7 showed that the total protein content is higher: at 7 days of delivery, the experiment group was significantly higher than the control group (P<0.05); at 14 days of delivery, the experiment group Ⅰ was extremely significantly higher than the control group (P<0.01), and the experiment group Ⅱ was significantly higher than the control group (P<0.01). The difference in the control group was not significant (P>0.05); at 21 days after delivery, the experiment group was significantly higher than the control group (P<0.01). In terms of albumin content: at 7 days of delivery, the experiment group II was significantly higher than the control group (P<0.01), and the difference between the experiment group I and the control group and the experiment group II was not significant (P>0.05); at 14 days and 21 days after delivery, The experiment group was significantly higher than the control group (P<0.01). In terms of globulin content: at 7 days of delivery, the experiment group I was extremely significantly higher than the control group (P<0.01), and the experiment group II was significantly higher than the control group (P<0.05); at 14 days of delivery, the experiment group I was extremely significantly higher than the control Group (P<0.01), significantly higher than the experiment group Ⅱ (P<0.05), while the experiment group Ⅱ and the control group were not significantly different (P>0.05); at 21 days after delivery, the experiment group was significantly higher than the control group (P< 0.05).

Table 7 Effect of YeaMOS on the activity of serum protein components of in Sows

| Time | Item (g/L) | Group | | |
|---|---|---|---|---|
| | | Control | Experiment group Ⅰ | Experiment group Ⅱ |

| | | | | |
|---|---|---|---|---|
| 7d | TP | $67.92\pm6.95^{b}$ | $70.34\pm6.47^{a}$ | $72.66\pm6.42^{a}$ |
| | ALB | $41.75\pm5.20^{B}$ | $43.22\pm3.14^{AB}$ | $45.61\pm3.89^{A}$ |
| | GLB | $27.40\pm5.38^{Bb}$ | $33.56\pm5.83^{Aa}$ | $31.67\pm4.67^{ABa}$ |
| | A/G | $1.50\pm0.52$ | $1.39\pm0.50$ | $1.66\pm0.58$ |
| 14d | TP | $66.09\pm4.32^{B}$ | $73.16\pm7.97^{A}$ | $69.89\pm6.50^{AB}$ |
| | ALB | $42.30\pm2.65^{B}$ | $48.22\pm2.95^{A}$ | $46.49\pm2.75^{A}$ |
| | GLB | $27.74\pm4.37^{Bb}$ | $32.74\pm5.40^{Aa}$ | $28.58\pm3.21^{ABb}$ |
| | A/G | $1.81\pm0.62$ | $2.03\pm0.93$ | $1.93\pm0.75$ |
| 21d | TP | $70.91\pm4.47^{B}$ | $78.93\pm4.21^{A}$ | $77.24\pm4.95^{A}$ |
| | ALB | $40.65\pm2.47^{B}$ | $47.14\pm3.55^{A}$ | $48.57\pm4.00^{A}$ |
| | GLB | $30.28\pm4.99^{b}$ | $34.69\pm5.67^{a}$ | $32.86\pm3.84^{a}$ |
| | A/G | $1.26\pm0.35^{B}$ | $1.64\pm0.52^{A}$ | $1.71\pm0.37^{A}$ |

2.4.3 Effects of YeaMOS on blood glucose and blood lipid components of Sows

Table 8 showed that there is no significant difference in glucose content between the experiment group and the control group ($P>0.05$). In terms of total cholesterol content: at 7 days of delivery, the experiment group II was significantly lower than the control group ($P<0.05$), and the difference between the experiment group I and the control group was not significant ($P>0.05$). At 14 days of delivery, the test group was significantly lower than the control Group ($P<0.05$), at 21 days after delivery, the experiment group was significantly lower than the control group ($P<0.01$). In terms of triglyceride content: at 7 days and 21 days after delivery, the experiment group II was significantly lower than the control group ($P<0.01$), and the experiment group I was significantly lower than the control group ($P<0.05$); at 14 days after delivery, the experiment group was both significantly lower than the control group (P<0.01).

Table 8 Effects of YeaMOS on blood glucose and blood lipid components of Sows

| Time | Item (Mol /L) | Group | | |
|---|---|---|---|---|
| | | Control | Experiment group Ⅰ | Experiment group Ⅱ |
| 7d | GLU | 5.39±0.69 | 5.28±0.52 | 5.50±0.64 |
| | TC | $2.05±0.25^{a}$ | $1.90±0.40^{ab}$ | $1.80±0.37^{b}$ |
| | TG | $0.75±0.26^{Aa}$ | $0.54±0.28^{ABb}$ | $0.50±0.29^{Bb}$ |
| 14d | GLU | 5.22±0.62 | 5.20±0.51 | 4.92±0.67 |
| | TC | $2.23±0.49^{a}$ | $1.97±0.36^{b}$ | $1.94±0.37^{b}$ |
| | TG | $0.57±0.02^{A}$ | $0.30±0.01^{B}$ | $0.37±0.02^{B}$ |
| 21d | GLU | 5.35±0.49 | 5.38±0.50 | 5.22±0.53 |
| | TC | $2.30±0.46^{A}$ | $1.90±0.24^{B}$ | $1.84±0.23^{B}$ |
| | TG | $0.60±0.04^{Aa}$ | $0.42±0.02^{ABb}$ | $0.38±0.01^{Bb}$ |

