

Beef cattle breeding for healthy meat

The Challenge

How can techniques to measure lean meat yield and meat eating quality combined with measures of fat and different fatty acids to influence future breeding decisions, and support a premium for healthier meat?

The Research

Establishing and evaluating accurate and reliable techniques for measuring or predicting carcass and meat eating quality in beef cattle and sheep is a key step towards:

1. the development of value-based marketing systems
2. genetic improvement programmes
3. management systems to enhance product quality.

A major part of this project includes investigating the genetic basis of differences in carcass fat and fatty acid profiles.

More than 650 meat samples have been analysed for fatty acid profiles. In collaboration with BLOSS, analyses will be carried out to predict the genetic basis of individual fatty acids. The main emphasis is on Omega-3 fatty acids.

Breeding strategies to improve the fatty acid profiles in meat can then be developed to benefit human health.

Most of the animals used were raised at SRUC's Beef Research Centre.



Near Infrared spectroscopy

The Results

Preliminary research indicates that the amount of Omega-3 fatty acids in meat (associated with better human health) is highly heritable in beef cattle.

It has been demonstrated that fatty acid profiles in meat can be accurately estimated on the rump muscle using Near Infrared spectroscopy (see picture) or Hyperspectral Imaging technology in the abattoir.

These results open up the opportunity for efficient selection for healthy meat.

The Impact

Widespread use of genotypes with these beneficial attributes for human health would reduce waste resulting from excess fat trim as well as resulting in healthy high quality meat products.

Increased polyunsaturated Omega-3 fatty acids in human diets have been reported to reduce the risk of cardiovascular disease (CVD) and improve cognitive

functions – the total cost associated with CVD in the UK is estimated at £19 billion each year.

In addition, conjugated linoleic acid content in human diets has been related to reducing the risk of certain cancers. Red meat is a major source of these beneficial fatty acids. Further enhancing these levels, through genetic selection, for cattle with an improved fatty acid profile represents a real opportunity to contribute towards a healthier diet.

At processor level, this may also hold a marketing advantage with a unique selling point holding potential premium.

Project Detail

Project start date: 04/2011, finish date: 03/2016.

Email: Rainer.Roehe@sruc.ac.uk The research team involved Rainer Roehe, Dave Ross and Carol-Anne Duthie, SRUC, West Mains Road, Edinburgh, EH9 3JG, Scotland.

The Scottish Government has funded this project. Collaborators in previous research projects, for which the data was recorded, include Scotbeef, Gilden Photonics, QMS, EBLEX, BIOSS and the University of Bristol.

For further info see the following links: http://www.foodhealthinnovation.com/media/19619/fhis_rainer_roehe_sruc_071112.pdf

www.sruc.ac.uk/download/downloads/id/1875/imeq_report

<http://www.knowledgescotland.org/briefings.php?id=72>

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Further Information

For more information on farm business management, beef systems, nutrition and breeding contact SAC Consulting beef and sheep specialist at beefandsheep@sac.co.uk