



THE UNIVERSITY OF
NEWCASTLE
AUSTRALIA

DISCIPLINE OF FOOD SCIENCE & HUMAN NUTRITION

**HONOURS AND UNDERGRADUATE
RESEARCH PROJECTS**

2026



Undergraduate Research in Food Science & Human Nutrition

School of Science

There are a number of strong research themes in the Discipline of Food Science & Human Nutrition in areas such as:

- Postharvest research
- Food Biochemistry
- Functional food ingredients
- Food Analysis

We encourage undergraduates to get involved in research throughout their degree. By doing so you will learn and develop skills in searching, selecting and retrieving information from scientific sources, skills in project management, experimental research skills as well as skills in presenting scientific information in a clear and concise manner, both orally and in writing. These will provide you with a strong foundation for your future career, whether it be in the industrial, commercial or academic sector.

There are three main ways to get involved in research:

- a) **Summer research project:** Short paid undergraduate research projects over summer. [Scholarships](#) are advertised each year
- b) **SCIE3500:** A 10-unit undergraduate course consisting of a research project under the supervision of an academic staff member. Assessment is based on a progress report, a research notebook, a final project report and an oral presentation. The course is open to third year students who have successfully completed at least 140 units and have a cumulative GPA of at least 5.0 and is offered in both semesters. Course outline link [here](#).
- c) **Honours research project:** A full-year research project after completion of the Bachelor of Food Science and Human Nutrition or another cognate degree. A minimum GPA of 5.0 is required for entry into honours. Program handbook link [here](#).

This booklet contains a list of undergraduate research projects currently available in the discipline. Academics are listed in alphabetical order. In all cases you should discuss potential projects with prospective supervisors before trying to enrol or apply.

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Dr Taiwo Akanbi

Food Bioprocessing, Lipid Chemistry and Food Waste Valorisation

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There are growing health concerns over the use of chemically synthesised compounds in food, and the food industry is now turning to natural ingredients. One of my research interests is exploring natural alternatives for use in food.

I am also interested in the recovery and utilisation of high-value compounds from food waste, as this aligns with the circular economy concept, where food processing wastes are kept in use while minimising negative environmental impacts and footprints.

Available research projects

Polyphenols as food preservatives: Polyphenols are a group of plant metabolites recognized for their health benefits, including anti-inflammatory, antimicrobial, and antioxidant effects. These properties make them suitable for use as natural preservatives of meat. Because polyphenols are soluble in either water, oil, or both, these affect their applications. This project will study how some commercially available polyphenols can be used to preserve minced meat and fish.

Composite antioxidants for stabilising omega-3 oils: Omega-3 fatty acids are the third most widely used dietary supplements after minerals and vitamins. They are also added to infant formulas because they help with visual function and neural development. However, they are highly oxidatively unstable, thus, the need for antioxidant addition. Interestingly, the most widely used antioxidants are chemically synthesized. In this project, a combination of natural antioxidants will be studied for their effectiveness in stabilising omega-3 oils.

Bioactive compounds from winery waste: Winemaking leads to the production of large quantities of wastes. These wastes are rich sources of phytochemicals such as anthocyanins, proanthocyanidins, and other polyphenols. Current methods of extracting these compounds involve the use of environmentally unfriendly chemicals. So, there is a need to develop new techniques. In this project, the effectiveness of adsorption resins for extracting phytochemicals from winery waste will be investigated.

Food-grade polysaccharides from seaweeds: Fucoidan is a polysaccharide commonly found in brown seaweeds and has many uses in the pharmaceutical and food industry. It has been successfully extracted from kelps and fucoid brown macroalgae in the Northern Hemisphere. The project is dictated by the need to find local sources of fucoidan, which could be used in the food industry. As a first step, we will use common algal species that are likely to contain fucoidan for extractions. The species will be sampled from different locations to see if there is spatial variability in fucoidan concentrations. Several extraction methods will be compared to maximise the possible yield.