2.4.4 Effect of YeaMOS on Sow's whole blood index

Table 9 showed that in terms of white blood cell content: the 0.4% group was significantly higher on the 7th, 14th and 21st day of delivery than the control group (P<0.05), and the experiment group I was also significantly higher on the 14th and 21st day of delivery. In the control group (P<0.05). In terms of red blood cell content: at 7 days of delivery, the experiment group was significantly higher than the control group (P<0.05); at 14 days of delivery, the experiment group had a tendency to increase compared to the control group (0.05<P<0.1); delivery 21 At day time, the experiment group II was significantly higher than the control group (P<0.05), while the experiment group I was not significantly different from the control group. From the point of view of platelet content: the experiment group II was significantly higher than the control group at 7 days and 14 days of delivery (P<0.05), while the difference between the experiment group I and the control group was not significant (P>0.05); the experiment group I was significantly higher than the control group (P<0.05) at the 21st day of delivery, and the experiment group II was not significantly different from the control group (P>0.05). There was no significant difference in hematocrit between the test group and the control group (P>0.05).

Table 9 Effect of YeaMOS on Sow's whole blood index

| Time | Item | Group | | |
|---|---|---|---|---|
| | | Control | Experiment group Ⅰ | Experiment group Ⅱ |
| 7d | WBC (10e9/L) | 8.42±2.35[b] | 9.26±2.91[ab] | 10.30±1.90[a] |
| | RBC (10e12/L) | 1.63±0.28[b] | 1.98±0.37[a] | 1.99±0.46[a] |
| | PLT (10e9/L) | 144.05±25.55[b] | 167.62±22.36[ab] | 178.70±25.08[a] |
| | HCT (L/L) | 0.070±0.014 | 0.068±0.017 | 0.062±0.024 |
| 14d | WBC (10e9/L) | 9.06±1.57[b] | 10.63±1.04[a] | 10.51±1.00[a] |
| | RBC (10e12/L) | 1.71±0.34 | 1.96±0.57 | 1.96±0.44 |
| | PLT (10e9/L) | 152.83±24.41[b] | 178.55±22.89[ab] | 178.70±22.23[a] |
| | HCT (L/L) | 0.069±0.019 | 0.072±0.022 | 0.063±0.023 |
| 21d | WBC (10e9/L) | 8.92±1.55[b] | 10.35±2.07[a] | 10.37±1.48[a] |
| | RBC (10e12/L) | 1.62±0.25[b] | 1.71±0.33[ab] | 1.91±O.51[a] |
| | PLT (10e9/L) | 168.13±28.10[b] | 204.37±27.91[a] | 178.33±32.49[ab] |
| | HCT (L/L) | 0.066±O.O18 | 0.060±0.015 | 0.068±0.022 |

2.5 Effects of YeaMOS on blood index of Piglets

2.5.1 Effects of YeaMOS on enzyme activity in Piglet Serum

Table 10 showed that when the piglets were 7 days old, the serum alanine aminotransferase (ALT) and aspartate aminotransferase (AST) activities of the experiment group I were significantly lower than those of the control group (P<0.01), and the alkaline phosphatase (ALP) activity was higher than the control group, but difference is not significant (p>0.05); the experiment II group has no significant activity compared to the control group (p>0.05); the serum alanine aminotransferase (ALT) activity of the experiment group I is significantly lower than experiment group II (p<0.05), aspartate aminotransferase (AST) activity was significantly higher than experiment group II (p<0.05), alkaline phosphatase (ALP) activity was not significantly different (p>0.05).

When piglets were 14 days old, the serum alanine aminotransferase (ALT) and aspartate aminotransferase (AST) activities of the experiment group I were extremely significantly lower than those of the control group (P＜0.01), and the alkaline phosphatase (ALP) activity was not significant compared with the control group (P>0.05); aminotransferase (ALT) and aspartate aminotransferase (AST) activities of experiment group II alanine were extremely significantly lower than the control group (P<0.01), alkaline phosphatase (ALP) activity was not significant compared with the control group ( p>0.05); Compared with the two test groups, the serum alanine aminotransferase (ALT) activity of experiment group I was extremely significantly higher than that of experiment group II (P<0.01), and the activity of aspartate aminotransferase (AST) was extremely significantly lower than that of experiment group II (P <0.01), the difference in alkaline phosphatase (ALP) activity is not significant (p>0.05).

