

# Probiotics can act as enhancers of immune response to vaccination

by Dr M. Castillo, R&D and customer support manager, Rubinum SA.

Gut flora plays a key role in keeping gut health as well as in the development of the immune system of the animals. So, it makes sense that the proper bacteria colonisation can help on the correct response of animals to humoral immune response and then vaccination. In this regard, in human medicine, the administration of probiotics with vaccines is a new strategy that results in an optimisation of immunisation against the antigen administered.

## Positive effects

In livestock animals, the use of probiotics as enhancers of immune response is still being studied. From recent trials, we know that some non-resident bacteria used routinely as probiotics (in particular *B. cereus* var. *toyoi*) have positive effects increasing antibody titers against common vaccinations such as mycoplasma and influenza disease in growing pigs.

*B. cereus* var. *toyoi* is a sporulated bacteria commercialised all over the world for more than 30 years (Toyocerin, Rubinum SA).

Its mode of action is well known, and several effects on the develop-

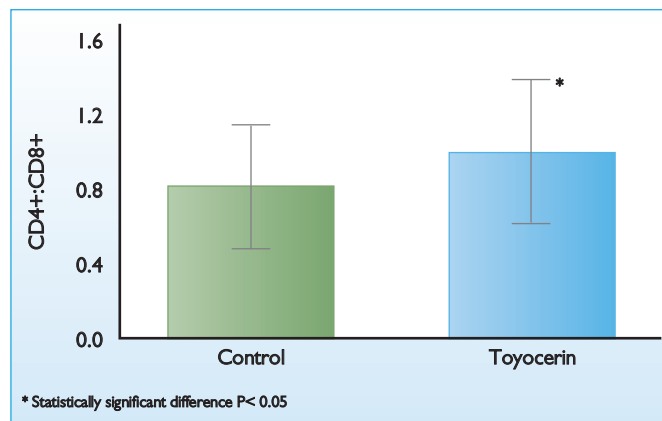


Fig. 1. Lymphocytes CD4+:CD8+ relation in blood of piglets fed with diets supplemented with or without Toyocerin.

ment of immune system have been demonstrated. When piglets are fed with this bacteria, they react to produce earlier some specific immune cells (lymphocytes CD8+, CD25+ and Y8) that results in higher Ig A in the gut.

As expected, this higher local immune response is reflected in higher antibodies production after vaccination.

Two trials were run in the FUB where weaned piglets were fed with the commercial dosage of the probiotic and divided in four groups: influenza control group, influenza vaccinated group, mycoplasma control group and mycoplasma vaccinated group. Animals were

vaccinated against mycoplasma (inactivated vaccine, intramuscular at day 28 of life) and influenza (inactivated vaccine, intramuscular administration H1N1 and H3N2 at day 63 and 84).

In both studies, cytometry was performed in order to analyse immune cells in blood and to check if the probiotic produced any response at this level. Antibody titers against influenza were studied at 96 days of life and at 108 for mycoplasma antibodies.

In the animals that were fed with Toyocerin in the diet composition as well as the activity of immune cells was modified. The ratio CD4+:CD8+ was higher as shown

in Fig. 1. This ratio reflects the secondary immune response being therefore indicative of a reduction in symptoms presented by the animals.

Moreover, probiotic-fed animals showed a higher amount of antibodies in both trials. In the case of the antigen H1N1, 90% of the vaccinated animals and fed with Toyocerin showed titers higher than 160 (HAU, hemagglutination inhibition test), whereas only 55% of the control animals showed similar values.

In the case of H3N2, animals fed with the probiotic showed an average value higher than in the case of the control animals, as shown in Fig. 2. In a similar way, animals vaccinated with mycoplasma and fed with the probiotic showed higher titers of antibodies against the vaccine antigen compared with control animals (Fig. 3).

## Key strategy

These trials show the clear effect of a non-resident bacteria used as a probiotic in order to optimise the effect of commercial vaccination in growing pigs.

This fact could help in finding the key strategy in the use of this product for livestock animals.

References are available from the author on request

Fig. 2. Antibody titers in serum against porcine influenza in piglets vaccinated and non-vaccinated, with and without Toyocerin in the diet.

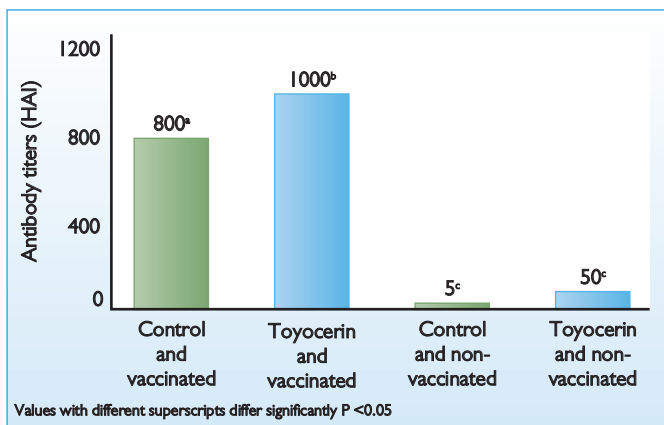


Fig. 3. Antibody titers in serum against mycoplasma in piglets vaccinated and non-vaccinated, with and without Toyocerin in the diet.

