Australian Government

ANSTO

COUNTRY REPORT

Australia

Update on nuclear-related policies and application of nuclear science and technology

Geordie Graetz

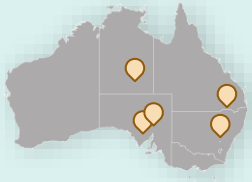
Government and International Affairs Advisor

Science. Ingenuity. Sustainability.

Australian energy policy

FEDERAL GOVERNMENT

National Radioactive Waste Management Facility



GEN IV International Forum

GEN IV International Forum℠

NEA Nuclear Energy Agency

ANSTO

Nuclear science and applications

GOVERNMENT SUPPORT

ANM Mo-99 Project

Australian Synchrotron

Beamlines

OPAL Multi-purpose reactor

Accelerators

Centre for Accelerator Science

ANSTO

ANSTO Nuclear Medicine Project

Mo-99 production facility
ANM

Synroc waste plant
SyMo

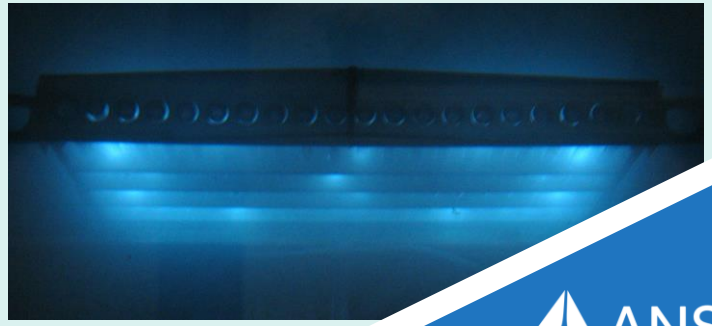
Australian Synchrotron – Clayton, VIC

Nuclear science applied to agriculture

FOOD
Authenticity

FOOD
Science

FOOD
Irradiation



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Food authenticity – Seafood provenance research

Why

Demand for seafood is growing globally. Regulatory bodies, market chain actors and consumers have an interest in seafood provenance and food safety assessment tools to protect human health, guarantee sustainability, reduce or prevent food fraud, and to minimise biosecurity risks associated with global movement of raw seafood products.

Question and Approach

Can we use isotopes and nuclear techniques to prove the origin of seafood and agricultural products?

Nutrients and elements in foods and environment can be linked to regions, countries and production methods - help determine source of origin of products.

Benefit

Consumers can be sure that they are buying quality, unadulterated food and know its origin, including the production methods.

Natural abundance of stable and radio-isotopes

^{14}C	^{2}H
^{13}C	^{15}N

ITRAX element analysis

Neutron Activation Analysis (NAA)

RESEARCH PARTNERS

Sydney Fish Market · UNSW Sydney · Macquarie University Sydney·Australia · Australian Government Department of Industry, Innovation and Science · National Measurement Institute

