

Supporting the immune response and performance of piglets after weaning

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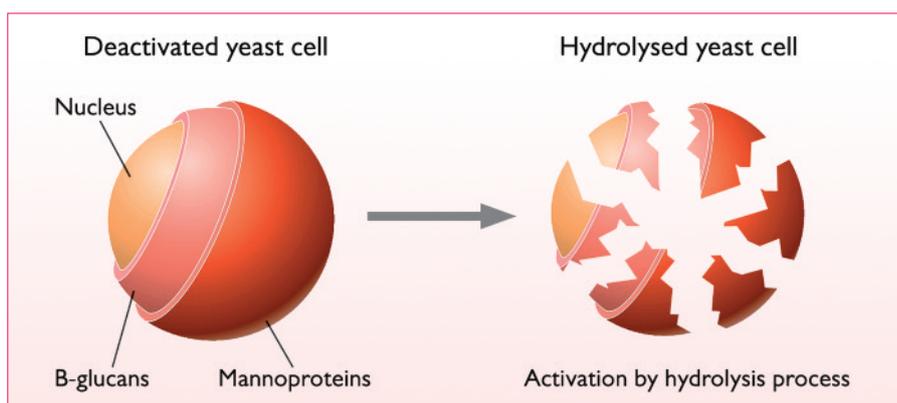
Weaning is a big challenge for piglets. A change of feed, new grouping and a new environment are challenges the piglet has to overcome. Genetics is improving and the amount of live born piglets is increasing all the time. However, variation in the weight of piglets is larger and, due to that, they are more susceptible to different health disorders.

At the same time there is increasing concern about the use of antibiotics and high dosing of zinc oxide in weaning diets. Many countries have a program to reduce the use of antimicrobials in production because of increasing concerns about antibiotic resistance and residues.

To help piglets cope with this transition, various nutritional approaches have been proposed, including supplementing the diet with substances that have antimicrobial and immune stimulating properties.

Supporting performance

Weaning of piglets is often associated with diarrhoea and an impaired growth rate, partly due to the immaturity of the intestinal



Left, a deactivated yeast cell and, right, a hydrolysed yeast cell.

and the immune system of the piglets. Post weaning diarrhoea, toxigenic *Escherichia coli* infection, is one of the major welfare and economic problems in pig production at weaning.

There are a number of different products on the market – organic acids, probiotics, prebiotics, yeasts and plant or herbal extracts – to stabilise or modulate microbiota in the gut or to stimulate immunity. Yeasts are one of the most widely used.

Most yeast cell wall products are by-products of the yeast extracts industry.

The extract is separated and used in the food industry and the rest is sold as a feed ingredient.

Progut is a patented processed *Saccharomyces cerevisiae* yeast hydrolysate. It contains both internal cell nucleotides, peptides and cell wall particles, mannoproteins and betaglucans.

Yeast cells from the brewing industry are deactivated by heat treatment and then they are hydrolysed to release the soluble, bioactive particles which act as its active ingredients.

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Fig. 1. Average sheep red blood cell titers measured using a haemagglutination assay.

