BioCC OÜ

1. Scientific Impact of Research

1.1. Positive aspects

BioCC OÜ, a bio-tech center based in Tartu, has a significant scientific impact, particularly in the fields of biotechnology, microbiology, and food technology. It focuses on research and development that spans the entire food chain — from animal feed to health-promoting food products and supplements. The company uses a wide range of scientific methodologies, including those in biochemistry, genetics, bioinformatics and metabolomics. Importantly, the company follows emerging problems occurring in society, namely the spread of the antibiotic resistance in the environment and the development of plant-based food alternatives.

One of the key areas of BioCC's research is the development of lactic acid bacteria strains, which are patented and used in various health-related applications. These probiotics are designed to address cardiovascular health, immune function, allergies, and oxidative stress. Clinical trials, often involving international collaborations, have validated their efficacy. BioCC has conducted over 20 clinical trials, reflecting the company's commitment to developing scientifically backed, health-promoting products. Some of their products reach the market via their daughter-company, Nordwise. Some of the results of the clinical trials have been published in the scientific literature during the evaluation period, which represents clear progress compared to the previous evaluation period.

BioCC is also recognized for its high standards in quality and safety. The company adheres to international certifications, such as the FSSC 22000, ensuring that its products meet global food safety and quality standards.

The institution's research has been positively evaluated, making it a leading center for innovation in the Baltic region.

69 patents and numerous national and international awards indicate the high-quality work done by BioCC. The impressive patent portfolio is a clear hallmark of the company's scientific quality.

Each patent, most of which are centered around a bacterial strain with certain properties, could be utilized to produce novel knowledge about the central important challenge of the modern society - improvement of human health.

They are also custodians of bacteria strain collections and contracted by various agencies to carry out microbiological surveillance analyses for food samples.

In summary, The Panel recognized very low output of publications in scientific journals. However, the patent portfolio is very strong and contains a lot of new knowledge. After the site visit Panel was confident that overall outcome of this company is good, which is indicated by high number of patens and awards. It is our firm opinion that patents should be included also in the research evaluation as a positive outcome of research.

1.2. Areas for improvement

The research portfolio of BioCC is carefully selected to focus on short-term achievable objectives. On one hand this is a wise strategy given the substantial revenue opportunities in the food market. On the other hand, the specialised techniques and the lack of basic concept-driven research may question the long-term role they could potentially play in food-product research.
The Panel noted the modest research output in terms of publications. In several recent years no research paper was published by the whole staff of approx. 25 R&D employees. The publications tend to be in very specialised journals.

Consistently with poor research track record, the number of PhD students engaged in research at the institute varied between zero and two.

1.3. Recommendations

During the lab visit, the Panel recommended to strengthen the research publication outputs of the Institute. This can be achieved in 4 main ways:

1. Soon after submitting a patent, the BioCC staff can produce a manuscript for publication. The Panel encourages to do more collaboration with local universities, e.g. microbiologists, in order to strengthen the research output.

2. Involving PhD students, research output of BioCC can substantially grow. Having at least 2 PhD students could contribute substantially to BioCC's publication record.
3. BioCC has a Scientific Advisory Board with 3 expert advisors. Having brain-storming sessions with these experts once a year (or every other year) could stimulate BioCC staff to publish papers and look for new projects beyond their immediate interest.
4. Bacterial cultures and data on AMR also seem like a goldmine for publications targeting the emergence and spread of antimicrobial resistance in humans.

Assessment of the scientific impact of research

Exceeds threshold.

2. Sustainability of Research

2.1. Positive aspects

BioCC is a small company (approx. 25 R&D employees with 70-80% female) and much of their core work is carried out in 7 laboratories locally. Infrastructure in terms of space and equipment is good. The small size makes them dynamic and quick to respond to emerging opportunities.

2.2. Areas for improvement

The lack of a broad basic and applied research base can make them vulnerable to fluctuations in the food sector and/or changes in national or international research priorities. To remain a significant research center in food development & safety, BioCC will need to broaden their research portfolio and esteem and strive to be seen as research-driven organisation. The Panel thought that using more advanced computation techniques including Artificial Intelligence, can further advance the company's image.

2.3. Recommendations

Maintaining the current well-targeted research is very important, although publishing the research findings in Open Access journals would be highly desirable. By increasing collaboration with universities or by jointly advising PhD students with one advisor

at a university and the other at BioCC they can increase significantly their role in Estonian research environment. The Panel would recommend including sessions with the scientific advisory board to explore new ideas and potential future research opportunities.

Assessment of the sustainability of research

Exceeds threshold.

3. Societal Impact of Research

3.1. Positive aspects

The BioCC has some media and outreach activities via local and national TV and radio. They are also involved in developing food-related governmental policies. The awards BioCC staff received also indicate their role in maintaining food security.

3.2. Areas for improvement

Whilst the small size of BioCC will limit their outreach activities, there is room for improvements. The best option for this would be to increase the visibility of research by increasing the scientific publications of their research, for instance, hiring PhD-students for thesis preparation. This gives a number of other options to receive more publicity also for their products. BioCC has a lot of small and separate outreach activities that are good as such. However, in order to increase their research impact, they should prepare a more focused strategy for outreach activities. The panel recognizes two major threads of sustainability, which touches both education and research. The first one is a potential shortage of students, especially at the MSc and PhD-level in natural sciences. Another is an extremely tight dependence on external funding, which could fluctuate markedly. This can be solved partially by having more extensive collaboration with other Estonian institutes, especially with the University of Tartu, both in the research and education of natural sciences.

3.3. Recommendations

The Panel recognises the significant role BioCC plays in food-targeted R&D. However, BioCC could increase the societal impacts of their research, for instance, increasing their contacts with schools.

Assessment of the societal impact of research
Exceeds threshold

4. Assessment proposal

4.1. Proposal summary
In accordance with Section 8.4 of the Regular Evaluation Guidance 2024, the research and development activities of BioCC OÜ in the field of Natural Sciences are proposed to be evaluated **positively**, as all assessment criteria meet or exceed the established thresholds.

5. Additional Feedback

5.1. Feedback on the institution's additional questions that are described at the final page of the report
N/A