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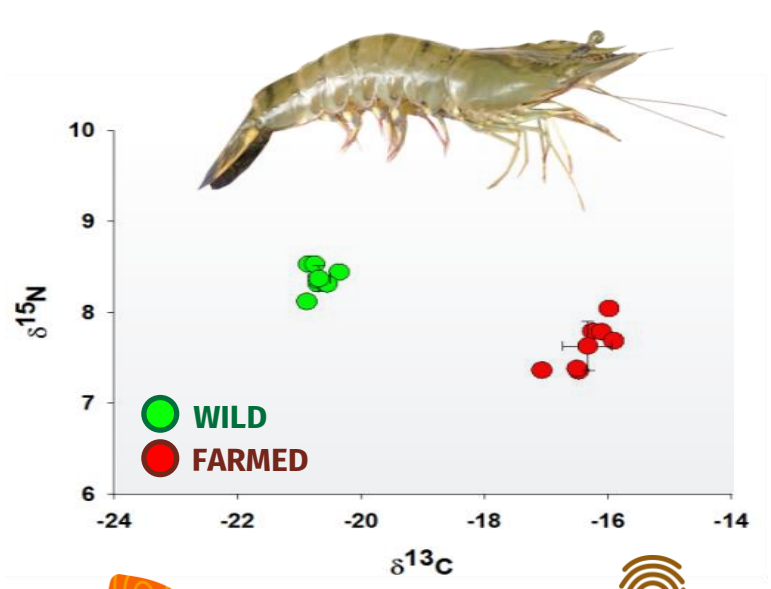
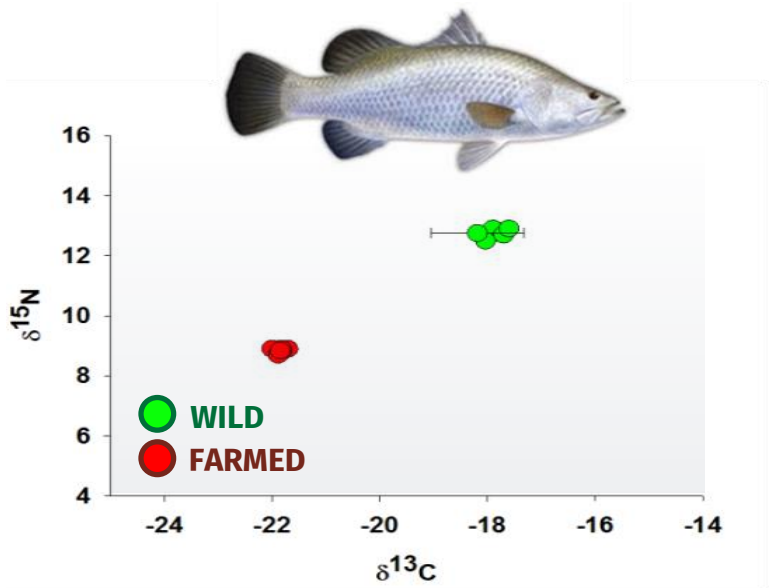
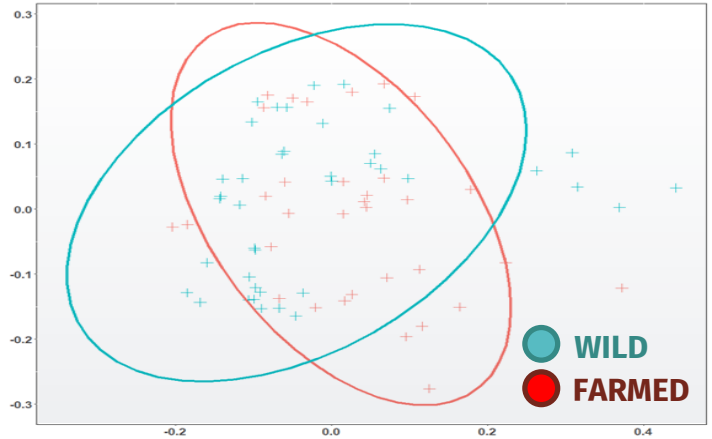
Seafood provenance research at ANSTO

Elemental and stable isotope analysis able to determine farmed vs. wild caught, and geographic locations with an **accuracy of over 90%**.







Unknown sample → **Isotopic and elemental fingerprint analyses** → **Farm vs Wild**, **Geographical origin**

Production method and geographical origin determined.

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Food science

Why neutrons and food?

Structure and dynamics ✓	Isotopic sensitivity ✓
Solids, liquids, solutions ✓	High sensitivity to hydrogen ✓
Non-destructive, non-invasive ✓	Complementary to other methods ✓
High penetration ✓	Systems in realistic conditions ✓

Structure of starch changed by chemical treatment, affecting its properties.

- Porous starches are digested more slowly (lower GI).
- Lower GI important to diabetics and can help prevent disease.

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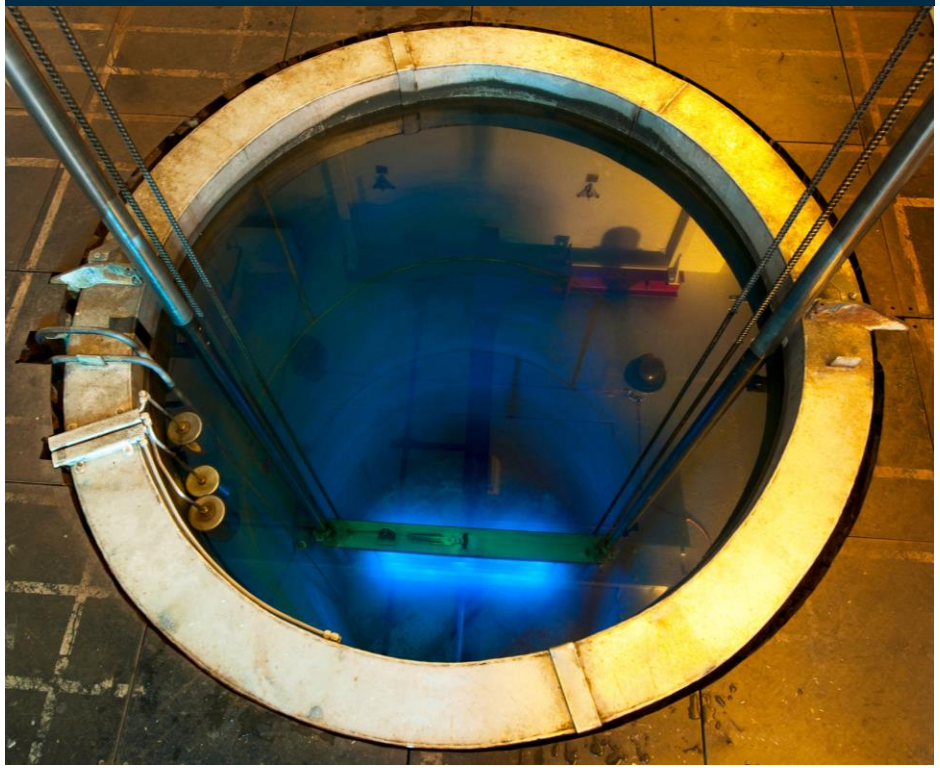
Irradiation for food and agriculture