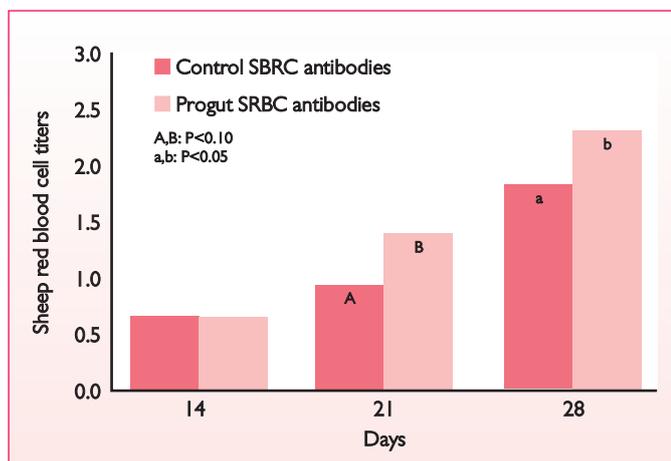
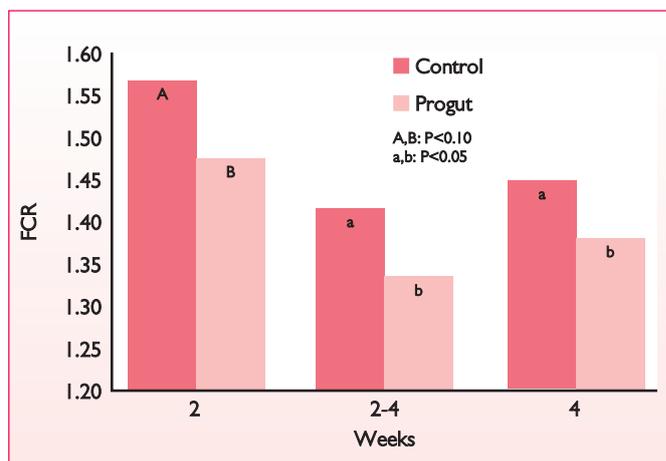


Fig. 2. Effect of the experimental diets on feed conversion ratio (FCR).



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The carbohydrate components in yeast are very long polysaccharide chains. In this new generation yeast hydrolysate those sugars are broken down in order for them to become more active. All the yeast cell particles are present and the product is stable.

Progut has been shown to interfere with the colonisation of harmful microbial species like *E. coli*. This may be due to its content of soluble bioactive manno-oligosaccharides decreasing the number of available binding sites for *E. coli* by acting as receptor analogues for type-I fimbria.

Progut has also been shown to enhance the immunity of young animals.

Better intestinal health

A trial at Schothorst Research Centre in the Netherlands investigated the effect of Progut on the performance and specific humoral immune responses in weaning piglets

In the trial 120 pigs were allocated to 20 pens, taking initial body weight into account and distributed into two groups as follows: a negative control diet and the same diet supplemented with 2g Progut/kg feed.

At days 7 and 21 of the experiment, half of the piglets per group were challenged intramuscularly with 1ml of a solution of 20% sheep red blood cells.

Feed intake, daily gain and feed conversion

ratio were measured. Natural antibodies, specific antibodies against SRBC and acute phase proteins were measured from the blood samples.

The effect of Progut

The intestinal tissue plays a central role in the immune system of the body. Early immune maturation of young animals with good immunoglobulin production is essential in the fight against pathogens especially during stressful situations.

In a Schothorst trial piglets were challenged with sheep red blood cells to determine the ability of their immune system to produce antibodies. Progut piglets showed higher agglutination titers ($p < 0.05$) suggesting a more responsive immune system. Due to that it is possible that the piglets might have a better immune response, for example after vaccination. In the same trial the average titers of natural IgM antibodies were also higher.

It is generally accepted that mounting immune responses require resources that could otherwise be allocated to other biological processes, for example, growth, reproduction or lactation.

In this study, piglets that received Progut in the diet showed a significantly improved FCR than piglets receiving the control diet. This higher nutrient digestibility can be related partially to the positive effects of Progut on intestinal health, but also to the intestinal architecture.

Progut, administered to piglets at 2g/kg in feed had the potential to reduce the risk of post weaning diarrhoea without affecting performance.

It should be highlighted that the improved FCR associated with the Progut group was observed in a clean environment where morbidity rates were low, and therefore beneficial effects on piglet performance are usually much more difficult to detect in such environments.

Conclusions

The results of the present study show that supplementation of 2g Progut/kg to weaning pigs led to an improvement in feed conversion ratio and suggests that the immune system is triggered to a more responsive state, which could potentially be beneficial for overcoming disease challenges.

Better intestinal health and immunity improves performance and profitability in pig production. A significantly better immune status and a lower risk for post weaning diarrhoea will reduce the use of antibiotics in production and in that way animal welfare, safety and sustainability will improve. ■

*References are available
on request from the author*