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**“Governance of Transgenic livestock in Canada and a DNA
traceability trial to enhance the identity preservation of transgenic
livestock”**

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ABSTRACT

In Canada the development and production of transgenic animals is increasing with advances in this technology. In particular, the transformation of livestock animals has become more prevalent and now includes cattle, sheep, goats and pigs. The biotechnology/pharming industry, regulatory agencies and the public alike all have a vested interest in ensuring that such transgenic livestock are properly governed. There is currently an ongoing review of the Canadian regulatory framework for transgenic animals which will be outlined in this paper.

In North America the unapproved release of novel animals into the public food/feed chain has already occurred on at least four occasions in recent years. Such erroneous releases threaten not only the public confidence in the emerging transgenic biotechnologies but can also damage trust in the regulatory authorities who oversee such novel genetic applications. In North America's

first DNA livestock traceability study Canada's federal government, trialed a DNA traceability application on 300 conventional pigs. The aim of the study was to test the viability of the use of a modern biotechnology as a means tracing transgenic animals within a real time animal production system from gate to plate. More specifically the study allowed the participants, to (a) field test the on-farm sampling of animals with DNA sampling ear BiotagsTM; (b) to examine the use of specialized meat sampling devices in abattoir and supermarket level sampling and (c) to explore the ability to DNA trace meat from various supermarkets back to through the production chain to the farm and animal of origin.

Results show that by employing the use of specialized DNA sampling BiotagsTM and sampling at various critical points in the production and distribution chain, we demonstrated the successful tracking of target animals from field to fork. Retail samples from a number of supermarkets over several sampling dates were shown to be able to be traced back to specific individual animals thus adding an unprecedented enhanced level of risk mitigation and traceability. On-farm sampling and pig identification was carried out through the use of DNA sampling BiotagsTM, while specialised carcass sampling devices were used in the abattoir and supermarkets. Sampling was carried out with a 100% success rate.

The study positively linked meat products sampled along the supply chain with source carcasses. This was carried out with a view of testing the efficacy of traceability from farm to slaughter, slaughter to boning hall and slaughter to supermarket. Traceability levels were found to be 100% from farm to slaughter (n=300), 97.5% from slaughter to boning (n=40) and 96.9% from slaughter to supermarket (n=36). In addition the DNA analysis successfully isolated a deliberately spiked sample from the retail sample set. The results show the value and suitability of such a DNA traceability based tool to enhance the capacity to track and monitor transgenic animal stock that are considered high risk or that remain unapproved for food/feed use.