

Report

ReValue – Dissemination and Communication report

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Report

ReValue – Dissemination and Communication report

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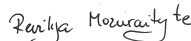
ABSTRACT

The dissemination and communication work in the ReValue project had the aim of maximising the impact of the innovative solutions developed in the project by sharing the results with various stakeholders. These stakeholders included the research and academic community, industry, governmental associations and general public. This report summarises all the dissemination and communication activities from the ReValue project.

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1 Introduction

The ReValue project aims to contribute to achieving the Sustainable Development Goals (SDG) target on food losses reduction, by developing innovative technologies for Surimi industry, namely reducing losses by improved cold chain management and efficient conversion of rest raw material (RRM) and wash water into value-added protein and oil ingredients for food and feed applications. The dissemination and communication work in the ReValue project had the aim of maximising the impact of the innovative solutions developed in the project by sharing the results with various stakeholders. These stakeholders included the research and academic community, industry, governmental organisations and general public. Several dissemination and communication activities have taken place over the 3-year project period including scientific publications, conference presentations, popular science articles and participation in workshops. The project has also had a strong social media presence. An overview of all dissemination and communication activities is provided in this report.

2 Dissemination and Communication activities

2.1 Open Days

Three open days were organised that were attended by academia, industry and students. Two open days were arranged in collaboration with the RE-food INTPART project in Mumbai (November 2018) and Kolkata (December 2019). One open day was arranged in Trondheim in September 2019. The summaries from the open days in Mumbai and Kolkata are published in separate reports published by the RE-food project.

Open Day, Mumbai 2018

The event in Mumbai was arranged in collaboration with the RE-food project and was used to disseminate the research, innovation and education results achieved in the two projects. About 45 participants were present including external stakeholders. Discussions focused on the following:

- Improving resource efficiency in the fish processing industry
- Improving energy efficiency in the fish industry
- Extraction of proteins from wash water from surimi processing
- Ways to increase collaboration between industry and research institutes
- Funding opportunities for research collaboration between Norway and India

The agenda for the open day is shown in Figure 1.



The Second Symposium
Sustainable technologies for
food processing and preservation



28. – 29.
November
2018



Mumbai

Mumbai, INDIA

Wednesday Nov. 28

Industry visit at Keiko Surimi processing plant

- Visit factory facilities
- Discussions

Thursday Nov. 29

ReFood symposium and ReValue open day

- Presentations
 - ReFood project
 - ReValue project
 - Other relevant projects (India, Norway, Spain)
 - Embassy, Innovation Norway
 - Government
- Group discussions
 - Innovation and product development
 - Student and research exchange and internships

Re-FOOD is an international partnership for research and education in **energy efficient resource utilization in food value chains between Norway and India**. The project is funded by the Research Council of Norway under the INTPART programme focussing on developing an integrated approach to deal with the challenges in the field of **bio-economy** with focus on sustainable utilization of food resources to meet the growing global demand for food and feed ingredients. Re-FOOD will focus on building a long-term **cooperation** between Norwegian and Indian institutes, as well as other industries and governmental stakeholders in both countries.

ReValue: Innovative technologies for **improving resource utilization** in the Indo-European fish value chains. ReValue will contribute to achieving the Sustainable Development goal (SDG) on food losses reduction, by developing innovative technologies for Surimi industry, namely reducing losses by **improved cold chain management** and **efficient conversion of rest raw materials** and wash water into value added protein and oil ingredients for food and feed applications.

Annual meetings to foster new relations and opportunities

An annual symposium will be used to disseminate the research, innovation and education results achieved by Re-FOOD and ReValue, as well as an opportunity to create new contacts to strengthen the cooperation on bio-economy.

Project webpages:
www.sintef.no/en/projects/re-food/
www.sintef.no/prosjekter/revalue/
Contact: Kristina.widell@sintef.no



The Research Council of Norway

PLACE: Mumbai, India.
TIME: 28. – 29. Nov. 2018.

The symposium is organised by SINTEF Ocean and funded by the INTPART-programme subsidiary of The Research Council of Norway.



Figure 1. Agenda for open day held in Mumbai in November 2018

Open Day, Kolkata 2019

The event in Kolkata was also arranged in collaboration with the RE-food project and was used to disseminate the research, innovation and education results achieved in the two projects. About 50 participants were present including external stakeholders. Discussions focused on the following:

- Cold chain for market expansion considering the environmental aspects
- New technologies and new species for better utilisation of marine bioresources

- Sensors for the detection of Food Borne Pathogens
- Food regulations and Streamlining Food Safety Ecosystem in India



Photo: AMITY University Kolkata.

Open Day, Trondheim 2019

The agenda for the open day held in Trondheim in 2019 is shown in Figure 2. The event was attended by approximately 50 participants that included researchers, students and industry. The presentations focussed on the key outcomes of the ReValue project as well as other industry and research presentations on improving resource utilisation in the food value chains. The programme was well received and was used as a good networking opportunity with external stakeholders. One of the presentations focussed on the cold chain infrastructure needs in India and described the critical areas for future work as shown in Figure 3. Discussions focused on the following:

- Cold chain infrastructure needs in India
- Energy-efficient refrigeration systems
- Utilisation of rest raw materials from the Norwegian salmon industry
- Water treatment in the seafood processing industry

ReValue Open Day: Challenges and trends related to improved resource utilization in food value chains

19th September, 10:00 – 16:00

SpareBank 1 SMN Kvartalet, Søndre gate 4, Trondheim

In connection with the ReValue project, SINTEF Ocean invites you to a seminar focusing on improved resource utilization in food value chains. The aim of this seminar is to present the findings from ReValue project and discuss solutions for improved resource utilization in food value chains considering biological resources, energy and water.

ReValue is an Inno-Indigo EraNet project coordinated by SINTEF Ocean and jointly funded by Research Council of Norway, Department of Biotechnology, India and Centre for the Development of Industrial Technology, Spain. It focusses on optimizing the surimi value chain through a series of innovations in energy efficient refrigeration, cold chain management and efficient conversion of rest raw materials and wash water into value added protein and oil ingredients for food and feed applications.

The project also focusses on establishing a sustainable partnership between ReValue partners and other relevant stakeholders from Europe and India working in the field of Bioeconomy.

<https://www.sintef.no/prosjekter/revalue/>

10:00	Introduction to ReValue project	Maitri Thakur, SINTEF Ocean
10:15	Rest raw materials in India: challenges and possibilities	Nutan Kaushik, Amity University
10:30	Cold chain infrastructure needs in India	Souvik Bhattacharyya, BITS Pilani
10:45	Cold chain management in seafood value chains	Kristina Widell, SINTEF Ocean
11:00	Coffee Break	
11:20	Energy efficient refrigeration systems	Trygve Eikevik, NTNU
11:35	Utilization of rest raw materials from salmon industry	Aurora Resell, Nutrimar
11:55	How India can increase animal production by 30% - caused by healthier cows and high value forage	Jarl Gjønnes, Orkel
12:10	Lunch	
13:00	An interdisciplinary review of sustainability in SINTEF Ocean	Summer Students, SINTEF Ocean
13:15	Matsvinn project - a tool for reporting food waste in Norway	Ana Carvajal, SINTEF Ocean
13:30	Water treatment in the seafood industry	Tom Ståle Nordtvedt, SINTEF Ocean
13:45	Improving utilization in seafood value chains	Veronica Hjellnes, NTNU
14:00	Summing up	Maitri Thakur, SINTEF Ocean
14:10 – 16:00	Lab visits at NTNU	

Register [here](#) for this free workshop before

13th September



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Figure 2. Agenda for open day held in Trondheim in September 2019



Figure 3. Cold chain infrastructure needs in India



Photo: SINTEF Ocean.

2.2 Webinars

Three webinars were arranged to disseminate the project results to a wider audience. A summary from each webinar is provided in this section.

