Novel biotyping tool reveals hidden diversity within the UK's algae bank

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Glaucocystis sp. Image: Wikipedia.

Thousands of samples at the UK's 'algae bank' will need to be re-labelled as a ground-breaking new screening tool has revealed greater diversity than was previously known within the collection.

Analysing the protein 'fingerprint' of 32 algae which had all previously been catalogued under the same heading, experts from Newcastle University and the Scottish Association for Marine Science (SAMS) found they actually divided into four distinct sub-groups and that one was apparently a completely new species.

Now scientists at the Culture Collection of Algae and Protozoa (CCAP) in Oban, Scotland, are preparing to embark on the mammoth task of

analysing and re-labelling the 3,000-strong collection in light of the new research which is published this month in the academic journal *Scientific Reports*.

Dr Gary Caldwell, a Senior Lecturer in Marine Science and Technology at Newcastle University, said: "We're only just beginning to understand the vast unlocked potential of algae as an energy source, a clean-up tool and as a food.

"And part of the reason for this is that we still know relatively little about them. Properly identifying and categorising the different strains is a key step towards unlocking that potential and that is why research like this is so important."

The exploitation of marine and aquatic organisms for biotechnology applications – so-called 'blue biotechnology' – has risen to the forefront of the global research agenda over the past decade.

Algae and cyanobacteria have been shown to have huge potential – their ability to convert sunlight into biomass, capacity to grow in saline or hypersaline environments and their ability to metabolise industrial and domestic waste (including CO2 and wastewater) making them attractive targets for industry.

Professor John Day of SAMS said the new screening tool had 'huge potential' and could lead to scientists discovering new high value chemicals and toxins that may have gone undetected. He added: "Our understanding of the biodiversity at the CCAP and the relationship of each organism to another is very fluid, so we are constantly learning more about these strains.

"This fingerprinting will give us much more precise identification and even tell us where these strains have come from, in terms of family

links. It can tell us what a cell is doing and what it's made of."

Funded by the Natural Environment Research Council, the CCAP is a national resource – the algal equivalent to the Millennium seed bank at Kew.

Using proteomic-based biotyping – a rapid and accurate method of strain separation – the research team analysed 32 algae which had all previously been labelled as being the same based on key DNA markers and physical characteristics.

More information: "Proteomic-based biotyping reveals hidden diversity within a microalgae culture collection: An example using Dunaliella" Day and Caldwell et al. *Scientific Reports*. DOI: 10.1038/srep10036

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