



Mohammed GAGAOUA

Technology centre: Meat Technology Ireland (MTI), Teagasc

Academic Mentor: Dr. Anne Maria Mullen

Commercial Partner: Dawn Meats

Commercial Mentor: Peter Mooney

Mohammed is a food/meat scientist who received his engineer degree in INATAA institute, Constantine 1 University, Algeria. In 2009 Mohammed started his high postgraduate degree in the same university, focusing on main endogenous muscle proteolytic systems and serpins inhibitors before undertaking a PhD in meat and muscle biochemistry at INRA research centre, France on biomarkers of sensory qualities of beef: understanding of the biological mechanisms and prediction.

The academic appointments of Mohammed are animal and food sciences, food biotechnology, meat and meat products and foodomics. His current research activities are at the interface of chemistry and biology with a focus on the use of protein biomarkers quantified by western-blotting, Dot-Blot and reverse phase protein arrays (RPPA) to manage meat quality and also to understand the mechanisms behind meat tenderizing.

As a career achiever, Mohammed was runner-up in 2015 for the International Meat Secretariat Award; he received in Australia the ICoMST2018 award by Robin Shorthouse for outstanding contribution to advancing Meat Science and the ICoMST2018 Meat Science award for best presentation. He has published 48 peer-reviewed papers in international journals, 6 book chapters, 23 proceedings and has more than 40 communications in national and international congresses.

Dr. Anne Maria Mullen

Anne Maria has been responsible for the management of two commercially focused research programmes. The first of these has been the optimisation of meat tenderness outcomes through a multi-disciplinary approach. Her contributions to the research design and industry engagement were key in ensuring Meat Tenderness Management was secured as a research pillar within this Technology Centre. The second programme of research is in the area of recovery of value from meat co-products. Outputs are also helping guide discussions on a wider stakeholder level on future strategies in relation to the bioeconomy. Research findings have been published in high impact journals with the highest impact factor of 25.8.

Peter Mooney

Peter Mooney has a degree in Biotechnology from DCU, an IEA Diploma in International Trade and Marketing, and an MII Marketing Diploma. Peter has 25 years of experience in R&D, Product Development and Commercial Development in the export food business, working in food ingredients and consumer products. Peter was recruited in 2012 by Dawn to drive and manage its Research & Innovation agenda, working across the Group to commercially assess new ideas and technologies. He has led 2 Innovation Partnerships and other commissioned research with Irish and UK RPOs, is currently leading Dawn's input to the H2020 Nanopack Innovation Action, and actively pitching with other partners for new H2020 projects.

Meat Technology Ireland (MTI)

Meat Technology Ireland is an industry-led initiative that is building a strategic research and innovation base in beef and sheepmeat processing in Ireland. The Centre is a 'one-stop shop' for meat processing research and technology, serving as a hub to co-ordinate all beef and sheepmeat processing research needs. MTI is hosted by Teagasc, the Irish Agriculture and Food Development Authority, Teagasc has a world-renowned reputation for meat safety and shelf-life research. Teagasc Food Research Centre in Ashtown has ten multidisciplinary meat research laboratories, an experimental abattoir, boning hall, packaging hall, cooked meats facility and food processing pilot plant if needed.

Dawn Meats

Established in 1980, Dawn Meats supplies a quality range of lamb and beef carcass, primal cuts, burger patties, added value and slow cooked products throughout Ireland, the UK, continental Europe and other overseas markets, with global sales offices and distribution partners. One in five McDonald hamburgers consumed in Europe are produced at Dawns processing facilities, processing 900,000 cattle and 2,600,000 sheep from 25 sites in Ireland and the UK, with in excess of 8,000 employees and a turnover of €2bn. It is supplied by over 30,000 Irish and British farmers and contributes €1.67bn to rural economies.

Mohammed's project

“Omics-based biomarkers for beef carcass quality management: elucidating biochemical pathways underlying variation in meat tenderness”

Meat tenderness is a key attribute influencing consumer's satisfaction and willingness to purchase. One of the main challenges for the meat industry is to meet consumer expectations for tender beef. The Irish beef industry must become more responsive to the changing market place and consumer demands for guaranteed eating quality.

Along with the issue of consumer dissatisfaction this variability prevents optimal marketing of Irish meat on a global scale. While many advances have been made to improve and guarantee beef tenderness, an unacceptable level of variation, most of which is accountable to the post-mortem period, still remains. This variation arises from a lack of knowledge of the suite of biochemical mechanisms (at rigor/apoptosis onset and during the post-mortem aging processes) in the muscle responsible for post-mortem meat tenderization.

During the post-mortem period, muscle is converted to meat and differences between individuals at this biochemical level influence the carcass response to post-mortem management (e.g. chilling regime) which in turn impacts on the tenderness outcome. Using high-end state of art analytical tools to probe the muscle biochemistry, this project is expected to lead to identification of biomarkers associated with tenderness.

Using this knowledge to make science-based decisions around carcass management is in turn expected to lead to better assurance of meat tenderness. Beef is an expensive product and one which the consumer deserves to enjoy and have expectation met. Therefore, the objective of this proposal will be to further our knowledge and understanding of the role of various metabolic pathways, not yet fully understood, in optimizing a carcass management system for consistently delivering tender meat. As a result, marketed beef tenderness will be less variable and will better meet consumer's expectations.