INTERNATIONAL WEBINAR: TOWARDS SUSTAINABLE SEAFOOD SUPPLY CHAIN IN INDIA Organised by BITS Pilani via Zoom on 10 June, 2021

A webinar was arranged to give perspectives on energy efficient and sustainable refrigeration technologies for seafood, discuss the latest developments in the seafood cold chain, as well as highlight opportunities for further improvements. The webinar included approximately 100 participants from the engineering and logistics industries, as well as from universities and research institutes. The webinar focused on energy efficient, integrated and responsive supply chain design for the seafood sector. Seafood supply chains comprise several stakeholders demanding comprehensive systematic management. Assurance of food quality, reduction of food waste and low environmental impact are the goals. These issues, along with rising concerns about rest raw material valorisation and eco-friendly production necessitate the design of efficient refrigeration systems and sustainable and integrated supply chains. The webinar was recorded and is available on the ReValue project website: <https://www.sintef.no/prosjekter/2018/revalue/>

International webinar

Towards Sustainable Seafood Supply Chain in India

Perspectives from Indo-Norwegian Projects

10th June, 2021

3:00 PM to 5:30 PM (IST)
11:30 – 14:00 (CEST)

About the Webinar:

This webinar will focus on energy efficient, integrated and responsive supply chain design for the seafood sector. Seafood supply chains comprise several stakeholders demanding comprehensive systematic management. Assurance of food quality, reduction of food waste and low environmental impact are the goals. These issues along with rising concerns about rest raw material valorization and ecofriendly production necessitate design of efficient refrigeration system and sustainable and integrated supply chains.

Who should attend:

Entrepreneurs in seafood or general cold chain for food, Consultants, Various supply chain stakeholders. Cold chain related equipment manufacturers, retailers etc. Students, Researchers and educators with interest in refrigeration and supply chain management.

Benefits of attending:

- Latest developments in seafood cold chain
- Energy efficient and sustainable refrigeration technologies for seafood
- Opportunities in cold chain – Indian perspective

Introduction by Prof. Souvik Bhattacharyya, Vice Chancellor, BITS Pilani, India



Dr. Maitri Thakur
Senior scientist, SINTEF, NORWAY
Overview of Revalue project for improving resource utilization in fish value chains



Prof. Armin Hafner
Professor, NTNU, NORWAY
Advantage of natural working fluids in the global and Indian seafood cold chain



Mr. Ravichandran Purushothaman
President Danfoss, INDIA
Building tomorrow's sustainable fisheries value chain



Dr. Kristina N Widell
Senior scientist, SINTEF, NORWAY
Refrigeration in the seafood cold chain



Mr. Ravi Ravipati
CEO, Tueron Mobility, Dallas, USA
Reduction of energy consumption in cold chain



Prof. Mani Sankar Dasgupta
Professor, Mechanical, BITS Pilani, INDIA
Re-value : BITS Pilani experience

Click to attend (Zoom link): <https://zoom.us/j/96290445171?pwd=QF05SjBUZTNXk1RHlYmtsTzRsbzcrdz09> Meeting ID: 962 9044 5171 Passcode: 348282

For any query please contact: Mr. Santosh Saini (santoshsaini633@gmail.com), or Mr. Abdullah Sultan (abdullahsultan1991@gmail.com)








Main outcomes

Throughout the webinar we heard presentations from several of the project participants which spanned work packages and continents. Below is an overview of the various speakers' presentations.

Overview of the ReValue project – Improving resource utilisation in fish value chains

Dr. Maitri Thakur, SINTEF Ocean

Starting off the webinar, Dr. Maitri Thakur of SINTEF Ocean gave an overview of the status of the ReValue project. Here she reviewed the project objectives, list of deliverables and work packages, as well as reviewed the results so far as the project neared its finish. The primary objective of the ReValue project has been to contribute to achieving the Sustainable Development Goals target on food loss reduction by developing innovative technologies for the Surimi industry. The project has been running since 2018, has had a budget of 800 000 Euros (funded by the National Research Council of Norway, and has included participants in Norway, India and Spain. Results from the project include improvements in the areas of cold chain and refrigeration systems, processing of rest raw material and food and feed formulation. A comprehensive mapping of the Surimi cold chain's supply side in India has been conducted so as to better understand the challenges and points where improvement potential exists. This led to the design of a climate-friendly refrigeration system. In addition, value-added ingredients have successfully been extracted from Surimi rest raw materials for use in food and feed applications. The project has also contributed to the education of four PhD students in India.

Advantage of natural working fluids in the global and Indian (sea)food cold chain

Prof. Dr.-Ing. Armin Hafner, NTNU

Professor Dr.-Ing. Armin Hafner of NTNU spoke about advantages of natural working fluids compared to synthetic. He began by giving a brief history of refrigeration, including how ice used to be exported from Norway, and how the concept of refrigeration is rooted in beer and food production in the late 19th century. This method proved to be unsustainable and the switch to "safe synthetic fluids" was made in the 1930s, but ended up being harmful to the environment, and lobbyist action aided in the transition away from these synthetic fluids. Hafner argued that an overarching trend in the industry is that low global warming potential values need to be inclusive of more than just what's in the bottle. They also need to include values from products' production as well as afterlife, and what happens as a product degrades. This shows the need for a focus on a switch to natural fluids, such as for example an integrated CO₂ unit. This type of unit has been proven to save money and be more efficient when tested, however the challenge lies in the higher cost for implementation.

To investigate this further, development is underway for a refrigerated seawater unit for onboard chilling, and 50+ units have been delivered so far to ships in Norway to replace the RC system with a CO₂ unit. This unit requires less space and the freezing of a catch goes faster when using seawater-cooled freezers, making it more efficient. All in all a big take away is that green cooling is not at all possible with non-natural working fluids, due to their biproducts, and the ultimate goal must be to achieve legislation and government supported programs that fund and support the additional start-up costs of switching to these new types of units.

Building tomorrow's sustainable fisheries value chain

Ravichandran Purushothaman, Danfoss India

Ravichandran Purushothaman of Danfoss began by emphasising India's importance in the world fish production industry, which then presents a huge opportunity for the industry to improve. Increased demand means increased need for aquaculture production rather than catch production, and there is an increasing need to maintain temperature throughout all stages of the value chain, from fishing to sale. Similarly, Purushothaman highlighted the many benefits of using a CO₂-based system, including better cooling, non-toxic and non-flammable properties, a small carbon footprint, and an overall higher-quality product.

He went on to explore the additional option of a combined solution with both ammonia and CO₂ as an even more productive and still environmentally safe alternative. Purushothaman argued that such a system would provide a great opportunity for India to grow its seafood industry, and also stressed the need for social connection alongside political will in order to accomplish true change, since the driving forces for establishing a more sustainable fisheries value chain include both social and economic issues.

Refrigeration in the seafood cold chain

Kristina Widell, SINTEF Ocean

Kristina Widell of SINTEF Ocean discussed the complex process of the entire cold chain, from production to processing to retailers to consumption. During this process, there are many stages which need to operate efficiently in order to both improve energy efficiency as well as to ensure a high-quality product. Widell shared results from the related ReFresh project, which included the benefits of freeze chilling as a more environmentally friendly transport method, extended product shelf-life, reduced food waste and boosted commercial value.

In addition, she shared some results from the Holdbart project, which examined the different treatments of salmon filets stored at various temperatures. Here the samples were analysed over time to see what proved to be the best, and here the results suggested that chilling was better than freeze chilling but results would need to be verified again. Widell also went through an overview of the cold chain for the four different types of fish in Norway – pelagic, white fish, aquaculture/salmon and other seafood, while reviewing the key aspects of what is needed in order to maintain good product quality of the seafood.

Energy Crisis in Freezer Chains

Ravi Ravipati, Tueron Mobility

Freezer chains of fresh materials place a high demand for energy. People want food as quickly as possible and they want food to be as fresh as possible, creating a high demand for good cooling. But in order to do this efficiently, we need to address challenges in the freezer chains. Ravipati discussed how current energy mix is changing due to an increased focus on sustainability, changing supply availability, new regulations and consumer awareness about the impact of energy use and freezer chains. In recent times, energy costs have doubled, which makes the push towards sustainable energy sources in freezer chains even stronger. So what's being done to reduce energy in freezer chains?

Ravipati explained how suppliers have begun looking into the redesign of networks, to find the weak links in the chains and then improve upon these vulnerabilities. Warehouses and storage facilities that aim to be more effective and minimise their energy costs have begun to think outside the box, and have for example started partnering with co-located, mutually beneficial facilities to fully utilise all of the energy supply. One example of such a partnership that was given was a refrigeration-based company in the US that partnered with their soup-manufacturing neighbouring company. Here, any warmth produced by the refrigeration-based company was then channelled into the soup-making company to be used, rather than released into the environment unused, and the soup company then obtaining new energy. Many more examples of these systematic innovations exist and are being developed, all in the interest of energy consumption and full utilisation.

The BITS Pilani Experience

Professor Mani Sankar Dasgupta

Professor Dasgupta gave a run through of the ReValue project, as experienced by BITS Pilani. Some of the major achievements in the project for BITS Pilani have been the collection of knowledge about the Surimi cold chain in India, the training of two research scholars, and the establishment of valuable connections with industry, research labs and universities. In addition, they calculated the carbon footprint for the process of Surimi production in India, proposed a novel refrigeration system dedicated to seafood processing and researched the scope of natural refrigerants and other alternatives with a low global warming potential.

