



RHASS Presidents' Initiative for 2023

The RHASS Presidents' Initiative for 2023 will raise awareness of the critical role science plays in our food and drink sector.

CASE STUDY: From soil to glass: Arbikie leads decarbonisation of global drinks industry



Case Study Partners

Five years of research at Abertay University and the James Hutton Institute (JHI), in collaboration with Arbikie Distillery, culminated in the release of gin, Nàdar.

Master Distiller, Dr Kirsty Black, completed her PhD at Abertay University and the JHI, exploring the potential of pulses such as peas and beans, as an environmentally sustainable feedstock to the brewing and distilling industries.



Dr Kirsty Black and Agroecologist
Dr Pietro Iannetta of the JHI

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Overview

Becoming a world leader in the decarbonisation of the whisky and drinks sector has been in the sights of Arbikie Highland Estate in Angus since the Scottish distillery first opened for production in late 2014.

Owners, the Stirling family, have been farming for over 400 years, and since the distillery was added nearly a decade ago, they have been focused on developing their ‘field to bottle’ model, with the aim of decarbonising their supply chain and returning to the traditional way of growing and distilling.

Brothers Iain, David and John identified a gap in the craft gin distillery market, with most distillers buying in grain neutral spirit, and turned this into an opportunity to grow and harvest on-site and also to find a new use for certain crops which were too readily being rejected by supermarkets, such as potatoes.

The Stirlings have always grown barley for the whisky industry, but recently started to grow heritage barleys that were grown by their father, Alex Stirling, during his long farming career to both celebrate his significant legacy and to create a range of whiskies with unique flavours.

They also recently started growing rye, but one of their most successful ventures has been in growing and distilling less conventional crops such as peas, driving the expansion of the global sustainable spirits' market.

Peas offer many benefits, including their ability to fix their own nitrogen, which the Stirlings saw as an opportunity to reduce their reliance on synthetic fertiliser, but also to deliver home-grown sustainable protein by using spent products from the distilling process for animal feed.

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Climate-positive gin

Beginning with Scotland's potato-based vodka, to their more recent and award-winning spirit, pea-based gin Nàdar, the Stirlings are a fantastic example of how collaborating with scientists has allowed them to explore new ventures and markets for their crops and to build their sustainability credentials in the process.

Nàdar - which means nature in Gaelic - is the world's first climate-positive gin, made from peas, with each bottle saving 1.54kg of CO₂ e. It was created by Master Distiller and scientist Dr Kirsty Black, who developed the gin as part of her PhD with the James Hutton Institute and Abertay University.

“Peas are a part of a unique set of plants known as legumes that are able to source nitrogen... this removes the need for synthetic nitrogen fertilisers.”



Kirsty, who balanced her studies whilst managing Arbikie, ran small scale trials in the lab to explore the distilling potential of leguminous crops, in particular looking at peas which offer huge benefits for the environment over other raw materials, mainly grain traditionally used in the distilling process.

Iain Stirling added: “At Arbikie, we like to collaborate and our ongoing partnership with the James Hutton Institute and Abertay University helped us create the revolutionary Nàdar, that is now sold in many of the world's best bars, hotels, resorts and retailers across the world.

“Peas are a part of a unique set of plants known as legumes that are able to source nitrogen, which is critical for plant growth, from the air,” she explained. “This removes the need for synthetic nitrogen fertilisers and, therefore, avoids the negative environmental impact its production and use have on our waterways, air and soils.”

A perfect example of returning to the traditional ways of farming and distilling. We were very lucky to inherit our family farming business, built by our mum and dad, that has allowed us to grow all the ingredients we need for distilling.”

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This case study is one in a series, highlighting where farmers, across a range of different sectors, have benefited from scientific advancements.





Scientific collaboration

Agroecologist Dr Pietro Iannetta, from the James Hutton Institute, was one of the scientists involved with Nàdar from the very start of Arbikie's journey.

"The climate change crisis demands far greater respect for natural resources than has previously been afforded," he said. "We must be more efficient, and the best place to start is locally. Towards that end, this is not simply a story of a new gin but is in fact another great example of Scottish teamwork, partnership and ingenuity.

"Nàdar is fully provenanced as a sustainable Scottish product, and when purchased consumers can be assured they are also encouraging more practical crop rotations, helping to reduce artificial fertiliser use, improve soil qualities, and most importantly, to directly reconnect the values of local consumers and farmers to help realise the most respectful and sustainable of agricultural operations at home."



Green hydrogen development

To bolster their decarbonisation journey, this spring, the Stirlings began installing a green hydrogen energy system at the distillery, which comprises a 1MW wind turbine electrolyser, hydrogen storage and hydrogen boiler system, which will be powered using wind energy.

"Our aim is to become one of the most sustainable distilleries in the world, so being able to use green hydrogen power will be another significant step on our

sustainability journey and we hope one that will pave the way for other Scottish distilleries to follow," continued Iain.

"We know the drinks industry globally will be looking closely at what we are doing, particularly with rising fuel costs and the ongoing drive to improve sustainability - we want to create a good 'farming to alcohol' story which can be replicated and help decarbonise the drinks sector across the world."




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