



**NEWTON FUND
INSTITUTIONAL
LINKS:**

Biorefinery approach to valorising Thai seafood processing industry by-products

Asst.Prof.Dr.Tantawan Pirak



RESEARCH BACKGROUND



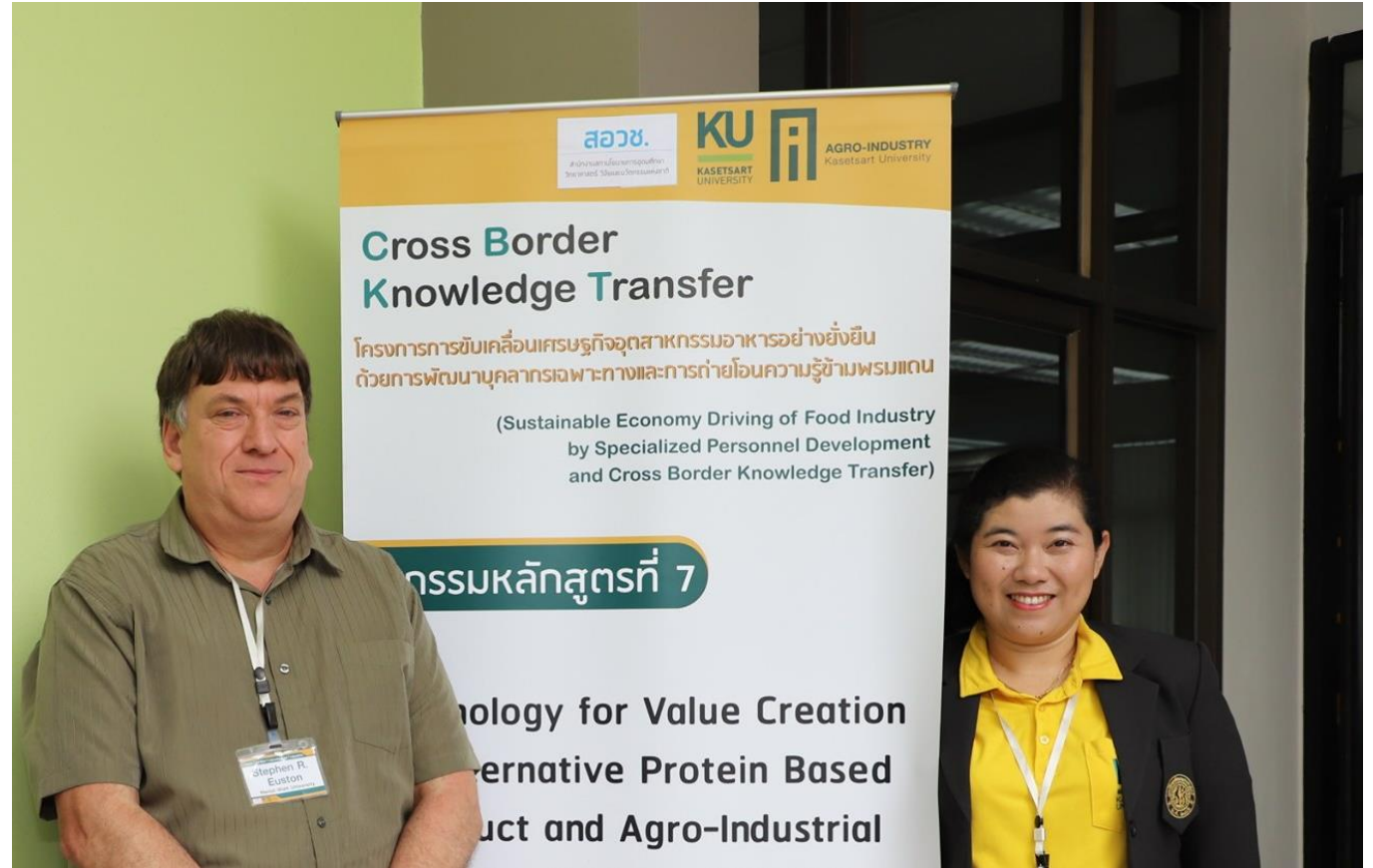
THE COLLABORATED PARTNERS

THAI AND UK TEAM



Prof.Derek Stewart

UK CO-PI



Prof.Stephen R. Euston

UK-PI

Asst.Prof.Dr.Tantawan Pirak

THAI-PI

**LARGE
COMPANY:
PRODUCTION OF
AQUACULTURE**

**Shrimp
Production**



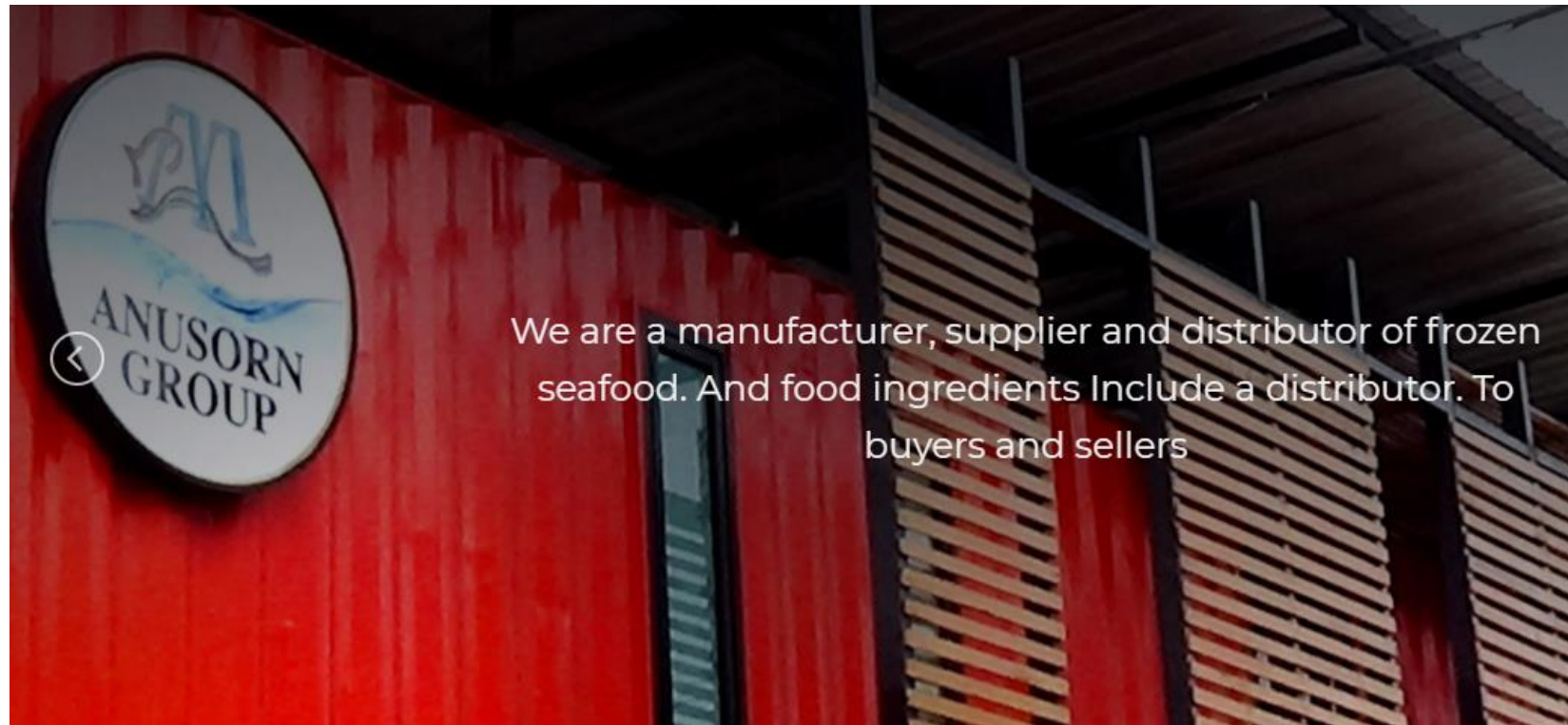
SHRIMP PRODUCTION WASTE

- Shrimp heads and shells
- 1.8 million kg/year
- 5,000-6,000 kg/day



**MEDIUM SIZE
COMPANY:**

**SURIMI
PRODUCTION**



We are a manufacturer, supplier and distributor of frozen seafood. And food ingredients Include a distributor. To buyers and sellers

<https://anusorn.co.th/en/>

WASTE FROM SURIMI PRODUCTION



Fish wastes



No containing
skin and
bone



Might include
some small
bones



2,000-2,500
kg/day



Need further
analysis



Only moisture
content are
recorded



Sold as fish
meals



WASTE FROM SURIMI PRODUCTION

OTHERS

**SMALL SIZE
COMPANY:
FRESH
SEAFOOD
PRODUCTION**



SEAFOOD ផលិតផល

<http://www.sirikhun.com/>

**WASTE FROM
FISH AND
SHRIMP PRIMARY
PRODUCTION**

Fish (various species made by order)