GATRI

Co-60 irradiator since 1970

ANSTO's R&D underpins industrial radiation processing



Sterile insect technique

Food irradiation

Beehives

Mutation breeding

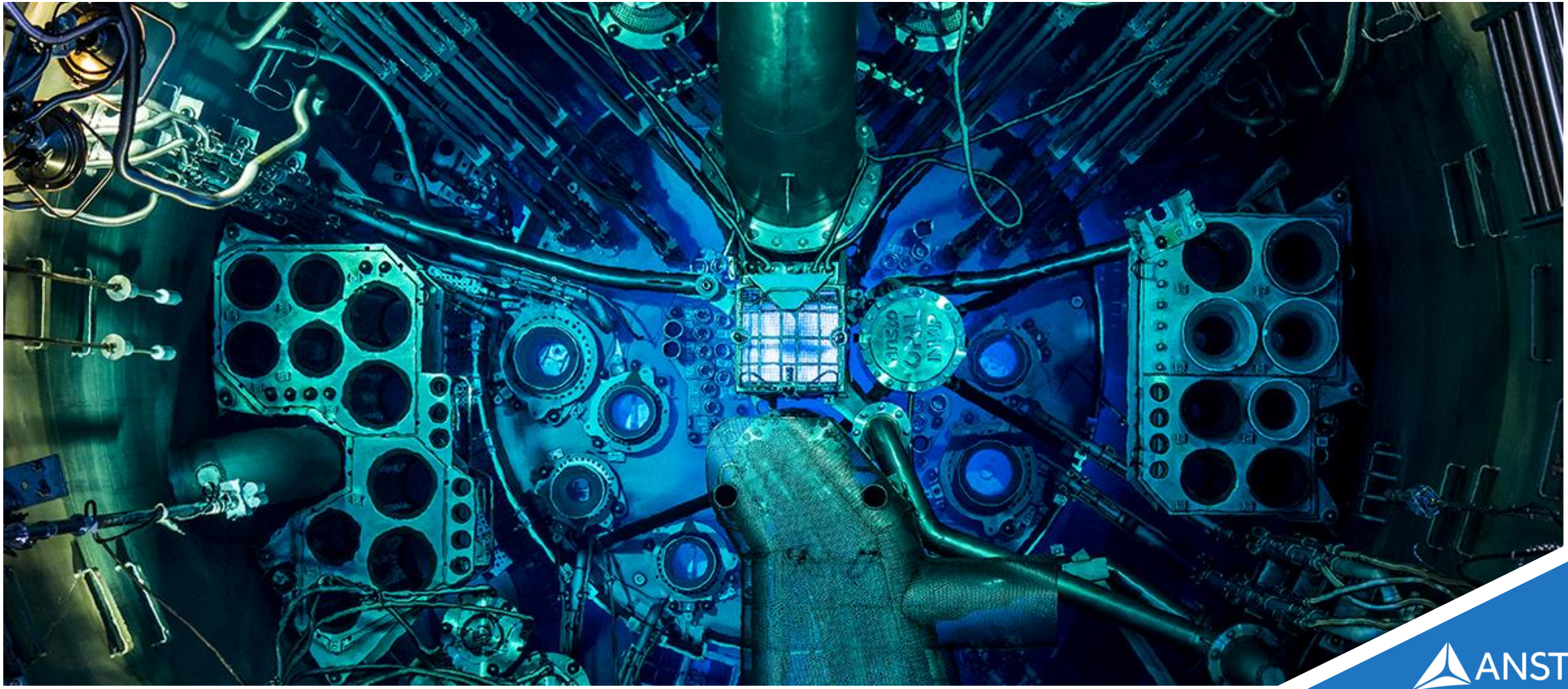
ANSTO

Thank you.

ANSTO's Lucas Heights Campus – NSW

ANSTO's Lucas Heights Campus – NSW

ANSTO's OPAL multi-purpose reactor



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ANSTO's Camperdown Cyclotron - NSW