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## Meat industry by-products: a cunningly disguised opportunity

A. ROGERSON

Consultant, 1 Ring Terrace, St Mary's Bay, Auckland, New Zealand

A pharmaceuticals division was first established in a New Zealand (NZ) meat company by Richmond Limited in mid 2001. This new division was a first in Australasia and had the stated objective of adding value to a range of relatively low-value by-products. At that time the supply of by-products throughout the meat industry in NZ was generally characterised by:

- low prices;
- low level of attention;
- low levels of enthusiasm;
- lack of market knowledge.

This presentation will attempt to:

- describe, in general terms, the establishment of a pharmaceuticals division as an integral part of a meat company;
- describe the process of establishing relationships between suppliers and customers;
- highlight areas of particular strengths and weakness in the pharmaceuticals arena for the NZ meat industry;
- make some observations about the medium and longer term prognosis for the industry, in its widest sense.

In 2001 the NZ meat industry appeared to be possessed of a number of paradigms, namely:

- *by-product* was a general term that incorporated pet food, render, tallow and almost any other animal-derived material that did not have an edible use;
- the core business of every meat company was killing and cutting;
- the only interesting offal was an edible offal;
- pharmaceutical and biotechnology companies were considered very difficult to deal with as customers because of their unusual demands;
- by-products sold to such customers were often strange in nature and were usually looked after by a beef salesman in his spare time.

It was apparent, in 2001, that there was significant untapped potential in this area. It was also apparent that, in order to deliver on this potential, it would be necessary to work on maximising:

- collection yields;
- market development;
- prices.

As a general principle it is feasible to take a two-tier approach to maximizing revenue from by-products for pharmaceutical application, ie:

- supply of raw material, where the by-product is supplied from the meat plant frozen, in cartons, for extraction or further processing by the customer;
- supply of value-added products, where the meat company adds some value to the raw material before sale.

While it is impossible to provide verifiable figures, it is probably safe to say that currently the overwhelming majority of pharmaceutical materials sold by NZ meat companies would fit into the former category and be sold in bulk, frozen form. Some NZ meat companies involve themselves in rudimentary value-adding processes on site (such as converting blood from a range of animals into plasma and serum, acid-dipping pancreas glands, separating the cortex and medulla from adrenal glands and excising various brain components). Developing partnerships with customers, or developing appropriate expertise in-house (or in collaboration with other external experts), would appear to present a real opportunity for the NZ meat sector.

The successful establishment of a pharmaceuticals division within a meat company will not come as a result of merely identifying opportunities and generating impressive-looking spreadsheets. It will come from a commitment of all the key stakeholders within the company. This needs to start from the top and be communicated effectively to every level of the organization. It specifically needs the support of:

- plant managers, their supervisory staff and the people who stand on the plant floor collecting and packing the products;
- the technical staff, who can assist with interpreting complex import (and export) regulations for a range of unusual products;
- finance staff, who ensure that costs and revenues are being properly (and fairly) allocated;
- livestock buyers, who may be required to purchase specific stock for specific products.

In short, the people charged with successful implementation of a pharmaceuticals division will be required to:

- change the company's view of by-products;
- educate senior company executives as to the potential;

- win the buy-in from plant managers and, through them, their production staff;
- identify a whole new range of customers for these new products;
- demonstrate a commitment to working with these customers to meet their demands for quality in the product, the process and the supporting documentation.

If enough meat companies are prepared to demonstrate the necessary commitment and to implement the necessary initiatives, it may be reasonable for the industry in NZ to start to claim that: *we do not supply meat industry by-products, we supply biotechnology and pharmaceutical industry raw materials.*

Taken a step further, it may even be reasonable for the industry to communicate a new vision, specifically related to pharmaceutical products that: *one day (soon) the edible meat produced by the meat industry will become by-products of their business of supplying raw materials to the biotechnology and pharmaceutical industries.*

There is no doubt that supplying animal-derived raw materials to the biotechnology and pharmaceutical industries can be a successful business stream for any NZ meat company, and represents one of the industry's greatest short-term opportunities. However it is vitally important to be conscious of the fact that the world-wide trend is for all animal-derived raw materials to be removed from human health products, or from processes that generate human health products. If it were possible to eliminate cost-effectively all animal-sourced raw materials, every manufacturer would do so with immediate effect. Any animal-sourced raw material, regardless of its source or its intended application, displays a range of negative attributes, such as:

- *Variability within and between batches.* NZ meat companies process a wide range of animals reared for a wide range of purposes. There are variations, which can be significant, in:
  - hormone levels from animals of different sex and age, and at different times of the season;
  - aprotinin levels, which increase significantly in the lungs of older animals;
  - enzyme concentrations and activity, from animals of different ages;
  - contaminants (such as heavy metals) which are significantly higher in tissues from older animals.

Different meat plants will interpret the same standard operating procedure (SOP) differently and will generate variable products. There are variations

in breeds, rearing conditions, climate, grass (and other feed) availability and quality.

- *Variability of supply.* The livestock industry in NZ exists principally for the production of milk, meat and wool, and livestock numbers vary from year to year. This can have serious ramifications for some biotechnology and/or pharmaceutical customers. Likewise customers can be compromised by certain edible meat products becoming less fashionable or less financially viable. Customers of pituitary glands or certain brain components were seriously affected by the loss of the European market for edible brains in response to bovine spongiform encephalopathy (BSE).
- *Increased risk of disease transfer.* NZ has the world's lowest official risk of animal health disease. This does not mean that NZ is free from animal disease, nor that NZ supplies animal-derived products which are always *safe*. Some NZ bovine blood products test positive for bovine viral diarrhoea (BVD). Tuberculosis, while confined to a few movement control areas, still presents a significant threat. NZ imports thousands of agricultural products and receives millions of visitors annually. Disease is always a threat.
- *Negative market perceptions.* This is not the forum to debate the trend, in every sector, away from products that contain animal-derived ingredients. This trend is happening and will continue and should be viewed by the industry as a driver for short-term action.

