

Probiotics in a porcine gastro-intestinal model

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Team members:

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Research Institute: ARC-Animal Production Institute

Research focus area: **PORK PROJECT**

New, rapid, sensitive and specific diagnostic tests that will reduce the time needed to detect and diagnose diseases

Full Title of the project

Isolation of potential bacteria from indigenous pigs and evaluation of probiotic properties in porcine gastro-intestinal model

Aims of the project

- To isolate potential probiotics bacteria from the ileum of indigenous pigs
- To evaluate the efficacy of selected probiotics bacteria to survive in a porcine gastro-intestinal model
- To investigate the effect of selected probiotics on growth performance and incidence of post-weaning diarrhea of weaned indigenous and Large White (LW) pigs

Executive summary

The purpose of this project was to isolate, identify and characterise strains of lactic acid bacteria from the ileum of piglets. Eighteen bacteria were initially isolated and finally, four bacteria were considered for further tests. The isolates exhibited good properties towards growth at low pH and bile tolerance. Results for antimicrobial tests against pathogens were also promising.

To investigate whether the isolates had adherence properties, an ileum model was constructed. Results were not consistent although a certain pattern showing adherence properties was established.

Results obtained in the study show that the isolates could be used in the pig industry. The rationale of using the isolates as pure cultures is to avert the use of antibiotics, which have normally being used, more especially in piglets. Normally, piglets suck milk, from birth, from their mother for about 3 months. Due to the demand of pork products, the period of suckling is reduced to 3 - 4 weeks. This can result in diseases like the post-weaning diarrhoea (PWD). To avoid the PWD, the piglets are subjected to antibiotics, which are efficient in solving the PWD problem. The drawbacks with using antibiotics are the long-term side effects and also that the antibiotic residues could be manifested in the immune system, thus rendering certain metabolic functions compromised.

We believe that the potential antibiotics could be used in the pig industry due to their range of benefits, which include: maintaining the balance in intestinal microbiota, enhance the digestion of feed, reduce the activity of carcinogenic enzymes, lower serum cholesterol, stimulate immune response, prevent digestive disorders, etc. Our role is to bring to the knowledge of the pig farmers about these probiotic products. Another focus deals with intellectual property (IP), which the Agricultural Research Council (ARC) will take care of.

The Red Meat Research and Development (RMRD) played a huge role in the success of this project. They have not only provided financial support but the technical input, more especially in the Technical Audit organized by the Technology for Human Resources and Industry Partner (THRIP) in September 2012. In this audit meeting held at the ARC, both THRIP and RMRD were present. THRIP was our partner in this project.

About 10 people were actively involved in this project at the ARC and they have all played a significant role.

The next objective of the project will be a huge-scale trial at the ARC where the isolated potential probiotics will be tested in the piglets. A proposal has been submitted to RMRD, and we hope that they will continue to support us, more especially, financially.

Conference

Rashwahla Lesiba Sydwell Langa, Goitsewang Makete, Marietjie Bruwer, Dikonketso Shirley-May Mofokeng, Christa Coetzee, Olayinka Ayobami Aiyegoro. 2013. Indigenous porcine gastro-intestinal tract as veritable source of probiotic isolates. 18th conference of South African Society for Microbiology, November 24 - 27 2013.

Scientific article

Rashwahla Lesiba Sydwell Langa, Goitsewang Makete, Marietjie Bruwer, Dikonketso Shirley-May Mofokeng, Christa Coetzee and Olayinka Ayobami Aiyegoro. 2014. Indigenous porcine gastro-intestinal tract as veritable source of probiotic isolates. Journal of Pure and Applied Microbiology, Vol. 8 No. 3.