When the piglets were 21 days old, the serum alanine aminotransferase (ALT) activity of experiment group I was significantly lower than that of the control group (P＜0.01), and the activity of aspartate aminotransferase (AST) was significantly lower than that of the control group (p＜0.05). Alkaline phosphatase (ALP) activity was lower than the control group and the difference was not significant (p>0.05); the serum alanine aminotransferase (ALT) activity of the experiment group II was extremely significantly lower than the control group (P<0.01), aspartate aminotransferase (AST), alkaline phosphatase (ALP) activity difference was not significant (p>0.05); compared with the two test groups, the serum alanine aminotransferase (ALT) activity of experiment group I was significantly higher than that of experiment group II (P<0.01), aspartate aminotransferase (AST), alkali The activity of phosphatase (ALP) was not significantly different (p>0.05).

Table 10 Effects of YeaMOS on enzyme activity in Piglet Serum

| Item | Time (d) | Group | | |
|---|---|---|---|---|
| | | Control | Experiment group Ⅰ | Experiment group Ⅱ |
| ALT | 7 | $44.50 \pm 4.93^{A}$ | $38.50 \pm 6.29^{a}$ | $42.20 \pm 5.98$ |
| | 14 | $46.56 \pm 7.90^{A}$ | $39.50 \pm 6.35^{B}$ | $33.10 \pm 5.96^{C}$ |
| | 21 | $49.33 \pm 4.74^{A}$ | $39.50 \pm 4.64^{B}$ | $33.17 \pm 4.58^{C}$ |
| AST | 7 | $63.36 \pm 8.94^{Ac}$ | $55.05 \pm 8.86^{a}$ | $60.16 \pm 6.82^{b}$ |
| | 14 | $72.62 \pm 9.42^{A}$ | $49.23 \pm 8.67^{C}$ | $54.05 \pm 7.06^{B}$ |
| | 21 | $71.00 \pm 9.56^{a}$ | $62.73 \pm 8.52^{b}$ | $67.56 \pm 9.02^{a}$ |
| ALP | 7 | 915.63±197.27 | 945.17±186.63 | 959.42±192.52 |
| | 14 | 727.12±158.46 | 682.89±158.15 | 769.11±163.88 |
| | 21 | 558.06±142.14 | 553.75±161.81 | 581.36±161.64 |

2.5.2 Effects of YeaMOS on serum protein composition of Piglets

Table 11 showed that when piglets are 7 days old, the serum total protein (TP) and albumin (ALB) contents and protein coefficient (A/G) of experiment group I are higher than those of the control group, and the difference is not significant (p>0.05). (GLB) content is lower than the control group, the difference is not significant (p>0.05); total protein (TP), albumin (ALB) content, protein coefficient (A/G) of the experiment group II is lower than the control group, the difference is not significant (p ＞0.05), the content of globulin (GLB) is higher than that of the control group and the difference is not significant (p＞0.05); compared with the two test groups, the protein coefficient (A/G) of experiment group I is significantly higher than that of experiment group II (p<0.05), The contents of the other three are not significant (p>0.05).

When piglets were 14 days old, the serum total protein (TP), albumin (ALB) and globulin (GLB) levels of experiment groups I and II were higher than those of the control group, and the difference was not significant (p>0.05), and the protein coefficient (A/G) was lower than the control group, the difference was not significant (p>0.05); the difference between the two experiment groups was not significant (p>0.05).

When the piglets were 21 days old, the serum total protein (TP) content of experiment group I and II was extremely significantly higher than that of the control group (P<0.01), and the content of albumin (ALB) and globulin (GLB) was higher than that of the control group, the difference was not significant ( p>0.05), the protein coefficient (A/G) is lower than the control group and the difference is not significant (p>0.05); the difference between the two experiment groups is not significant (p>0.05).

Table 11 Effects of YeaMOS on serum protein composition of Piglets

| Item | Time (d) | Group | | |
|---|---|---|---|---|
| | | Control | Experiment group Ⅰ | Experiment group Ⅱ |
| TP | 7 | 61.38±5.59 | 61.82±5.29 | 59.68±5.98 |
| | 14 | 52.85±4.15 | 53.48±4.36 | 53.58±4.99 |
| | 21 | $53.31±5.49^a$ | $60.23±5.12^A$ | $59.25±5.40^A$ |
| ALB | 7 | 30.96±3.76 | 32.96±3.97 | 30.33±3.28 |
| | 14 | 32.36±4.28 | 32.95±3.58 | 32.38±3.58 |
| | 21 | 36.18±5.01 | 38.90±5.08 | 38.35±5.15 |
| GLB | 7 | 26.16±3.45 | 25.25±3.31 | 27.76±4.08 |
| | 14 | 19.35±3.06 | 21.46±3.37 | 21.33±3.21 |
| | 21 | 16.77±3.24 | 18.04±3.20 | 18.89±3.10 |
| A/G | 7 | 1.14±0.31 | 1.23±0.31a | 0.99±0.30b |
| | 14 | 1.58±0.26 | 1.45±0.29 | 1.42±0.28 |
| | 21 | 1.84±0.35 | 1.66±0.37 | 1.57±0.37 |