As a part of the energy mapping done, BITS Pilani analysed the energy footprint of trawlers that generally carry crushed ice in their onboard compartments and found that about 28% of the exhaust gas gets lost in the process. Seeing an opportunity here, they then designed a rapid-absorption refrigeration system powered by engine exhaust and heat rejection to sea water. In terms of the onshore processing plants, they designed an alternative, more efficient cascade refrigeration system and tested this in various applications. They are currently working on several low GWP refrigerant options.

Through a mapping of the Surimi supply chain in various cities they identified 81 major activities that comprise the supply chain, and proposed improvements to many of these activities in terms of their energy footprint. A life cycle assessment was conducted and analysed the results, which showed the need for increased integration in India rather than the use of a fractured supply chain system as it is today.

INTERNATIONAL WEBINAR: Sustainable Utilization of Water in Seafood Industry- Recycle and Reuse

Organised by Amity University Uttar Pradesh, Noida via Zoom on 6 August 2021

This online workshop aimed at discussing recent development in technologies and policies to reuse and recycle meat and seafood industry wash water. More than 100 participants from various higher education and research organizations and industry were a part of the webinar. Participants discussed recent developments in technologies and policies to reuse and recycle meat and seafood industry wash water.

Experts discussed the industrial problem of wastewater across India and the globe, possible solutions to mitigate the problem, potential valorisation options of industrial wastewater and funding options. Amity University's Uttar Pradesh presented the Amity Excellence Award in Food Processing to Mr. Deepak Gadre, Founder of Gadre Marine Export Pvt. Ltd. for his outstanding accomplishments and contributions in the field of seafood processing. The webinar was recorded and is available on YouTube: <https://youtu.be/wvSntriCFjs>



Sustainable Utilization of Water in Seafood Industry- Recycle and Reuse

6th August 2021, 2:00 PM- 4:30 PM (IST)

<https://amityuni.live/83678836693>

Speakers:

- Dr. Ashok K. Chauhan, Founder President, Amity Education Group
- Dr. Atul Chauhan, Chancellor, AUUP
- Dr. Balvinder Shukla, Vice Chancellor, AUUP
- Dr. W. Selvamurthy, President, ASTIF DG, ADSI, AUUP
- Dr. Sandeep Sarin, Advisor, Department of Biotechnology, India
- Dr. Neelima Alam, Scientist-F, Technology Mission Division, DST India
- Dr. Rasa Silztye, Senior Research Scientist, SINTEF Ocean, Norway
- Dr. Rajiv Sharma, DG, AFSTIA Senior VP, RBEF
- Dr. Nutan Kaushik, DG, AFAF
- Mr. Deepak Gadre, Founder, Gadre Marine Export Pvt. Ltd.
- Shri. H.S. Sathish, Chief Scientist, CSIR-CFTRI

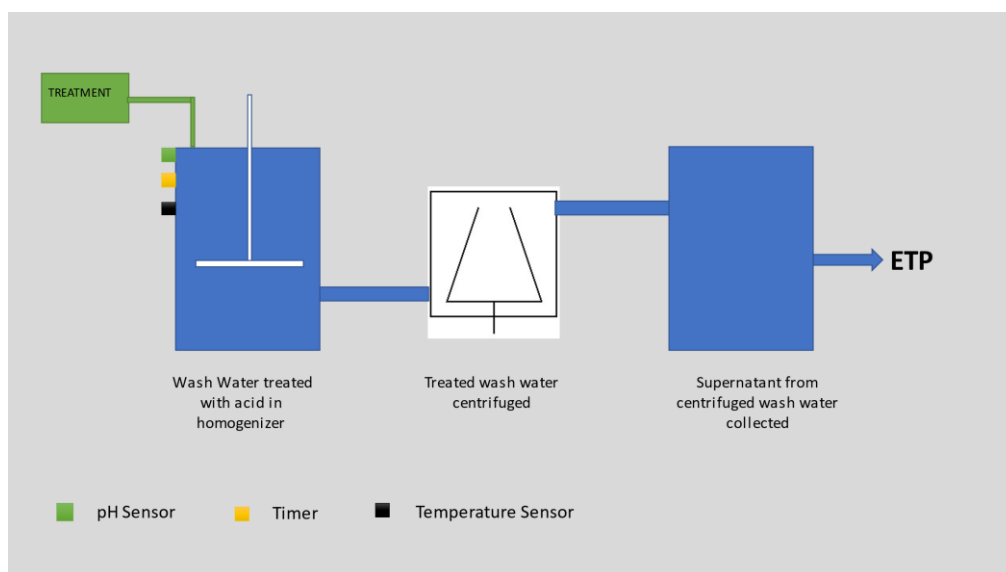
Amity University Uttar Pradesh, Noida

Dr. Nutan Kaushik

Dr. Kaushik began by emphasising the importance of water, and the scarcity of usable water. During her presentation she proposed ways in which industries can contribute towards remedying this situation by reducing the usage of water during manufacturing or incorporation of sustainable ways to recycle and reuse water. She gave a brief overview of the ReValue project.

Dr. Kaushik mentioned that during her visits to various Surmi processing industry sites in India she came across one problem highlighted by industries – namely the reduction of Nitrogen content from water to less than 50 ppm, since wash water contained huge amounts of the soluble protein which is difficult to remove by filtration. She has developed a process to bring down this nitrogen concentration within the prescribed limits (less than 50 ppm). She further plans to automate this technology of the treatment of wash water in the future.

She also mentioned the development of protein hydrolysate from fish head and viscera that contained more than 80% protein. To mask the fishy odour present in protein hydrolysate, she has developed microencapsulated fish hydrolysate which is further utilised for the development of fish soup. Also discussed was the development of processes for production of gelatine from fish skin and bones, and the use of gelatine to develop meat balls.



Amity University Uttar Pradesh, Noida

Dr. W. Selvamurthy

Dr. Selvamurthy complimented the team members for focusing on the sustainability. He focused on the valorisation of waste products and development of wealth from waste by developing sustainable solutions. He mentioned about the importance of these kinds of alliances and shed some light on Amity University's role in sustainable agriculture. He talked about India's contribution to world food production, post-harvest loss and wastes, thereby focusing on the role of sustainability in post-harvest management. Dr. Selvamurthy believes that academia should be linked with technology and hoped to develop a very strong sustainable synergy with all partners.

Amity University Uttar Pradesh, Noida

Dr. Rajiv Sharma

Dr. Sharma discussed his experiences during an extension of support towards research aimed at finding solutions to challenges faced by people due to water shortages. Dr. Sharma mentioned the Indian government's shift in focus towards the recycling of industrial water from ground water. While promoting recycling of water, he talked about possibility of retaining the nutrients which otherwise are washed away during ETP treatments. This would, in turn, increase the profitability for industry.

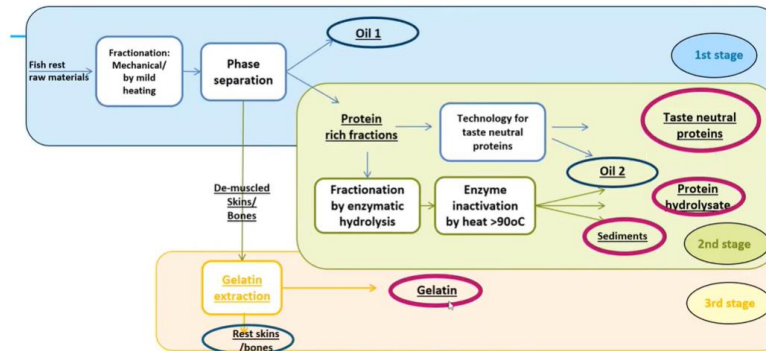
SINTEF Ocean, Norway

Dr. Rasa Slizyte

Dr. Slizyte discussed the rest raw material produced in Norway and its utilisation trends. She mentioned that the intensity of processing these rest raw materials in Norway is up to 84%. She gave a brief overview of the amount of rest raw material produced in Norway, and production of a lipid and protein from this rest raw material. Dr. Slizyte has calculated that 145000 tonnes of lipids, 142000 tonnes of proteins are produced in Norway. Her idea is to develop food through the use of rest raw materials produced from the processing of marine products. She mentioned the use of thermal separation to produce lipids and enzymatic hydrolyses

to make protein hydrolysate. She also stated that with phase separation, very high qualities of protein-rich fractions can be produced.