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Dr Penta Pristijono

Horticulture Postharvest

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My research interests mainly to develop innovative horticulture postharvest technology for extending fruits and vegetables postharvest life.

Horticulture postharvest extension. Fruits and vegetables continue to respire and transpire after harvest. However, since the produce is removed from source of water, photosynthates (mainly sucrose and amino acids) and mineral, it is now dependent entirely on its own food reserves and moisture content. Therefore, losses respirable substrates and moisture are not made up and deterioration commences. Fruit and vegetables metabolically divided into two groups of climacteric and non-climacteric produce. The classification relates primarily to changes in respiration patterns and ethylene production during maturation, ripening and senescence. Climacteric produce experience a pronounced increase in respiration and ethylene production during ripening, while non-climacteric produce show no marked change in these characteristics during maturation. Methods for extending horticultural postharvest life by reducing metabolism rate, minimise exposure to postharvest pathogens and limit handling-related damage.

Research Projects

UV-C irradiation. UV-C irradiation has been reported to have beneficial effect on maintaining postharvest quality of horticultural produces. UV-C treatment offer considerable advantage over existing postharvest treatments, being low technology and chemical free for delaying fruit ripening and preventing produce deterioration in the supply chain. Project in this area will focus on the application of single UV-C treatment or combine with other postharvest technologies and different packaging materials to achieve optimum postharvest life extension for specific climacteric or non-climacteric produce, analyse fruits and vegetables quality using destructive and non-destructive methodology.

Amino acids. Proteogenic amino acids treatment offer considerable advantages as being water soluble solids that can stored and utilised in a commercial environment with minimal training. They also have GRAS (Generally Regarded As Safe) status which recognises their safety as food additives. The project in this area will focus on the use of proteogenic amino acids to inhibit the progression of key senescence characteristics of horticultural produce. This project also focuses on combination treatment with different temperatures and atmospheres, assess the fruits and vegetables postharvest life by assessing metabolic process focussing on respiration rate and ethylene production during storage.

Citrus postharvest shelf-life extension. Citrus is one of the most important crops in the world which produce largely in Australia. After harvest, citrus fruit are stored and handled in packing houses in order to maintain their postharvest life and quality, as well as to reduce the decay due to pathogen infection. This project will focus on the shelf-life extension of citrus fruit with various postharvest treatments on different citrus fruits either as a single treatment or combination with other postharvest treatments to achieve an ideal treatment to prolong storage life of citrus fruits after harvest.

Essential oils. Plant essential oils (EOs) are mostly terpenoids derived from units of with further structural diversification achieved through the inclusion of heteroatom functional groups such as alcohols, aldehydes, ketones, esters, and ethers. EOs has been shown to be effective in controlling postharvest pathogens. This project will evaluate application of EOs on different fruits either as a single treatment or combination with other postharvest treatments to achieve an ideal treatment against postharvest pathogens and maintains fruit quality, evaluate the fruit quality using subjective and objectives methods.





Dr Nienke de Vlieger

Consumer behaviour, food choice, marketing and nudging

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We make over 200 food-related decisions a day, most of which we don't even realise we are making. While each choice may seem small or routine, collectively, these decisions have a substantial impact on overall health, dietary habits, and even emotional well-being. Each choice reflects personal preferences, nutritional knowledge, and environmental or cultural influences, underscoring how complex and interlinked these decisions are. Food choices can also be influenced by factors like convenience, cost, availability, and marketing cues, making even seemingly minor decisions part of a broader network of choices that shape our diet and, ultimately, our health.

Studying how the consumer makes choices and how these can be influenced is vital to understanding and potentially guiding these decisions in healthier directions. Research in these areas sheds light on how people perceive food, respond to marketing, and are influenced by subtle cues in their environment.