We are in a twilight industry and the market for animal-derived raw materials will eventually dry up. Statements of this nature have been made for the past 20 years and in that time some long-standing markets have disappeared (e.g. the synthesis of nature-identical hormones and, most famously, human insulin from *E. coli* that has replaced porcine insulin). The twilight could possibly last for a further 20 years, or it could be over much sooner. Regardless, this is a branch of the meat industry that is associated with some significant growth potential, even if it may be of limited duration.

The development of a range of ingredients for use in the cosmetic sector may present a slightly different proposition. There is certainly less risk from the perspective of animal disease, although these measurable risks may be less significant, in reality, than the risks posed by activists. It is impossible, of course, to quantify such risks, and they will certainly have been

considered by the NZ companies that are involved in this aspect of the business.

NZ is a small country, a long way from almost every significant international market. The driving force for any prospective customer going to the trouble to consider buying raw materials from such a remote place relates directly to our:

- animal health status;
- traceability;
- *auditability*;
- MAF certification;
- clean, green image.

Our animal health status is a consequence of isolation, border control, education and vigilance. We have a justifiable reputation, but this may be more tenuous in the longer term than we care to believe. Some European countries that have suffered the consequences of BSE and foot-and-mouth disease have responded to their poor market position in novel, and potentially challenging, ways. We should not assume, for example, that the world markets will continue to view NZ's animal-derived raw materials as the best that money can buy.

Our traceability goes hand in hand with our animal health status and is an equally vital component of our uniqueness internationally. We have systems in place to identify quickly and accurately, the source of animals at slaughter, which puts us a long way ahead of the game. The basis of this system is the Animal Status Declaration (ASD) sheet that requires forms to be filled, boxes to be ticked and statutory declarations to be made each time livestock are transferred. This has obvious limitations. Introducing a paperless version of the ASD process would address only some of these limitations.

As an industry we are audited on a (very) regular basis by the likes of European Union, United States of America Department of Agriculture (USDA), individual country representatives and individual customers (and their customers). Pharmaceutical and biotechnology customers often introduce additional audit requirements that any meat company aspiring to become a supplier must be prepared to meet.

NZ's Ministry of Agriculture and Fisheries (MAF) plays much more of a role than merely policing activities at meat plant level. The presence of a MAF seal on a carton of product, and the accompanying MAF export certification, is taken by many customers as being the equivalent of a government-sanctioned seal of approval. In the real world this has significant commercial value.

Pharmaceutical and biotechnology companies purchase raw materials from NZ because they are compelled to, not because they necessarily want to, and we would do well to always bear that fact in mind. Yet there is currently a *feel-good* factor about NZ as a country that makes customers (current and prospective) want to come here. This is not a trivial consideration and is something we should ensure features on all of our promotional material for the whole of the meat industry.

As NZ meat companies have woken up to the opportunities that pharmaceuticals can deliver, there have been some significant marketing successes. For example NZ now provides the second largest source of lungs (and is tending rapidly towards the largest) to the world's largest producer of aprotinin for human health use.

Almost any material derived from any farmed animal can potentially be sold as a raw material to the pharmaceutical and/or biotechnology sector. The table below provides a (very) small selection.

<b>Raw material</b>	<b>End use</b>
Adrenal gland	Freeze-dried as whole glands and/or extraction of biochemicals from medulla and cortex
Bone	Manufacture of a freeze-dried intermediary component of products to treat osteoporosis
Gullet	Extraction of chondroitin sulphate
Hock tendon	Extraction of collagen for application in medical devices
Pericardium	Manufacture of products used in wound healing
Lungs	Extraction of aprotinin
Pituitary gland	Extraction of follicle stimulating hormone (FSH), growth hormone and other hormones
Scapula	Extraction of chondroitin sulphate
Testes	Extraction of hyaluronidase for application in cell culture media
Trachea	Extraction of chondroitin sulphate
Plasma/serum	Extraction of various proteins and/or application as a component of cell culture media

The market application within the pharmaceutical and biotechnology sectors for animal-sourced materials of non-bovine origin is very limited. Some notable exceptions would be ovine pituitary glands and cartilage and some deer products such as velvet antler, blood and glands. NZ's pig industry appears not to supply any significant pharmaceutical raw materials. There has been some debate to the effect that non-bovine raw materials are inherently safer than their bovine counterparts (primarily in relation to the risks posed by BSE), yet the opportunity to substitute non-bovine alternatives is largely prevented due to licensing and regulatory constraints on customers.

It is not meaningful to present a figure which represents the *total potential added value per head* because, in reality, this figure is influenced by a wide range of factors. In some instances the price of pharmaceutical items can be hundreds of dollars per kg, but these would be items which are associated with relatively very low yields (and probably with relatively low demand). Other items sell for one or two dollars per kg, reflecting their relative abundance and ease of collection, and the relatively low-value products into which they are transformed.

There is no such thing as a *meat industry by-product*. It has been demonstrated in NZ that the sale of items formerly known as by-products can be associated with rapid growth and medium-term sustainability. In order for the momentum to be maintained it will be necessary to ensure that *pharmaceuticals* become integrated into a large number of major meat exporters. Procuring animals to kill them, cut them and sell the meat products may still be the business of a meat company, but it should not be considered its only business focus.

In their time, space travel and wireless telephones were fanciful visions. The re-positioning of a meat business, in which the edible meat becomes by-product of the supply of pharmaceutical and biotechnology raw materials, may still be in the vision phase. It may never become a reality, but even aspiring to achieve it will deliver significantly improved commercial success.