Three stage processing/fractionation for utilising **salmon skins and bones**



1. First stage covers fractionation of raw materials and separation of high-quality oil.
2. Second stage includes processing of protein rich fraction into taste neutral proteins or protein hydrolysates.
3. Third stage covers gelatine extraction from collagen rich skins and bones.

She discussed the challenges faced with wash water protein regarding its bioactive properties and bulk techno-functional proteins. She suggested focusing on nutritional properties and sensory properties of wash water protein.

Department of Science and technology, India

Dr. Nilima Alam

Dr. Alam talked about the Department of Science and technology’s efforts on water technologies and managements. Water Technology is a major program that sees water as a sector for promoting an application-led RnD program aimed at ensuring the sustainable use of water. These programmes are in line with national missions such as the swachh bharaat programme and the *namami gange* programme which are also underway in India and which focus on water treatment, desalination, making linkages internationally and providing clean water to every Indian. The WTI call 2021 is closing on 16 September 2021 on desalination technology.



She indicated the need for more efficient and sustainable desalination technology. The vision is to identify future needs and gap areas for desalination technology development in the country. Dr. Alam emphasised the importance of desalination of water, as India has a sea line, and desalination of both brackish and sea water can help tackle the problem of low water availability in many areas of the country.

She gave a broad overview of the measures taken by DST towards water management, including different calls, moving to a more thematic call mode, and various milestones. She stated that depending upon the areas from where we are coming, different partners were made, 11 clusters were made and work was conducted on various areas including water use, water salinity, water management, IOT, water marketing and wastewater technologies. Through international collaborations, in 2017, we called the proposals for water technology research and innovation centres (WATER-IC), and very interesting results are coming up from this. Another very important call that we went through in 2019 was when WTI went for a cross sectoral call across three areas: energy, health and agriculture. DST has worked through national development programs and state government at district levels.

Dr. Alam shared some of the outcomes, which included the support of more than 400 RnD projects and WARI fellowship- for students working on the wastewater. Every year, a group of students was sent to various universities in the USA. This program has already hosted 53 scholars and fellows.

INTERNATIONAL WEBINAR: CIRCULAR ECONOMY: Value Added products from Surimi Industry By-Products
Organised by Amity University Uttar Pradesh, Noida via Zoom on 27 August 2021

Amity Food & Agriculture Foundation organised the Revalue International Webinar on Circular Economy on 27th August 2021 via Zoom. This was the third workshop in the ReValue Communication & Dissemination series. The project focuses on optimising the Surimi value chain through a series of innovations in energy efficient refrigeration, cold chain management and efficient conversion by products (rest raw materials) and wash water into value-added protein ingredients for food and feed applications, and this workshop focused on presenting the results of the project related to value-added products developed from rest raw materials obtained from the Surimi industry.





Revalue International Webinar on
CIRCULAR ECONOMY:
VALUE ADDED PRODUCTS FROM
SURIMI INDUSTRY BY PRODUCTS

Date & Day: 27th August 2021 (Friday) | Time: 12 Noon - 2:00 pm

Register: <https://amityuni.live/89143638336>

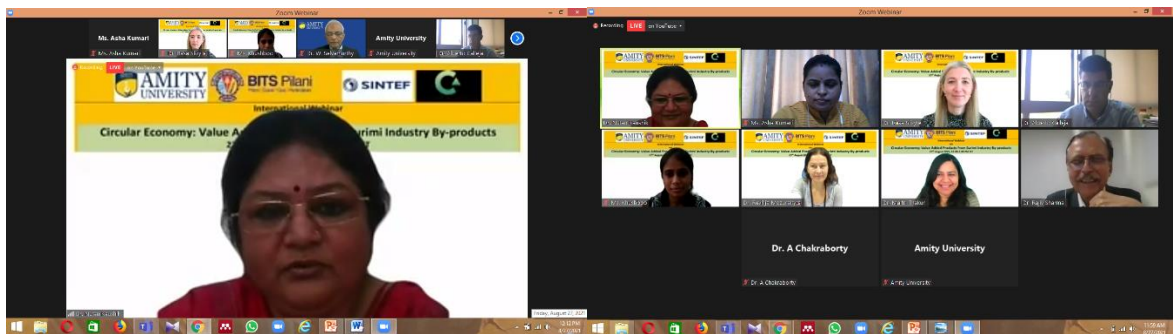
SPEAKERS

						
Dr. W. Selvamurthy President, ASTIF & DG, ADSI, Amity University Uttar Pradesh, Noida	Dr. Nutan Kaushik DG, AFAF, Amity University Uttar Pradesh, Noida	Dr. Rajiv Sharma Director General, Amity Foundation for Science, Technology & Innovation Alliances (AFSTIA), Senior Vice President, Ritnand Balved Education Foundation (RBEF)	Dr. Maitri Thakur, Senior Research Scientist, SINTEF Ocean, Norway	Dr. Rasa Slizyte, Senior Research Scientist, SINTEF Ocean, Norway	Dr. Alberto Calleja, Senior Project Manager, Carinsa, Spain	Dr. Revilija Mozuraityte, Senior Research Scientist, SINTEF Ocean

Amity University Uttar Pradesh, Noida

Dr. Nutan Kaushik

Dr. Kaushik from Amity University Uttar Pradesh, India, welcomed the guests and shared insights from the ReValue project. She also shared her past and current projects with SINTEF Ocean Norway, including the Impart project, the ReValue project and the Omega project.



Amity University Uttar Pradesh, Noida

Dr. W. Selvamurthy

Dr. Selvamurthy complemented Dr. Kaushik for the successful completion of projects, and talked about the importance of collaboration between industry and academic institutions. He also emphasized the importance of bringing new projects, products, and technologies, and about the importance of sustainability. Surimi processing by-product is useful to generate wealth and value-added products and argued that new products and technologies should be accessible and affordable.

Amity University Uttar Pradesh, Noida

Dr. Rajiv Sharma and Dr. A. Chakraborty

Dr. Sharma said that the ReValue project fulfils the objective of sustainability, and that every project outcome should be geared towards societal welfare. To conclude, he spoke about developing new alliances.

Dr. Chakraborty said that reports from the ReValue project can be used in developing standards and policies for the utilisation of by-products and seafood products.

Overview of the ReValue project – Improving resource utilisation in fish value chains

Dr. Maitri Thakur, SINTEF Ocean

Dr. Thakur gave an overview of the ReValue activities. She highlighted that the primary objective of the project is to develop innovative technologies to improve resource efficiency in the Surimi industry and also talked about budgets (800,000 Euro), partners (BITs Pilani, India; Amity University, India; Carinsa, Spain; Industry stakeholder, India; SINTEF Ocean, Norway) and funders (RCN, Norway; DBT, India; CDTI, Spain) of the project. She detailed the list of scientific publications (12); published reports (9); popular science and trade press publications (8); publications (23); patents (2); open days (3); PhD students (4) and webinars (3) coming from project. The major outcomes of the project are the development of concepts for the cold chain management supply chain, valorisation of RRM from Surimi processing and market exploitation in Europe and India, taking regulatory frameworks into account.

Rest raw material from surimi processing – Valorisation Techniques

Dr. Rasa Slizyte, SINTEF Ocean

Dr. Slizyte spoke about valorisation technologies of RRM from the Surimi processing industry. She discussed the chemical and microbiological characterisation of RRM from the Indian industry, Indian market and Spanish market, throughout various stages of the Surimi supply chain in India. She discussed the screening of enzymes for enzymatic hydrolysis based on yield, antioxidants, and protein quality. She explained the process of optimisation of enzymatic hydrolysis by selecting Alcalase as promising enzymes, talked about the removal of protein from wash water obtained from the Surimi processing plant by using acids, and discussed the optimization of gelatine extraction from Pink Perch skin and bones. She concluded that RRM can be valuable sources of high-quality protein and gelatine, and that microencapsulation is a promising and feasible method for the stabilisation of protein hydrolysates.

Food products derived from surimi value added products: soup and meatball

Dr. Nutan Kaushik, Amity University Uttar Pradesh, Noida

Dr. Kaushik gave an overview of WP3, starting with the fish production rate and state-wise fish production. She said that India is the second most productive country in terms of fish production in Asia, and sixth in the world. She gave an overview of Surimi production and suppliers, the type of fish used in production, and the amount of by-product (60-70%) produced during fish processing. She discussed the utilisation of fish RRM in the extraction of collagen, gelatine, enzymes, protein, and omega 3 fatty acids and their applications in different sectors such as food, cosmetics, fertilizer, and the pharmaceutical industry. She also discussed the chemical and microbiological, sensory and storage study of meatballs and soup developed from gelatine and protein hydrolysates, respectively.