Available research projects

Nudging in the online eating environment: Nudging in the online eating environment leverages subtle cues and design elements to encourage healthier food choices on digital platforms. For example, online grocery stores or food delivery apps might highlight nutritious options, arrange healthy items in the top results, or use labels like "recommended for you" on balanced meals. These nudges guide consumers toward healthier options without restricting choice. Such strategies are particularly effective in an increasingly digital world, helping to promote better eating habits while people shop or order food from home. In this project you'll work with an existing online mock-grocery store and will be able to test different nudges on that platform.

Food choice & marketing: Food choices are heavily influenced by marketing, which uses various strategies to shape consumer preferences and purchasing habits. Through colourful packaging, strategic product placement, emotional appeals, and persuasive advertising, marketing can make certain foods more attractive or desirable, especially highly processed or sugary products. This is particularly impactful on children and adolescents, who are more impressionable and sensitive to advertising cues. Understanding the role of marketing in food choice is crucial, as it not only affects individual preferences but also has broader implications for public health, influencing dietary patterns and contributing to long-term health outcomes. In this project, we will use different product designs to test their attractiveness and purchasing effect on the consumer.

Nature imagery and food choice: and eye-tracking study: Nature imagery in food marketing can significantly influence food choice by associating products with qualities like freshness, purity, and health. When images of landscapes, green fields, or natural ingredients are used on packaging or advertisements, they can create a perception that the product is more wholesome or environmentally friendly. This effect often taps into consumers' desires for authenticity and healthfulness, subtly nudging them toward choosing foods they perceive as closer to nature. Studies have shown that these natural cues can enhance trust and appeal, making nature imagery a powerful tool in encouraging healthier or more sustainable food choices. In this project we'll use innovative online eye-tracking technology to test to what extent people focus on the nature imagery when shopping for food products and how it influences their food choices.



Dr Joanna Gambetta

Flavour and secondary metabolites

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Flavour and aroma are key components of food that determine their acceptance by consumers. These are formed during crop ripening in the field and through different chemical processes during food manufacturing. One of my research interests is investigating the differences between produce grown in different geographical areas or from different varieties and the consequent differences in metabolite profile that can be used for product distinction, valorisation and traceability.

I am also interested in the effect of abiotic stress on secondary metabolites and the development of mitigation and adaptation strategies, as well as the valorisation of Australian native crops.

Available research projects

Flavour and metabolomic characterization of beers produced with different barley varieties.

Flavour is one of the most important attributes that determines consumer acceptance of beverages like beer. Flavour is determined by a combination of volatile and non-volatile compounds present in the matrix. Information on the how both interact and how these are affected by barley variety is lacking. This project aims to relate flavour characteristics to six different barley varieties grown in Australia by using HS-SPME/GCMS and LCMS/MS.

Production of terpenes by plant cell culture. Terpenes have an important role in plants and food where they act as attractors of pollinators, antioxidants, flavourings and preservatives. These odorant molecules give plants their unique aromatic fingerprint. Terpenes are commonly isolated through extractive laboratory processes which can make them quite expensive, or synthesised using organic chemistry. Current market trends are demanding natural products with no chemical additives. This project will explore a novel production technique – plant cell culture – to produce selected terpenes of high quality, and evaluate different growing parameters to evaluate the feasibility of this method.

Enhancement of bioactive compound production by UV-B application. Bioactive compound production is important for food acceptance but also to improve plant resilience in the face of a changing climate. This project will evaluate the effect of small controlled doses of UV-B on tomato secondary metabolism, their ability to withstand subsequent heat stress and fruit quality and shelf life.

Characterisation of finger limes grown in Australia and Europe. Finger limes are an Australian native crop that is receiving growing attention as an ingredient of gastronomic preparations of haute cuisine for its delicious flavour and fragrance. This growth in popularity has resulted in this crop being grown not only in Australia, but now other parts of the world. There is no information on the compositional differences between finger limes grown in Australia and elsewhere. This project aims to generate important information on the volatile and non-volatile difference of finger limes grown in different areas in the world, in order to help protect this valuable native Australian crop.