

Advisory report

Professional product 2



A Green Window of Opportunities

Rowen Meeusen (75939)
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HZ University of Applied Sciences
Supervisor: Bakker, S.
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Introduction

This advisory report is a continuation of the research justification. In the research justification the central question is “How can we ensure financial feasibility of HemCell prebiotics?”. Research was done on several topics but especially on the first section of the process, the so-called module A. This section is all about the waste collectors and recyclers. In addition to that, research to the end of the process, module E is done. Module E consists of the end consumer which are livestock farmers.

In this report, the recommendations given in the research justification will be elaborated further. As a result of the research done in the research justification, the following recommendations were given:

1. Look for other waste providers rather than traditional waste recyclers.
2. Complete the study on the effect on all livestock species as soon as possible.
3. Conduct a research on the differences between food intake-based prebiotics and stable floor-based prebiotics.
4. Conduct research to the growth capacity of the poultry industry in Western Europe to examine if Europe is the right target market.
5. Conduct research to the nitrogen process in the manure decomposition process.
6. Connect with other research institutions based in Western Europe.
7. Create partnerships with other probiotics companies.

Recommendation 1: Waste provider

The first recommendation is defined as follows: Look for other waste providers rather than traditional waste recyclers. Waste can be broken down into three different sources, municipal waste, industrial waste and dedicated waste.

Municipal waste which is waste generated by households. The waste is often collected separately, but there is a lot of contamination within the waste streams. After collecting the waste, the separated waste goes to the correct recycler.

According to Van Werven (n.d.), industrial waste can be described as the residual waste from companies and authorities. Its composition strongly depends on the type of company. Industrial waste from an office, for example, has a lighter specific weight than waste from the catering industry, because it contains a lot of packaging material. Industrial waste is normally also processed by regular waste collectors.

Dedicated waste is waste that comes from a specific type of company. For example, a PLA processing plant. A lot of other bio-plastic related waste remains after the processing of the PLA.

As research showed that for now traditional recyclers are not able to deliver the bioplastics needed to produce the HemCell prebiotic, HemCell started looking for alternatives. Municipal waste is not an option as this waste is processed by the traditional waste collectors. Industrial waste is normally also processed by them, but HemCell is convinced that with the right connections and agreements, the plastic waste stream can be bought from them. This saves them waste disposal costs and therefore they will be willing to sell their waste to HemCell. An example would be KLM, in the aviation sector, a lot of plastic is still being used. This is collected separately and could be an option for HemCell to buy. A huge disadvantage is that this waste often consists of contaminated waste streams. Too many different things are put into one waste stream.

That is why dedicated waste is the best option. These waste streams are close to a monostream and therefore easier to separate. An example is the company Pharmafilter. Pharmafilter is a company that strives to make the hospital and the environment cleaner and better through simplifying waste disposal and purifying hospital waste water. Especially the waste disposal from hospital could be interesting for HemCell. Currently, residual waste that do not ferment are removed and incinerated like the regular household waste. ZorgSaam, a hospital in Zeeland in the Netherlands, says it is a shame as within the waste there are still many substances that could be given a second life. The use of disposables is increasing in hospitals due to hygiene aspects. This creates even more plastic waste. According to Biovoice (2021), Pharmafilter is looking for a company that can minimize the residual waste and reuse materials that remain after treatment in the Pharmafilter installation as much and as well as possible. Analyses of the residual stream leaving the Pharmafilter show that it consists of 40% celluloses and 40% plastics. The plastics consist largely (approximately 70%) of polyethylene and polypropylene. These plastics are not biobased and therefore not applicable for HemCell, but the cellulose could provide as a raw material for the HemCell prebiotic. The maximum amount of waste to be processed at ZorgSaam is approximately 250 tons per year. Another advantage is that the waste would

come in already grinded. The only disadvantage is that it is still unsorted. Agreements would have to be made on whose task that is.

Recommendation 2: Study on different livestock species

HemCell strives to be a market leader in stable floor-based prebiotics. In this vision, it is made clear that HemCell does not want to limit themselves to the poultry industry. The R&D partner in India, Agriwas, has confirmed the following research results of the HemCell prebiotics:

- The prebiotic soil functions as a nitrogen cycle infringement
- Less harmful bacteria
- More desirable bacteria
- Improved living environment for human and animal
- Hens can lay up to 30% more eggs
- Reduction of greenhouse gases
- Manure suitable for reuse, the dry fraction is high-quality compost

The advantages mentioned above are until now only confirmed for the poultry industry. They are now testing other animal industries such as the cattle and pig farming. Only when these results are analysed, HemCell can profile itself as prebiotics in the livestock industry. The interest in the use of prebiotics has become clear from the feasibility study. Not only the poultry farmers were interested, also a cattle farmer showed interest but was not prepared for investment until research results were confirmed.