Food products derived from surimi value added products: burger and nuggets

Dr. Alberto Calleja, Grupo CARINSA, Spain

Dr. Calleja talked about the development of burgers and nuggets from protein derived from by-products from Surimi processing plants. He first spoke about his organization, which was established in 1993 in Barcelona. They mainly focus on fragrances, flavours, and technologies for the preparation of additives in the food, feed and cosmetics industries, and the CARINSA group is established in more than 30 countries. He talked about the characterisation and evaluation of oil and protein-rich fraction and concluded by saying that 25 kg burgers and nuggets were prepared by microencapsulated protein hydrolysates for flavours.

Regulation on the use of rest raw materials from seafood processing

Dr. Revilija Mozuraityte, SINTEF Ocean, Norway

Dr. Mozuraityte gave an overview of regulations on the use of fish RRM from seafood processing in Europe and India, and said that the quality of the raw material assured the quality of the final products. She discussed the hygienic regulations connected to foodstuffs, microbiological criteria for foodstuffs, fish, fish products and edible fish powder in India, as well as EU regulations for by-products utilisation.

Market studies of rest raw material-based food products

Dr. Alberto Calleja, Grupo CARINSA, Spain

Dr. Calleja gave an overview of the market studies on RRM-based food products done by Amity University and the CARINSA group. In the Indian market, fish powder is the more preferred form of protein supplement, whereas for others, the nugget is the more preferred form.

Future Plan and Open Discussion

Dr. Rasa Slizyte, SINTEF Ocean

Dr. Slizytes discussed future collaboration between India and Norway. Two new projects are coming from the ReValue project: INDEE (Future Refrigeration India 2021-2023) and OMEGA (2020-2024). She talked about Norwegian partnerships as a tool for strengthening STI-Systems in India, and about how different aims are strengthening research and innovation cooperation with selected countries, increasing cooperation in higher education through mobility and internships abroad. She outlined that priority areas for the Norwegian government are the ocean, climate, environment, clean energy, public energy renewal, better public services, development of industrial technologies, societal security, and social cohesion in a globalised world.

2.3 Scientific publications, reports and conference presentations

Scientific papers

1. Dasgupta, M.S., Routroy, S., Widell, K.N., Bhattacharyya, S., Thakur, M., 2019. "A strategy for improved temperature control in the supply and processing stages of Surimi cold chain in India", *Proceedings of the 25th IIR International Congress of Refrigeration at Montréal, Canada August 24-30*. DOI: <http://dx.doi.org/10.18462/iir.icr.2019.0131>
2. Routroy, S., Dasgupta, M.S., Thakur, M., Bhattacharyya, S., Widell, K.N., 2019. "Surimi value chain in India: A strategy for improved resource utilization", *Proceedings of the 25th IIR International Congress of Refrigeration at Montréal, Canada August 24-30*. DOI: <http://dx.doi.org/10.18462/iir.icr.2019.0149>

3. Widell, K.N., Dhakal, P.R., Thakur, M., Hafner, A., 2019. "Refrigeration to prevent food losses", *Proceedings of the 25th IIR International Congress of Refrigeration at Montréal, Canada August 24-30*. DOI: <http://dx.doi.org/10.18462/iir.icr.2019.0424>
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5. Sultan, F.A., Routroy, S., Thakur, M., 2020. "Introducing traceability in the Indian Surimi supply chain", *Materials Today: Proceedings*, 28(2): 964-969. DOI: <https://doi.org/10.1016/j.matpr.2019.12.333>
6. Sultan, F.A., Routroy, S., Dasgupta, M., Bhattacharyya, S., Thakur, M., Widell, K.N., 2020. "Developing cold chain for Indian Surimi supply chain", *6th IIR Conference on Sustainability and the Cold Chain – Proceedings*. DOI: <http://dx.doi.org/10.18462/iir.iccc.2020.295395>
7. Saini, S.K., Dasgupta, M.S., Widell, K.N., Bhattacharyya, S., 2020. "Performance evaluation of a multi-evaporator NH₃-CO₂ cascade refrigeration system with IHX for seafood processing industry", *Proceedings of the 14th IIR-Gustav Lorentzen Conference on Natural Refrigerants – GL2020*. DOI: <http://dx.doi.org/10.18462/iir.gl.2020.1089>
8. Sultan, F.A., Routroy, S., Thakur, M., 2021. "A simulation-based performance investigation of downstream operations in the Indian Surimi Supply Chain using environmental value stream mapping", *Journal of Cleaner Production*, 286: 125389. <https://doi.org/10.1016/j.jclepro.2020.125389>
9. Sultan, Farook Abdullah; Routroy, Srikanta; Thakur, Maitri., 2021. "Evaluating sustainability of the surimi supply chain in India: a life cycle assessment approach". *The International Journal of Life Cycle Assessment*, 26: 1319-1336. <https://doi.org/10.1007/s11367-021-01927-9>
10. Saini, S.K, Dasgupta, M.S., Widell, K. N., Bhattacharya, S. 2021. "Comparative Analysis of a Few Novel Multi-evaporator CO₂-NH₃ Cascade Refrigeration System for Seafood Processing & Storage". *International Journal of Refrigeration*. <https://doi.org/10.1016/j.ijrefrig.2021.07.017>
11. Saini, S.K, Dasgupta, M.S., Widell, K. N., Bhattacharya, S. 2021. "Comparative study of exergetic and economic analysis of multi-evaporator NH₃ and NH₃-CO₂ CRS for a seafood processing plant". *International Refrigeration and Air Conditioning Conference. Paper 2130*. DOI: <https://docs.lib.purdue.edu/iracc/2130/>
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13. Kumari, A., Kaushik, N., Slizyte, R., Khushboo. "Protein hydrolysates produced from Pink Perch (*Nemipterus japonicas*) by-products from surimi industry can be used as protein supplements for high-value products", *submitted to LWT - Food Science and Technology*.

14. Kaushik, N., Falch, E., Slizyte, R., Kumari, A., Khushboo, Hjellnes, V. "Nutritional and bioactive peptides from fish protein hydrolysates: opportunities, challenges and regulatory issues: review", *submitted to Comprehensive Reviews in Food Science and Food Safety*.
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16. Sultan, F.A., Routroy, S. and Thakur, M., "Understanding the Utilisation of Fish Processing Co-Streams in India: A Comprehensive Review Using Bibliometric Analysis". *Journal of Cleaner Production (Under preparation)*.
17. Saini, S.K, Dasgupta, M.S., Widell, K. N., Bhattacharya, S. "Evaluation of low GWP refrigerant options for cascade systems in seafood processing and storage applications" (*Under preparation*).
18. Thakur, M., Cowan, E., Widell, K., Mozuraityte, R., Slizyte, R. "A multidisciplinary approach for improving resource efficiency in the Indian surimi supply chain" (*Under preparation*).
19. Khushboo, Kaushik N., Kumari A., Optimisation of gelatin extraction from Pink Perch skin and bones and characterisation (*Under Preparation*).
20. Khushboo, Kaushik N., Kumari A., Effect of Pink Perch gelatin on quality characteristics of chicken meatball (*Under Preparation*).
21. Khushboo, Kaushik N., Kumari A., Removal of soluble protein from surimi industry wash water (*Under Preparation*).
22. Khushboo, Kaushik N., Kumari A., Fish gelatin- Extraction, characterisation and application (*Under Preparation*).
23. Kumari A., Khushboo, Kaushik N., Slizyte R., Proximate analysis of fish industry by-products (*Under Preparation*).
24. Kumari, A., Kaushik, N., Slizyte, R., Khushboo. Microencapsulation characteristics protein hydrolysates from Pink Perch head & viscera (*Under preparation*).
25. Kumari, A., Kaushik, N., Slizyte, R., Khushboo Formulation of protein rich fish Based Soup Mix Powder (*Under Preparation*).

