Atlantic Stakeholder Platform Conference - 20 January 2015, Porto

Development of novel ingredients derived from marine fishery waste for sustainable aquafeeds

The workshop focused on the potential of novel materials principally from landed fish processing with a view towards reducing our fish meal dependency in Europe using new technologies for treating fish discard and trimmings into a range of useful materials from these by-products. The emphasis was on aquaculture and the potential to create new local industries and enterprises around the coastal regions of the Atlantic. Another area was the interests in seaweeds for many uses and presentations of research finding to utilize specific seaweeds as ingredients for fish to promote health and well-being. It addresses some issue of societal benefits of developing a sustainable industry based on exploitable sources within the marine bio-resource chain.

Organiser: [University of Plymouth, UK]

<u>speakers and panellists of workshop</u>

1. Professor Simon Davies (UK)
2. Majbett Bolton-Warberg (Ireland)
3. Pierre Erwes (France/Canada)
4. Dr Luisa Valente (Portugal)

1. Key messages

The three key messages from our workshop

1. There is considerable scope for developing marine clusters to foster innovation, enterprise and active business within the marine biotechnology sector with special emphasis on aquaculture applications. The marine biosciences agenda was briefly reviewed and its contribution towards a new blue economy for the Atlantic regions.

2. There is potential to mitigate the problem of fishery processing and discard waste by implanting new technologies to address recovery of marine protein and oil into a range of novel 'added value' products for human, pet animal markets and aquaculture to provide new and functional marine based ingredients.

3. The value of seaweed was discussed and two presentations demonstrated that processed sea weed meal could be an invaluable component of aquafeeds with examples of research undertaken in Ireland and Portugal on salmon, trout, cod and other fish species. The seaweed industry is a viable and sustainable industry and a common resource for exploitation

2. Summary

Pierre Erwes

Pierre Erwes provided a brief overview of his company, BIOMARINE and its mission to promote a sustainable agenda embracing a marine biotechnology platform. This Blue economy approach has been the theme of successive major meetings held in Nantes 2011, London 2012, Halifax, Nova Scotia, Canada, 2013 and Cascais, Portugal 2014. He spoke of the need for collaboration and networking and good governance and investment into the formation of marine bio-clusters to energise the marine biotechnology sector and related industry. These clusters could form the basis of marine science parks, attracting stake- holders and leading to new business incubation and establishment. This would apply to the cosmetics and pharmaceutical industry, aquaculture and sea food technology all linked to the Atlantic coastal regions in Europe, Canada and US.

Simon Davies

Professor Davies provided a detailed account of the state of aquaculture and its dependency on high value feed ingredients derived mainly from marine sources such as fish meal and fish oil.

The concept of converting waste material (fish offal and viscera, various organs) was listed and details about technologies to manufacture fish protein hydrolysates, enzymes and fish oil concentrates for human, companion animal (pet) feeds, aquaculture and other applications. This was made in the context of reducing fish meal and fish oil in the in compound commercial diets mainly for carnivorous fish species being raised intensively in aquaculture operations in Europe e.g. salmon sea bass and sea bream. The question of natural sustainable sources of protein with good amino acid balance was addressed and that various fish derived spray dried protein concentrates could make a valuable substitution for traditional fish meals originating from industrial fishing. This was significant in the light of changing quota legislation with in the EU and need to find new ways of providing novel income streams for fishermen.

The question of pigmentation in aquaculture was also regarding the potential of recovering the oil containing the expensive carotenoids uses in the farmed salmon industry that can be used for other aquafeeds or for biopharmaceutical purposes.

Majbett Bolton-Warberg

This presenter spoke of her innovative research based in the National University of Ireland at Galway into the use of specific types of seaweeds as supplementary feed ingredients in experimental diets for cod. The work showed the efficacy of replacing a fraction of balanced feed with dried macro-algae. At moderate inclusion level there were no deleterious effects on fish growth performance and it was feasible to use partial levels of seaweed to rear cod to production size. Higher levels did however affect growth due to poor digestibility. The effect of seaweed as a feed additive and having prebiotic and functional properties was also reported with beneficial pigmenting of the cod skin as an extra finding in the investigation. The work involved two Masters' students from Plymouth hosted by the NUI in 2014 demonstrating the strong UK-Ireland links in progress.

Dr Luisa Valente

Dr Valente surveyed the current aquaculture production status of major fish species and gave statistical information on the trends in production. It evident that aquaculture was providing some 47% of sea food demand with Asia and particularly China dominating the global production league with 70% of aquaculture arising from this region. There were implications of how Europe may respond to this with the farming of salmon, trout and other species such as sea bass and sea bream.

The provision of compounded feed with the highest quality of balanced protein and oil was a potential 'bottleneck' that could constrain this industry in the future due to the requirements of specialised ingredients and commodities such as Low temperature (LT) fish meals, refined soya bean meals and concentrates and other terrestrial plant by-products that could be included in feeds for salmon, trout and marine fish.

The focus in this talk was the studies undertaken in CIIMAR and the University of Porto by Dr Valente's group to evaluate various types of seaweeds as mixed function ingredients to help substitute fishmeal and other ingredients for trout. The work took the form of classical substitution of the reference diet components with dried seaweed meals to create a series of diets with similar nutrient specifications and character. The preliminary provided clear findings and suggest that an optimum inclusion of sea weed is feasible for this species. The research from this group complements the investigations of the previous speaker for Ireland and again integrates with the theme of generating novel materials for aquafeeds derived from natural marine sources. This has all potential for advancing new biotechnology industries associate with the Atlantic Ocean within a European context.

3. Questions and answers

Questions arose regarding the specific technologies and the nutritional value of the fishery derived products for aquaculture. The question of meeting the essential omega 3 requirements for human benefit was stated and the roe of unicellular algae in fish feeds. The costs and value of macro-algae was also addressed. Each question was answered professionally as the team are internationally recognised in their fields of specialisation.

4. Follow up

The speakers have been actively engaged in dialogue since this meeting and will be interacting to establish a better framework for future research collaboration via meetings and workshops in Europe. A new synergystic and dynamic relationship is in progress as a consequence of the workshop and with new inputs from those in attendance. WE will hope to have meetings in the UK, Ireland and Portugal again to maintain our momentum.

5. Next Atlantic Stakeholder Platform Conference

[Would you be interested in reporting back on the progress made since Porto at the next Atlantic Stakeholder Conference, which is to take place towards the end of 2015 (date and place TBC)?]

YES