Recommendation 3: Differences between food intake-based prebiotics and stable floor-based prebiotics

Most prebiotic definition being found online describe food intake-based prebiotics. The definition given by Wageningen University and Research (2004) is the following “Prebiotics is a collective term for nutrients added to the feed as a source of energy for beneficial bacteria. Through targeted feeding, attempts are made to influence the composition of the microflora, particularly in the large intestine”. HemCell strives to create a prebiotic that is not based on food intake but that serves as biomass on the stable floor. It stimulates a probiotic that is also based not based on food intake.

The current market leader on the food intake-based prebiotics is Beneo. They advertise the benefits of their prebiotic in the following way:

- Accelerated chick development (Beneo, n.d.)
- Increased bird performance and yield
- Safe and effective growth promotion
- Improved nutrient and mineral absorption
- Better carcass and egg hygiene

From these advantages, it can be concluded that the goal for both prebiotics are the same. In the benefit of HemCell, research should be done to the working of both types. Are the results exactly the same? Beneo claims to increase bird performance, but can it reach the 30% more eggs and 20% more meat weight from HemCell? What is the comparison cost-

wise? Maybe the food intake-based prebiotic is cheaper? The advantages are only performance and health focused; does it also make an impact on the nitrogen cycle? This study might take some time as tests that are being done with the HemCell prebiotic, have to be done again with food intake-based prebiotics.

Recommendation 4: Growth capacity of the animals in Europe

Europe is very developed in the agricultural sector. The poultry industry being the second highest export sector in the European agricultural trade, shows that this sector is very developed. The main poultry producers, as can be seen in figure 1, are all based in Western Europe.

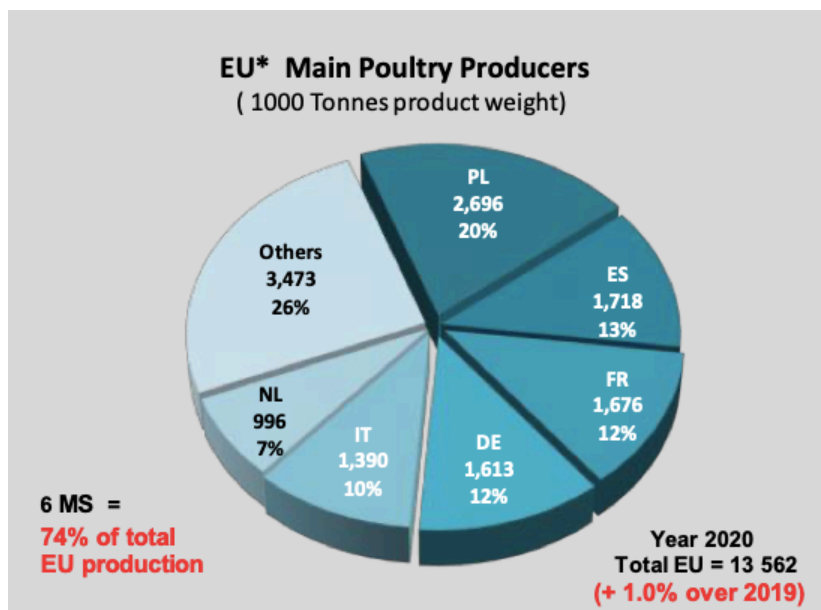


Fig. 1: EU main poultry producers (European Commission, 2021)

The developed industry indicates that there is little room for improvement. The feasibility study shows that a chicken farmer from Austria is concerned about the improvement capacity of his animals. They are already producing at 90% of their capacity and lay an egg every day. More is simply not possible. HemCell promises a 30% improvement in egg production. The research to the HemCell prebiotic is done in India, a less developed country in terms of agriculture. The question is whether these results can also be achieved in Europe. Research has to be done to determine whether Europe is the right target market for HemCell. Maybe it is only feasible for less agriculture developed areas.

Recommendation 5: The nitrogen process in the manure decomposition process

“Nitrogen crisis from jam-packed livestock operations has ‘paralyzed’ Dutch economy” (Stockstad, E., 2019). This headline perfectly reflects the nitrogen problem in the Netherlands. Nitrogen emissions are a big problem all over the world, but especially in the Netherlands this problem is considered seriously by the government. The expansion of dairy, pig and poultry farms, major sources of nitrogen in the form of ammonia from animal waste,

has been stopped by a suspended permit. As the prebiotic soil functions as a nitrogen cycle infringement, the HemCell prebiotic could be a lifesaver for many farmers. Nitrogen emissions will go down after using HemCell prebiotics, and as a result the expansion permits can be issued again. Additional research should be done on how much nitrogen is exactly being prevented from coming into the air. In addition to that, HemCell strives to be fully CO₂ neutral, from cradle to gate. This is a goal they want to achieve in the future because it is very difficult to actually be fully CO₂ neutral. How to do this should also be further researched.