Reports

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2. Dasgupta, M.S., Routroy, S., Bhattacharyya, S., Sultan, A., Saini, S.K., Gupta, K., Kaushik, N., Widell, K.N., Tveit, G.M. and Thakur, M., 2020. ReValue project Report–Deliverable 1.1- Value stream map and supply

chain interdependencies in India - Surimi case- ISBN 978-82-7174-375-8. DOI: <https://hdl.handle.net/11250/2756585>

3. Dasgupta, M.S., Routroy, S., Bhattacharyya, S., Sultan, A., Saini, S.K., Gupta, K., Kaushik, N., Widell, K.N., Tveit, G.M., Thakur, M., 2020. ReValue Project Deliverable 1.2 - Logistics and Cold Chain Management Concepts – OC2020 A-094: SINTEF Ocean AS 2020 13p. DOI: <https://hdl.handle.net/11250/2675576>
4. Mozuraityte, R., Perote, A., Kumari, A., Kaushik, N., Thakur, M., 2020. Regulations on the use of rest raw materials from seafood processing in EU and India – ReValue Project Deliverable 4.2 - 2020:00471 A. Trondheim: SINTEF Ocean AS 2020 (ISBN 978-82-14-06536-7) 51p. DOI: <https://hdl.handle.net/11250/2655279>
5. Dasgupta, M.S., Routroy, S., Bhattacharyya, S., Sultan, A., Saini, S.K., Widell, K.N., Thakur, M., 2020. ReValue Project Deliverable D1.3: Report on energy efficient refrigeration systems – Surimi case: SINTEF Ocean AS 2020 (ISBN 978-82-7174-394-9) 23p. DOI: <https://hdl.handle.net/11250/2675575>
6. Slizyte, R., Kaushik, N., Kushboo, K., Kumari, A., Armengol, A.L., Rafart, M.J., 2020. Report on physical, chemical and microbiological characteristic of rest raw materials (RRM) and wash water (WW). SINTEF report ISBN 978-82-14-06525-1 25p. DOI: <https://hdl.handle.net/11250/2738869>
7. Slizyte, R., Kaushik, N., Kushboo, K., Kumari, A., Fabregat, C., Rafart, M.J., 2021. Sustainable biotechnological solutions for RRM and wash water processing. Trondheim: SINTEF Ocean 2021 ISBN 978-82-14-06471-1 56p.
8. Thakur, M., Goff, L., 2021. ReValue Dissemination and Communication report. OC2021 A-073. Trondheim: SINTEF Ocean AS 2021 (ISBN 978-82-7174-423-6) 23 p.
9. Thakur, M., Srikanta, R., Dasgupta, M.S., Slizyte, R., Cowan, E., Kaushik, N., 2021. Exploitation of ReValue results - ReValue Project Deliverable 4.3 - OC2021 A-072: SINTEF Ocean AS 2021 (ISBN 978-82-7174-422-9) 12 p.

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1. Khushboo, G., Kaushik, N., Widell, K.N., Kumari, A., Singh, S., 2018. Product Quality and Global Competitiveness in Fishery Sector. AMIFOST; 2018-09-28.
2. Kumari, A., Kaushik, N., Slizyte, R., Kushboo, G., Singh, S., 2018. Fish Industry Waste Management and its Applications. AMIFOST; 2018-09-28.
3. Singh, S., Kaushik, N., Slizyte, R., Kumari, A., Khushboo, G., 2018. Recent Technological Innovations in Surimi Production. AMIFOST; 2018-09-28.
4. Dasgupta, M.S., Routroy, S., Widell, K. N., Bhattacharya, S., Thakur, M., 2019. A Strategy for improved temperature control in the supply and processing stages of Surimi cold chain in India, 25th IIR International congress of refrigeration at Montreal, Canada August 24-30.

5. Routroy, S., Dasgupta, M.S., Thakur, M., Bhattacharya, S., Widell, K. N., 2019. Surimi value chain in India: A strategy for improved resource utilization, 25th IIR International congress of refrigeration at Montreal, Canada August 24-30.
6. Santosh Kumar Saini, Mani Sankar Dasgupta, Kristina N. Widell, Souvik Bhattacharyya, Thermal and economic analysis of an on-board compensatory refrigeration system for small fishing boats, 25th National and 3rd International ISHMT - ASTEF Heat and Mass transfer Conference, Roorkee India, December 28-31, 2019.
7. Kumari, A., Gupta, K., 2019. "Valorization of Surimi industry rest raw material", The Third Re-Food Symposium: Sustainable Technologies for Food Processing and Preservation.
8. Kumari, A., Kushboo, G., Kaushik, N., Slizyte, R., 2019. "Towards Collaborative Leadership to Ensure Food Safety", 6th Annual AOAC International Conference.
9. Widell, K.N., 2019. ReFood and ReValue – our research within "Circularity - Making the most of resources". India Business Day; 2019-06-03 - 2019-06-03
10. Widell, K.N., 2019. Refrigeration to prevent food losses. 25th IIR International Congress of Refrigeration; 2019-08-25 - 2019-08-30.
11. F Abdullah Sultan, Srikanta Routroy and Maitri Thakur (2020) "Introducing Traceability in the Indian Surimi Supply Chain", International Conference on Recent Advances in Materials & Manufacturing Technologies (IMMT 2017), BITS Pilani, Dubai Campus, UAE, November 28-29th, 2019.
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13. Khushboo, Kaushik, N., Widell K.N., Kumari, A., 2019. Food Fraud in Fishery Sector. AOAC; 2019-03-01.
14. Kumari A., Kaushik N., Slizyte R., Khushboo, 2019. Challenges in Microbiological Food Safety in Fish processing Industry, AOAC; 2019-03-01
15. Kumari A., Kaushik N., Slizyte R., Das S., Khushboo. 2019. Bio-Conversion of Fish Industry Rest Raw Materials into Bio-Fertilizers, Indo-Tunisia Mini Symposium, 2019-07-05
16. Khushboo, Kaushik, N., Widell K.N., Kumari, A. 2019. Process for removal of soluble proteins from meat and seafood industry wash water and utilisation of recovered protein, Amity Innovation Day., 2019-10-15
17. Martínez, V., 2020. "Towards a sustainable agrofood industry. Program of empowering in energy efficiency", Workshop – INDUCE H2020 project by FIAB (Spanish Federation of Food and Beverage Industries).
18. Saini, S.K., Dasgupta, M.S., Widell, K.N., Bhattacharyya, S., 2020. "Performance evaluation of a multi-evaporator NH₃-CO₂ cascade refrigeration system with IHX for seafood processing industry", 14th IIR-Gustav Lorentzen Conference on Natural Refrigerants – GL2020.

19. Sultan, F.A., Routroy, S., Dasgupta, M., Bhattacharyya, S., Thakur, M., Widell, K.N., 2020. "Developing cold chain for Indian Surimi supply chain", 6th IIR Conference on Sustainability and the Cold Chain.
20. Kaushik, N., Kumari, A., Khushboo, 2020. Co-products from Indian Fish Processing Industry Reveals their Suitability for Production of Value-Added Products. *Pacific Fishery Technologist*, 2020-03-02
21. Saini, S.K, Dasgupta, M.S., Widell, K. N., Bhattacharya, S. 2021. Comparative study of exergetic and economic analysis of multi-evaporator NH3 and NH3-CO2 CRS for a seafood processing plant. (Herrick conferences, Purdue, USA)
22. Saini, S.K, 2021. Natural refrigerant based cascade refrigeration system for seafood application. Student and young researcher webinar on green refrigeration. (EduCool webinar, 24th March 2021).
23. Saini, S.K, 2021. Safer and Sustainable Refrigeration for Seafood Processing in India. Student and young researcher webinar on green refrigeration CO2. (EduCool webinar, 12th Dec 2020)

Popular science articles

1. Thakur, M., Tveit, G.M., Widell, K.N., Aursand, M., 2018. "Matsvinn i India", *Fiskeribladet Fiskaren*. <https://www.fiskeribladet.no/meninger/matsvinnet-i-india-er-enormt/8-1-61068>
2. Benjaminsen, C., Widell, K.N., 2018. Indisk matsvinn på bordet til norske forskere. *SINTEF Blog*. <https://www.sintef.no/siste-nytt/2018/indisk-matsvinn-pa-bordet-til-norske-forskere/>
3. Widell, K.N., Tveit, G.M., Thakur, M., 2018. Kan norsk industry være med på å redusere matsvinnet i India?", *Kulde*. https://kulde.biz/sider/tidligere_kulde.html
4. Tveit, G.M., Widell, K.N., Thakur, M., Aursand, M., 2018. "Hjelper India med å redusere matsvinn", *Matindustrien*. <https://matindustrien.no/2018/hjelper-india-med-a-redusere-matsvinn>
5. Thakur, M., 2019. This is how Norwegian researchers are reducing food loss in India, Blog Post, Norwegian SciTech News. <https://norwegianscitechnews.com/2019/05/this-is-how-norwegian-researchers-are-reducing-food-loss-in-india/>
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7. Thakur, M., Widell, K.N, Tveit, G.M., Slizyte, R., 2019. "Innovation report: Food Waste Management", *Geography & You*.
8. Thakur, M., Mozuraityte. R., 2021. Restråstoff, biprodukter eller avfall? *Fiskeribladet*. <https://www.fiskeribladet.no/meninger/restrastoff-biprodukter-eller-avfall-/2-1-942983>

2.4 Social media

The ReValue project has a dedicated webpage where important project news was communicated as well as a Facebook page for communicating with the general public. The webpage is hosted on the <https://www.sintef.no/prosjekter/2018/revalue/> and will stay live after the project ends. Some examples from the dissemination of project activities in the social media are shown below:



Du er her: [sintef.no / prosjekter / revalue](https://www.sintef.no/prosjekter/revalue): innovative technologies for improving resource utilization in the indo-european fish value chains

ReValue will contribute to achieving the Sustainable Development goal (SDG) on food losses reduction, by developing innovative technologies for the Surimi industry, namely reducing losses by improved cold chain management and efficient conversion of rest raw materials and wash water into value-added protein and oil ingredients for food and feed applications.