### 2.5.3 Effects of YeaMOS on serum glycolipid content of Piglets

Table 12 showed that when piglets are 7 days old, the serum glucose (GLU) content of experiment group I is significantly lower than that of the control group

($p<0.05$), and the content of total cholesterol (TC) and triglyceride (TG) is lower than that of the control group ($p>0.05$); the contents of the experiment group II were higher than those of the control group, and the difference was not significant ($p>0.05$); compared with the two experiment groups, the serum glucose (GLU) content of the experiment group I was significantly lower than that of the control group ($p<0.05$) ), the content of total cholesterol (TC) and triglyceride (TG) was lower than that of experiment group II, and the difference was not significant ($p>0.05$).

When the piglets were 14 days old, the serum glucose (GLU) content of experiment group I was lower than that of the control group, and the difference was not significant ($p>0.05$). The total cholesterol (TC) content was extremely significantly higher than that of the control group ($P<0.01$). The content of TG) was higher than that of the control group and the difference was not significant ($p>0.05$); the content of serum glucose (GLU) and total cholesterol (TC) in the experiment group II was significantly higher than that of the control group ($p<0.05$), and the content of triglyceride (TG) was higher compared with the control group, the difference was not significant ($p>0.05$); Compared with the two experiment groups, the serum glucose (GLU) content of experiment group I was significantly lower than experiment group II ($p<0.05$), and the total cholesterol (TC) content was significantly higher than experiment group II ($p<0.05$), the content of triglyceride (TG) was higher than that of experiment group II, the difference was not significant ($p>0.05$).

When the piglets were 21 days old, the three serum levels of the experiment group I were not significantly different from those of the control group ($p>0.05$); the serum glucose (GLU) and total cholesterol (TC) levels of the experiment group II were significantly higher than those of the control group ($p<0.05$) ), the content of triglyceride (TG) was higher than that of the control group and the difference was not significant ($p>0.05$); compared with the experiment test groups, the serum glucose (GLU) content of experiment group I was extremely significantly lower than that of experiment group II ($P<0.01$), The content of total cholesterol (TC) and triglyceride (TG) were not significantly different ($p>0.05$).

Table 12　Effects of YeaMOS on serum glycolipid content of Piglets

| Item | Time (d) | Group | | |
|---|---|---|---|---|
| | | Control | Experiment group Ⅰ | Experiment group Ⅱ |
| | 7 | 5.79±0.49[a] | 5.24±0.49[b] | 5.85±0.53[a] |
| GLU | 14 | 5.49±0.54[b] | 5.40±0.47[b] | 5.79±0.55[a] |
| | 21 | 5.40±0.38[b] | 5.26±0.34[A] | 5.66±0.37[a] |
| | 7 | 2.35±0.77 | 2.28±0.77 | 2.38±0.76 |
| TC | 14 | 2.96±0.38[Ac] | 3.70±0.39[a] | 3.30±0.41[b] |
| | 21 | 3.63±0.36 | 3.78±0.37 | 3.70±0.36 |
| | 7 | 0.95±0.25 | 0.91±0.25 | 0.96±0.25 |
| TG | 14 | 0.99±0.34 | 1.16±0.37 | 1.14±0.32 |
| | 21 | 1.50±0.31 | 1.42±0.30 | 1.62±0.29 |

## 3 Conclusion

The results of this experiment show that adding 0.2% and 0.4% yeast cell wall to the sow diet at the 85th day of gestation can improve the reproductive performance of the sow, shorten the estrus interval to a certain extent, improve the sow's lactation ability, and also improve the early stage. The content of whole milk solids and non-fat in milk, thereby increasing the weight of weaned piglets; at the same time, it can significantly reduce the serum metabolic enzyme activity, total cholesterol and triglyceride content in the sow's blood, and protect the sow's main body of liver. Tissue cells prevent the deposition of cholesterol in the serum to a certain extent and accelerate the catabolism of cholesterol. It can significantly increase the blood serum total protein, albumin, globulin content, white blood cell count, red blood cell count, and platelet count of sows, so it can improve the immunity of animals to a certain extent; it can also improve the apparent metabolism of nutrients for suckling piglets Rate, improve serum biochemical indicators. In summary, it is appropriate to add 0.2%.