Waste 50 Kg/day

Bones/skin/others

**BASED ON RAW
AND
PRETREATMENT
PRODUCTS**

Shrimp (all sold raw)

Waste 4 Kg/day

Shrimp heads and shells

Analysis	Shrimp	Fish	Fish fat	Fish washing water
Moisture content	73.76 \pm 0.61	69.81 \pm 1.00	57.90 \pm 0.11	90.67 \pm 0.02
Fat	3.67 \pm 0.11	0.96 \pm 0.03	37.45 \pm 0.15	1.55 \pm 0.06
Protein	13.53 \pm 0.19	20.84 \pm 0.92	2.64 \pm 0.24	6.57 \pm 0.18
Ash	5.32 \pm 0.43	7.87 \pm 0.10	0.17 \pm 0.02	0.28 \pm 0.01
Fiber	2.77 \pm 0.21	0.30 \pm 0.02	1.61 \pm 0.20	0.08 \pm 0.02
Carbohydrate	0.95 \pm 0.44	0.22 \pm 0.03	0.23 \pm 0.14	0.86 \pm 0.16

IN DEPTH ANALYSIS

Protein

Ash

Fat

Protein

Collagen

ACID / ENZYME EXTRACTION

Astaxanthin

SOLVENT (ETHANOL) EXTRACTION

Protein
Hydrolysate

ENZYME HYDROLYSIS

- **VARIOUS TYPES OF PROTEASE**
 - The resulted peptide functions



From seafood wastes to High value compounds

A collage of various seafood items including crabs, scallops, squid, and mussels. The background is a dark, textured surface, possibly a fishing net or a wooden deck. The seafood is arranged in a somewhat chaotic but visually appealing manner. A large blue rectangular box is overlaid on the center of the image, containing white text. Below the blue box is a solid orange horizontal bar. In the bottom right corner, the word 'SEAFOOD' is written in large, bold, grey letters, with 'Acti' visible above it and 'ad' below it.

Sustainable seafood production through
biorefinery process with optimized process
simulation and light touch life cycle analysis

Acti
SEAFOOD ad

From “Objectives” to “Deliverables”

O1. Composition of three Thai seafood waste streams

O2. Experimental verification of biorefinery

O3. Optimization of biorefinery process simulation with data from O2

O4. Preliminary life cycle assessment of biorefinery - LCA ensures the design follows the best circular economy practice.

From “Objectives” to “Deliverables”

**D1 Database of Thai
seafood waste
composition
(electronic resource)**

**D2 Verification of
biorefinery design,
including LCA**

**D3 Stakeholder
meeting**

**D4 Preliminary
roadmap for seafood
waste biorefinery
exploitation**



ฐานข้อมูลองค์ประกอบทางเคมีและโภชนาการบางประการ ของสัตว์น้ำและส่วนเหลือของสัตว์น้ำ



Database of Chemical Compositions and Some Nutritional
Qualities of seafoods and by-products



หน้าแรก ปลา กุ้ง ปลาหมึก อื่นๆ ส่วนเหลือจากอุตสาหกรรมสัตว์น้ำและสัตว์ทะเล TH | EN

ฐานข้อมูลองค์ประกอบทางเคมีและโภชนาการบางประการ ของสัตว์น้ำและส่วนเหลือของสัตว์น้ำ

DATABASE OF CHEMICAL COMPOSITIONS AND SOME NUTRITIONAL
QUALITIES OF SEAFOODS AND BY-PRODUCTS

Please visit our database website at:

<https://www.thaiseafoodcomposition.com/>



แบบสอบถามการสำรวจความพร้อมทางด้านเทคโนโลยี
สำหรับการถ่ายทอดกระบวนการไบโอรีไฟเนอรีสำหรับสาย
การผลิตอาหารทะเลสู่ภาคอุตสาหกรรมไทย (Technology
Readiness of Thai Seafood Industry for Seafood
Biorefinery Process Transfer)

A survey of Thai
seafood industry
technology
readiness using
online
questionnaire



ACTIVITIES

Monthly stakeholders meeting
Thai and UK PI meeting
All stakeholder meeting

Up-coming event: May 14-16, 2022

Workshop with the UK experts,
Industrial partners and Thai seafood
companies on **“Roadmap and
Biorefinery for
sustainable of seafood
production in Thailand”**

via **Zoom online platform** (organize
at Harriot Watt University with
Prof.Euston and Asst.Prof.Dr.Tantawan
and online as co-host from James
Hutton Institute by Prof.Stewart)

Please save the date.



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Thank you for your attention

