

# Biotechnology

## Business Scenario

Animal Nutrition Organization Australia (ANOVA) is dedicated to providing natural, non-antibiotic solutions to varied animal health and nutrition issues.

In 2012, ANOVA decided to take part in an eight-year study to ensure that Australian beef was a high quality meat that was environmentally responsible, safe and nutritious. ANOVA created a hypothesis for this program of investigation which stated,

“With knowledge of the intrinsic factors regulating the metabolism of the gastrointestinal tract, we can identify mechanisms for improving feed intake, enhancing feed efficiency and reducing the reliance on antibiotic use.”

The first research phase of ANOVA's R&D study involved identifying the intrinsic factors that regulated feed intake in the cow and developing a suitable, low temperature, high moisture pellet that facilitated the ingestion of the feed by cows.

To achieve its technical objectives and overcome the related technical risks, the ANOVA generated new knowledge at the conclusion of each experimental stage and built upon that knowledge at every stage of the remaining project.

After undergoing its first year of experimentation, ANOVA claimed four R&D activities for the 2013 fiscal year; two core and two supporting.

## ANOVA's Core R&D Activities:

Design and development of a series of prototypes to achieve the technical objectives and prove the hypothesis (design and adaptation of the chemosensory testing model).

Trials and analysis of data to achieve results that can be reproduced to a satisfactory standard (development and testing of feed intake and efficiency enhancers).

The main objective of this core activity was to determine whether a model for identifying cow preferences based on the chemosensory properties of an ingredient could be designed and developed. This experiment included:

- Identification of substances known to have an impact on feed intake and efficiency.
- Validation of a model for identifying cow preferences based on the chemosensory properties of an ingredient.
- Determination of the statistical sensitivity of the model for identifying the preferences of different ingredients and purification of feed ingredients.
- Determining of optimal feed processing conditions for retaining the intake improvement of an ingredient in a commercially relevant cow feed.

The hypothesis for this ANOVA core activity stated that with improved knowledge of the intrinsic factors regulating the metabolism of the gastrointestinal tract, it was possible to identify mechanisms for improving feed intake, enhancing feed efficiency and reducing the reliance on antibiotic use.

Details of this experiment included development of the enhancers based on information gained through the model and testing of the enhancers to ensure efficiency, accuracy and safety.

## Commentary

### Identifying Core R&D Activities

There are two types of core R&D activities:

1. Experimental activities whose outcome can not be determined in advance on the basis of current knowledge, information or experience, but can only be known by exercising a systematic progression of work that follows the principles of established science, proceeding from hypothesis to experiment, observation and evaluation, and lead to logical conclusions.
2. Experimental activities that are conducted for the purpose of creating new knowledge.

### Hypothesis Defined

AusIndustry recognises a hypothesis as a statement or proposition about what result is expected if certain conditions are put in place and certain actions are carried out in an experiment. It can range from an assumption or proposition to a theory, but it must establish the experimental activity and form part of a broader systematic progression of work undertaken by the company. It must be evident that the claimed experiment has been designed to test the hypothesis.

If the outcome of an activity can be obtained without a hypothesis, then the activity will not be considered R&D.

## ANOA's Supporting R&D Activities

Background research to evaluate current knowledge gaps and determine feasibility (background research for feed intake and efficiency stimulants).

ANOA's background research included literature search and review, consultations with industry professionals and potential customers, and preliminary equipment and resources review.

The activities conducted in the background research were necessary to support the core activities because they assisted in identifying the key elements of the research project.

Ongoing analysis of customer or user feedback to improve the prototype design (feedback R&D of the feed intake and efficiency enhancers).

This supporting R&D activity included:

- Ongoing analysis and testing to improve the efficiency and safety of the project.
- Ongoing development and modification to interpret the experimental results and draw conclusions that served as starting points for the development of new hypotheses.
- Commercial analysis and functionality review.

These activities were directly related to ANOA's core R&D activities because the feedback was necessary to evaluate the performance capabilities of the new design in the field and to improve any flaws in the design.

## Commentary

### Identifying Core R&D Activities

Activities that do not form part of the core experimental activities may still be eligible as supporting R&D activities. Supporting R&D activities are directly related to an eligible core R&D activity. They must have been performed for the primary purpose of supporting a qualified R&D activity.

### What records and specific documentation did ANOA keep?

To meet the R&D Tax Incentive requirements, ANOA had to save documents that outlined what it did in its core R&D activities, including experimental activities and documents to prove that the work took place in a systematic manner.

ANOA saved the following documentation:

- Background research
- Project records and laboratory notebooks
- Photographs / videos of extrusion process
- Testing protocols
- Results or analysis from testing / trial runs
- Records of resource allocation / usage logs
- Tax invoices

By having these records on file, ANOA confirmed that it was 'compliance ready' – meaning if it was selected for an AusIndustry audit, it could present documentation to show the progression of its R&D work.