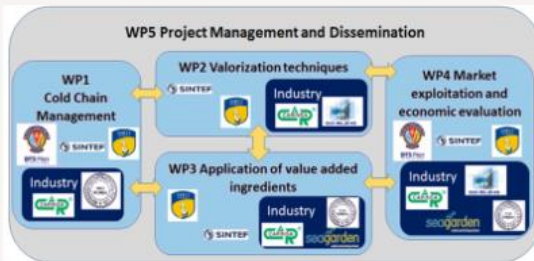


Photo: Pexels

Each year, 1.3 billion tonnes of food is lost globally. In order to enable a sustainable development of the food system, the EU and Member States adopted the Sustainable Development Goals (SDG) in September 2015, which include a target to halve per-capita food waste at the retail and consumer level by 2030, while reducing food losses along the food production and supply chains.

In Europe, the majority of food waste occurs at the consumption stage, but in India most of the loss occurs at the post-harvest stage due to improper handling and cold chain management.

Coordinated by SINTEF Ocean, ReValue aims to examine how improved cold chain management and the efficient conversion of rest raw materials and wash water into value-added protein and oil ingredients can help to reduce food losses. Surimi is selected in ReValue because various whitefish species can be used to make Surimi and thus the technologies developed in ReValue could be applied to a wide range of fish rest raw materials.



To read more about the project, check out the article in Norwegian SciTech News [here](#).

Video and programme from the latest ReValue webinar:



The webinar is hosted by BITS Pilani (India) and focusses on energy efficient, integrated and responsive supply chain design for the seafood sector. Speakers include researchers and industry from Norway, India and USA.

International webinar 10th June, 2021
Towards Sustainable Seafood Supply Chain in India
 Perspectives from Indo-Norwegian Projects

3:00 PM to 5:00 PM (IST)
 11:00 - 1:00 (CET)

About the Webinar:
 This webinar will focus on energy efficient, integrated and responsive supply chain design for the seafood sector. Seafood supply chains comprise several stakeholders, demanding comprehensive systematic management. Assessment of food quality, reduction of food waste and low environmental impact are the goals. These issues along with rising concerns about raw material substitution and sustainable production, necessitate design of efficient, self-sustained, robust and sustainable and integrated supply chains.

Who should attend:
 Entrepreneurs in seafood or general cold chain for food, Consultants, Seafood supply chain stakeholders, Cold chain related equipment manufacturers, retailers etc. Students, Researchers and industry with interest in refrigeration and supply chain management.

Benefits of attending:
 • Latest developments in seafood cold chain
 • Energy efficient and sustainable refrigeration technologies for seafood
 • Opportunities in cold chain - Indian perspective

Introduction by Prof. Sanku Bhattacharya, Vice Chancellor, BITS Pilani, India

Dr. Maitri Thakur
 Senior Scientist, SINTEF OCEAN
 Director of ReValue project. An ongoing research initiative to develop value chain

Prof. Sanku Bhattacharya
 Professor, IIT (ISM) Dhanbad
 Associate of several leading bodies in the national and global seafood sector.

Dr. Krishna N. Wadil
 Senior scientist, SINTEF OCEAN
 Participants in the seafood cold chain

Mr. Ravi Karpal
 CEO, Ocean Global, India, USA
 Reduction of energy consumption in cold chain

Dr. Ravishankar Paruchuri
 Professor, Indian Institute of Technology, Madras
 Assistant Professor, IIT Madras, Chennai, India

Prof. Mani Sankar Dasgupta
 Professor, Mechanical, BITS Pilani, India
 An expert, IITs, IISc, IITKGP

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Meeting ID: 984 5171 Password: 888882

Logos: BITS Pilani, AMITY UNIVERSITY, SINTEF, GREEN CARINA, ASSOCIATION OF BIOTECHNOLOGISTS, The Research Council of Norway

Publisert onsdag 14. mars 2018

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Utforsk fagområdene

- Nye marine ressurser
- Prosessering av sjømat
- Flaker
- Marin forurensning
- Prosessering og foredling

Nøkkeltall

14 Prosjektvarighet
 2018 - 2020

Project partners:

- SINTEF Ocean
- BITS Pilani
- AMITY University
- Grupo CARINSA

Project objective:

ReValue will contribute to achieving the SDG target on food loss reduction, by developing innovative technologies for Surimi industry.

Research areas:

- Bioeconomy
- Cold Chain Management
- Refrigeration
- Value chain analysis
- Rest raw material utilization

ReValue is funded through the INNO-INDIGO joint calls for proposals in the field of bioeconomy and consists of partners from Norway, India and Spain.



ReValue Surimi Project

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ReValue project – improved resource utilization in the Indo-European fish value chains

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ReValue Surimi Project

June 23 · 🌐

If you missed the webinar "Towards Sustainable Seafood Supply Chain in India: Perspectives from Indo-Norwegian Projects", check out the recording here: [https://www.sintef.no/prosjekter/2018/revalue/BITS_Pilani_Sintef_Ocean_NTNU - Norges teknisk-naturvitenskapelige universitet](https://www.sintef.no/prosjekter/2018/revalue/BITS_Pilani_Sintef_Ocean_NTNU_-_Norges_teknisk-naturvitenskapelige_universitet)



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ReValue: Innovative technologies for improving resource utilization in the Indo-European fish value chains - SINTEF

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ReValue Surimi Project is at Central Institute of Fisheries Technology.

December 10, 2019 · Kochi, India · 🌐

🇮🇳🇳🇴 Both the [ReFood project](#) and the [ReValue Surimi Project](#) were presented during a Workshop at ICAR-Central Institute of Fisheries Technology in Kohi, India this Saturday.

