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Food and The Marine

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## BioOpps: Opportunities for functional & bioactive protein ingredients derived from co-products of the Irish meat industry



### Key external stakeholders:

- Irish meat producers/processors, ingredients companies producing functional ingredients for meat products and protein enriched formulations, sports nutrition, blood processors, pet-food companies.
- Bio-based materials companies, especially those working with application as bioactive compound carrier and/or biomedical material (e.g. for cell growth).
- State agencies with interest in revalorization of meat co-products and sustainable production.

### Practical implications for stakeholders:

- Protein has nutritional as well as functional roles in food formulations. Meat co-product proteins can be explored to reduce e-numbers and improve the nutritional profile of protein enriched products.
- Support for more optimal and higher value uses of proteins from fifth-quarter presented.
- There is a strong rational (market level information and regulatory environment) to guide efforts in revalorising meat co-products into higher value applications.
- Cross-sector collaboration would enable creation of a network aiming to valorise co-products.

### Main results:

- Animal co-products can attract higher values if the right application is identified. The protein market is growing and recovery of proteins from alternative sources a necessity as demand grows in tandem with the world population. Opportunities exist to develop synergies between protein sources and ingredients.
- Meat processing co-products, e.g. offal, blood, cook-out, are underexplored source of proteins with valuable techno-functional properties and the generation of bioactive hydrolysates and peptides.
- An analysis of different markets relevant to animal protein ingredients and current players was carried out and an outline of current uses for selected co-products presented. The supply capability of the Irish sector and volumes of proteins which could be extracted were evaluated against current market demands, costs and available technology.
- Ireland has a unique opportunity to benefit from the opportunities in this space. Protein markets are forecast to increase, sustainable systems are imperative and science is advancing & finding more applications for co-products. Conditions are favourable for the recovery of value from co-products, which would encourage more innovative solutions, and allow a rise in value across the entire value chain.
- Cross-sectorial collaboration between industries along the value chain is necessary, in order to allow for a protein network to be created in Ireland. Due to economies of scale, alternative approaches such as the formation of consortia or co-op systems should increase the chances of success and bring about higher returns for the industry, while preserving core competencies from the different sectors.

### Opportunity / Benefit:

- A map locating DAFM approved slaughtering plants, fallen animal collectors, composting, rendering and incineration facilities as well as Bio-Pharma plants was generated.
- Generated information has provided invaluable insights to the market place and aspects to consider for downstream commercialisation of these products, to allow Irish companies to recover as much value as feasible, in a sustainable manner, throughout their production and processing chains.

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### 1. Project background:

The meat industry plays an important role in the Irish economy. Total Irish meat exports accounted for approximately €3.8 billion in 2017, and the value of beef exports alone reached €2.5 billion (Bord Bia). The production of meat inevitably generates co-products and side streams whose value is generally lower than that of meat. Simultaneously, more eco-friendly sources of proteins are being researched and the number of consumers opting for reduction or removal of meat from diets is increasing. This feeds into a wider scenario in which there is an increasing demand for protein and in which sustainability is key, and establishing steps to minimise food waste at every stage of the processing chain is critical with a view to identifying opportunities to reduce, recycle or revalorise. The current study was designed to give an overview of the current protein market and potential commercial opportunities for Irish meat producers, focusing on proteins from animal co-products. BioOpps outcomes include an analysis of the different markets relevant to animal protein ingredients and current players; an outline of current uses for selected animal co-products, especially in Ireland, and their potential applications. The supply capability of the Irish meat sector and the volumes of proteins which could be extracted are evaluated against the current market demands, costs and available technology, as well as the current legislative scenario, and particular applicable regulations which govern this area.

### 2. Questions addressed by the project:

- What is the current status of the protein market and are there potential commercial opportunities for Irish meat producers, to capitalise from proteins from animal co-products?

### 3. Main results:

- The strongest recommendation of this report is to encourage cross-sectorial collaboration between industries all along the value chain in order to allow for a protein network to be created in Ireland. That would allow for economies of scale, while preserving core competencies from the different sectors.

### 4. Opportunity/Benefit:

The study provides invaluable information on the market place and aspects to consider for downstream commercialisation of proteins from animal co-products, to allow Irish companies to recover as much value as feasible, in a sustainable manner, throughout their production and processing chains:

- A map locating DAFM approved slaughtering plants, fallen animal collectors, composting, rendering and incineration facilities as well as Bio-Pharma plants;
- Relevant national and foreign industry and stakeholders contacts.

### 5. Dissemination:

- IFSTI, 46th Annual Food Science and Technology Conference, Ashtown, Dublin, Ireland. 6th – 7th December 2017 (Oral presentation: Finding market opportunities for animal proteins derived from low value streams from the meat processing chain, Romain Couture)
- Invited Speaker: Oral Presentation: Maeve Henchion (2018) Traditional and emerging protein sources – working in synergy or fixed in competition Food Protein Vision, Amsterdam 7-9 March
- Invited Keynote Speaker: Anne Maria Mullen “Alternative uses for co-products: Harnessing the potential of valuable compounds from meat processing chains”. At 63rd International Congress of Meat Science & Technology (ICoMST), held in Cork, Ireland between 13-18th August 2017.
- BioOpps Seminar, Teagasc Ashtown, 26th April, 2018 (Dublin, Ireland) at which Romain Couture presented on this project

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- BioOpps and ReValueProtein researchers co-authored three chapters for the Elsevier-Academic Press book: “Sustainable Meat Production & Processing” published 1st Nov 2018: E-Book ISBN: 9780128156889, Paperback ISBN:9780128148747
    - Chapter 4 - Proteins recovery from meat processing by-products. Liana Drummond, Carlos Álvarez and Anne Maria Mullen
    - Chapter 5 - Blood Proteins as Functional Ingredients. Mònica Toldrà, Sarah A. Lynch, Romain Couture and Carlos Álvarez
    - Chapter 12 - Facilitators and barriers for foods containing meat co-products. Maeve Henchion and Mary McCarthy

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**6. Compiled by:** Dr Liana Drummond & Dr Anne Maria Mullen

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