



UCD Helps BioAtlantis Develop Novel Animal Health Product

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SCIENTIFIC



TECHNOLOGICAL



ECONOMIC

SUMMARY

In 2003 Tralee-based biotechnology company, BioAtlantis began collaborating with UCD researchers to develop a seaweed-based product to promote better animal health.

A key driver in the partnership was the ruling from Europe in 2006 that banned the use of in-feed growth promoting antibiotics. This was a major blow to the farming community throughout the EU and BioAtlantis, in partnership with UCD, sought to develop an effective natural alternative that could be validated by independent scientific research.

As a result of this successful collaboration with UCD researchers, BioAtlantis launched a pioneering animal health product, LactoShield. This breakthrough product has significant international sale potential worldwide. As a result of the collaboration UCD has become an internationally recognised centre of research excellence in the use of seaweed bioactives in animal nutrition.

The research collaboration has received funding from the Department of Agriculture, Food and Marine, Science Foundation Ireland, Enterprise Ireland and the Irish Research Council.

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BioAtlantis

Nature Working Naturally™

DESCRIPTION

Modern systems of animal production have been extremely successful in delivering large volumes of low cost food to the human population. The combination of high productivity and large numbers of animals inevitably means that animals are exposed to considerable stress during their productive period. Modern animal production has traditionally dealt with some of the problems of stress by using antimicrobial growth promoters to improve performance and /or health. However, the use of antibiotic growth-promoters was banned in EU member states since January 2006 and alternative systems to overcome stress, and to maintain efficient animal production had to be identified.



This work is contributing to the needs of the animal sector by researching the links between disease, health and nutrition and how to avoid disease using natural food compounds without the use of pharmaceutical products. Most research to date has focused on feeding the young animal to enhance its own immune system. Another, less researched novel approach is to enhance the immune system of the young via maternal colostrum and milk. Recent research has indicated that the quality of the maternal diet can have a substantial influence on growth and gastrointestinal health of the offspring in postnatal life. Dietary supplementation of a combination of laminarin and fucoidan to the pregnant sow enhanced colostrum immunoglobulin concentrations and the subsequent immune status of suckled piglets on Day 5 and Day 12 of lactation. These sows had lower fecal *E. coli* numbers at farrowing, and their suckling piglets had decreased digesta *E. coli* numbers at weaning and nine days after weaning compared to unsupplemented control piglets. The piglets also had a healthier digestive tract nine days after weaning, culminating in a greater average daily gain during the starter period and from Day 21 to slaughter.

In a longer-term study, sows were supplemented with seaweed extracts from Day 87 of gestation and the offspring were monitored until time of slaughter (Day 117 post weaning). Piglets from seaweed extract-supplemented sows had greater nutrient digestibility and increased beneficial bacteria and a greater body weight than control piglets for the duration of the study. Most importantly, dietary supplementation with seaweed extracts supported growth through an *E. coli* challenge, with the supplemented piglets having the highest growth rates and reduced diarrhoea compared to the unsupplemented controls.

DETAILS OF THE IMPACT

Scientific and Technological Impacts

Since the research and development for LactoShield began, Professor O'Doherty, along with Professor Torres Sweeney, UCD School of Veterinary Medicine, have conducted numerous in-depth studies and published approximately 40 academic papers on their findings. While the initial research has focused on the pig as an animal model, it is hoped that human applications can be developed for use in treating or alleviating symptoms associated with gastrointestinal disorders such as irritable bowel syndrome.

"Professor O'Doherty has been absolutely pivotal to what has been achieved," says John T. O'Sullivan of BioAtlantis. "I was proposing something unusual, but also novel and he was open minded where others may not have been. His team at UCD was invaluable in helping BioAtlantis develop our concept into a commercially viable product. I also felt that establishing a strong scientific basis for what we were doing was critical, and in this regard the connection with UCD has given us something money can't buy, which is validation and credibility. You can't underestimate the value of this for a small company trying to break into a global market."

In a nutshell, the researchers could see a significant improvement in intestinal microflora and a reduction in harmful bacteria. These findings were deemed very encouraging and led to Professor O'Doherty pressing ahead with a programme of research. Two patents have since been taken out on the Intellectual Property related to the development of the technology, and BioAtlantis is leading a €1.68 million EU research project in conjunction with UCD to validate the efficacy of naturally-derived products in enhancing pig and poultry health, immunity and productivity.

Economic Impacts

As a result of the successful collaboration BioAtlantis has the potential to become a leading biotechnology company in the future with strong economic benefits to Ireland. John T. O'Sullivan of BioAtlantis said, "the outcome of the partnership has been a good product that works, and has the potential to turn BioAtlantis into a very significant biotechnology company in the years ahead."

In addition the company and the economy will benefit from the talented Masters and PhD students that have been involved in this research. Prof O'Doherty said, "BioAtlantis was very insistent that while the idea might be good, it had to stack up scientifically. This has meant a lot of studies and a lot of publications, which have resulted in us becoming a major world leader in this type of research. A number of our Masters and PhD students have taken this as their specialist area and we have built up a valuable knowledge cluster." One of Prof O'Doherty's PhD students has now been employed by BioAtlantis Ltd, as their main animal nutritionist.



RESEARCH REFERENCES

Invited Review

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