Videos

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Surimi processing



0:48

Nutan Kaushik and 1 other
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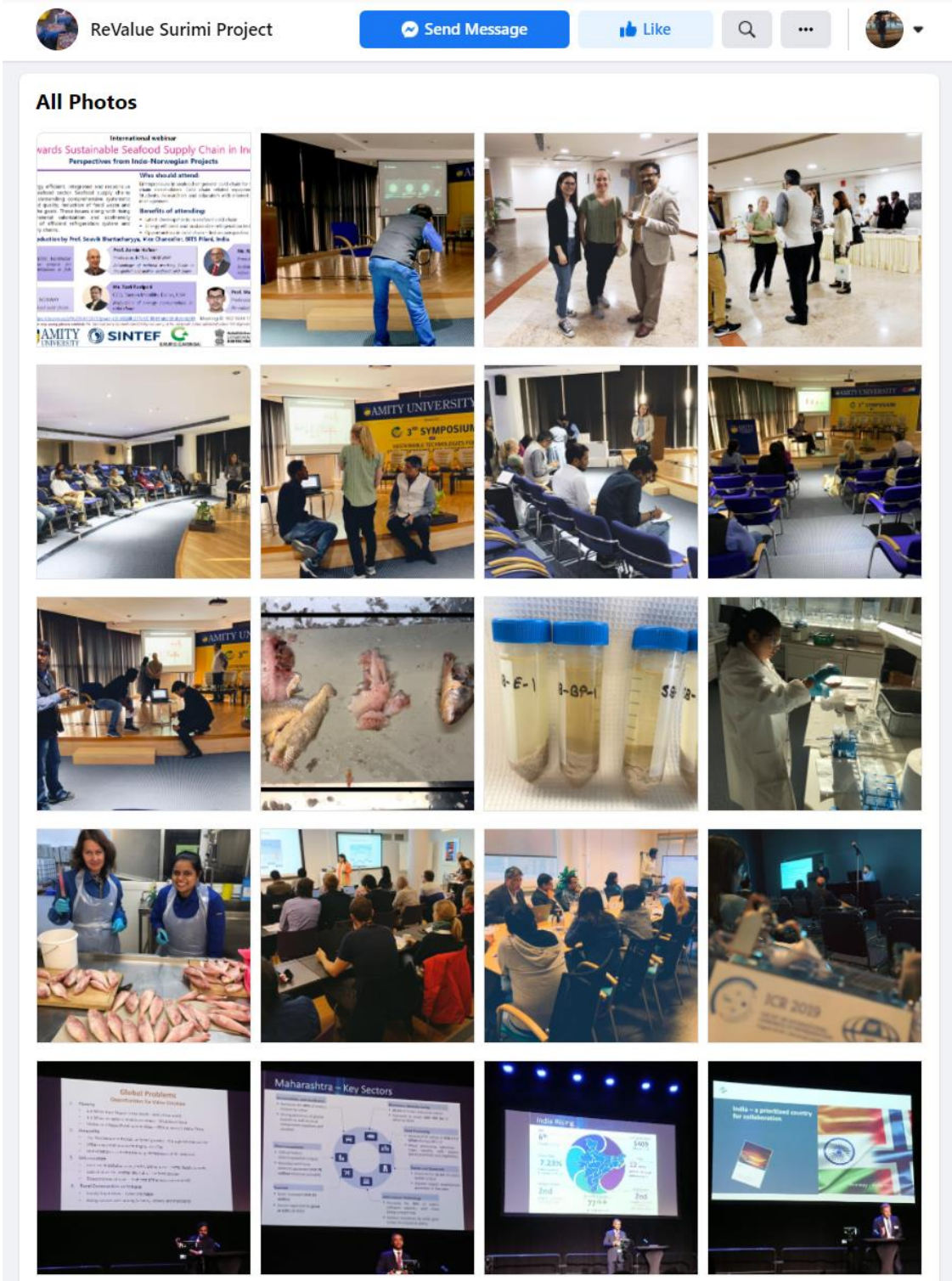


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ReFood project

December 10, 2019 · 🌐

This Saturday we were part of a 🇮🇳🇳🇴 workshop on «Cold Chain in Tropical Countries» at The Central Institute of Fisheries (ICAR-CIFT) in Cochin, India. Researcher... [See More](#)



2.5 Print media

Various project news and webinar outcomes were shared in newspapers:

समुद्री खाद्य उद्योग में जल का सतत उपयोग पर कार्यशाला

नोएडा। एमिटी विवि में शुक्रवार को ऑनलाइन कार्यशाला का आयोजन हुआ। कार्यशाला का विषय 'समुद्री खाद्य उद्योग में जल का सतत उपयोग-पुनर्चक्रण और पुनर्उपयोग' रहा। इसमें गाडरे मैरिन एक्सपोर्ट प्राइवेट लिमिटेड के संस्थापक दीपक गाडरे, नार्वे के शोध वैज्ञानिक डॉ. रासा स्लीजीटे, विज्ञान और प्रौद्योगिकी विभाग टेक्नोलॉजी मिशन डिविजन की वैज्ञानिक डॉ. नीलिमा आलम, एमिटी शिक्षण समूह के संस्थापक अध्यक्ष डॉ. अशोक कुमार चौहान, एमिटी विवि उत्तर प्रदेश की वाइस चांसलर डॉ. बलविंदर शुक्ला ने विचार व्यक्त किए। दीपक गाडरे को समुद्री खाद्य प्रसंस्करण के क्षेत्र में उत्कृष्ट उपलब्धियों और योगदान के लिए एमिटी इंडस्ट्री अवार्ड फॉर एक्सलेंस इन फूड प्रॉसेसिंग से सम्मानित किया गया। कार्यक्रम में एमिटी साइंस टेक्नोलॉजी एंड इनोवेशन फाउंडेशन के अध्यक्ष डॉ. डब्लू सेल्वामूर्ती सहित कई लोग उपस्थित रहे। ब्यूरो

Hindi Hindustan/ Noida/ Page No - 03 - workshop on "Sustainable Utilization of Water in Seafood Industry- Recycle and Reuse" at Amity

पुर्नचक्रण और पुनउपयोग विषय पर कार्यशाला

नोएडा। सेक्टर 125 स्थित एमिटी विश्वविद्यालय में ऑनलाइन कार्यशाला का आयोजन हुआ। कार्यशाला का विषय 'समुद्री खाद्य उद्योग में जल का सतत उपयोग - पुर्नचक्रण और पुनउपयोग' रहा। कार्यशाला में गाडरे मैरिन एक्सपोर्ट प्राइवेट लिमिटेड के संस्थापक दीपक गाडरे, नार्वे के शोध वैज्ञानिक डॉ. रासा स्लीजीटे, एमिटी शिक्षण समूह के संस्थापक अध्यक्ष डॉ अशोक कुमार चौहान, एमिटी विश्वविद्यालय उत्तरप्रदेश की वाइस चांसलर डॉ बलविंदर शुक्ला ने विचार व्यक्त किये।

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एमिटी में समुद्री खाद्य उद्योग में जल का सतत उपयोग विषय पर कार्यशाला आयोजित

नोएडा (युग करवट)। एमिटी विश्वविद्यालय में समुद्री खाद्य उद्योग में जल का सतत उपयोग नामक विषय पर ऑनलाइन कार्यशाला का आयोजन किया गया। इस दौरान रत्नागिरी के गारडे मैरिन एक्सपोर्ट के संस्थापक दीपक गारडे को एमिटी इंडस्ट्री अवार्ड फॉर एक्सलेंस इन फूड प्रोसेसिंग से सम्मानित किया गया। एमिटी फूड एंड एग्रीकल्चर फाउंडेशन द्वारा समुद्री खाद्य उद्योग में जल का सतत उपयोग नामक विषय पर आयोजित कार्यशाला में दीपक गारडे, डॉ. रासा स्लीजीटे, डॉ. नीलीमा आलम, एमिटी शिक्षण समूह के संस्थापक अध्यक्ष डॉ. अशोक कुमार चौहान, वाइस चांसलर डॉ. श्रीमती बलविंदर शुक्ला सहित अन्य ने विचार व्यक्त किए। ऑनलाइन कार्यशाला में रत्नागिरी के गारडे मैरिन एक्सपोर्ट के संस्थापक दीपक गारडे को समुद्री खाद्य प्रसंस्करण के क्षेत्र में उनकी उत्कृष्ट उपलब्धियों और योगदान के लिए एमिटी इंडस्ट्री अवार्ड फॉर एक्सलेंस इन फूड प्रोसेसिंग से सम्मानित किया गया। कार्यशाला में दीपक



गारडे ने कहा कि समुद्री भोजन विशेषकर मत्स्य का 30 से 35 प्रतिशत उपयोग मनुष्य के भोजन हेतु होता है और बाकी नष्ट हो जाता है। हम समुद्री खाद्य प्रसंस्करण उद्योग में जल को कच्चे माल की तरह उपयोग करते हैं इसलिए जल का संरक्षण करना और भी महत्वपूर्ण हो जाता है। जल के संरक्षण में मूल्यां को जोड़ना आवश्यक है। एमिटी शिक्षण समूह के संस्थापक अध्यक्ष डॉ. अशोक कुमार चौहान ने कहा कि यह एक महत्वपूर्ण कार्यशाला है। जिसमें खाद्य प्रसंस्करण उद्योग में जल संरक्षण हेतु चर्चा की गई। राष्ट्र को वैश्विक स्तर पर अग्रणी बनाने के लिए अकादमिक और उद्योग को संयुक्त रूप से शोध और विकास को बढ़ावा देना होगा। एमिटी में छात्रों को समाज और उद्योगों की समस्याओं के समाधान के लिए प्रेरित करते हैं। कार्यशाला में एमिटी साइंस टेक्नोलॉजी एंड इनोवेशन फाउंडेशन के अध्यक्ष डॉ. डब्लू सेल्वामूर्ती और एमिटी फूड एंड एग्रीकल्चर फाउंडेशन की महानिदेशिका डॉ. नूतन कौशिक सहित अन्य शामिल हुए।

Amar Ujala/ Noida/ Page No - 05 - workshop on "Sustainable Utilization of Water in Seafood Industry- Recycle and Reuse" at Amity



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ReValue Dissemination and Communication Report

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