Recommendation 6: Connect with other research institutions

Currently, HemCell has a R&D partner based in India. This means that all research results are based on tests being executed in India. Tests can be influenced by the different climate. Also, India is not focused on the use of prebiotics in the Netherlands. Connecting with other research institutions in the Netherlands or Belgium, can help improve the quality of the research specifically for the Netherlands.

Wageningen University and Research (WUR) is specialised in the fields of climate, biodiversity, food production, healthy and safe food and circular economy. They have also done research to bioplastics and therefore they might be a helpful partner.

KU Leuven Research and Development (LRD) might also be an interesting partner. They are a leading research institution in biosciences, food and agriculture. Especially the fact that LRD is based in Belgium might be interesting. They will be more focused on Belgium than WUR and therefore offer other perspectives. As HemCell is based in Heinkenszand, very close to the Belgian border, it can be refreshing to see what they have to offer.

Recommendation 7: Create partnerships with other probiotic companies

In the current plan, HemCell wants to offer the prebiotic in combination with the SSMO (Soil specific microorganism) produced in India. Research is being done to different soils in the Netherlands and SSMO gives the opportunity to adapt the probiotic to the specific soil in that area. In a sand and clay soil there are other types of bacteria, and the SSMO adjust to the bacteria of that specific area.

As stable floor-based prebiotics have to be introduced in the Netherlands, it might be interesting to partner up with probiotic companies that have already established themselves in the agricultural sector. The company Probioticfarm in Belgium is such a company. This way, HemCell can get in touch with farmers who already use probiotics and build up a good customer base.

Probioticfarm advertises the probiotics with the following advantages:

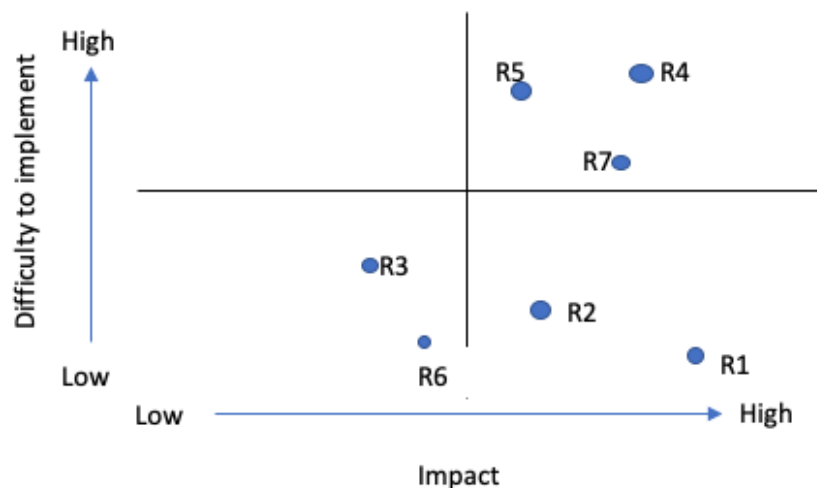
- The animals have better resistance (Probioticfarm, n.d.)
- Reduced use of antibiotics
- Better feed conversions – faster weight gain
- Less litter thanks to a drier environment
- Decrease in odour nuisance

- Safe for humans and animal
- Cost effective

These advantages are very similar to the advantages of the HemCell prebiotic. The goal is the same and this probiotic is also focused on the reduction of waste and smell. This means the nitrogen process is breached, which is also a USP of HemCell prebiotics. Moreover, this probiotic is not food intake-based and therefore it seems to be a perfect partner for HemCell.

Planning

The timespan in which these recommendations can be implemented is 1-5 years, depending on the complexity of the recommendation.



R1: Requires a relatively low difficulty to implement this recommendation. A solution is being requested from Pharmafilter and HemCell is able to deliver that solution. When Pharmafilter can deliver the bioplastics, HemCell can start producing and therefore the impact is very high.

R2: Requires a relatively low difficulty to implement and tests are already being done with cattle and pig livestock. The results have to be researched, but the study is already an on-going process. The results of these tests can have a big impact as it determines the size of the market HemCell can target.

R3: Requires a new study which is very time consuming but should not be too difficult. The effects of both prebiotics are known, they only have to be compared. The impact is relatively low as for the product it does not matter in which form the prebiotic comes.

R4: Requires a completely new and intense study to the interests and capacities of different regions in the world. It is difficult to collect all this data of the different areas and do

research to the maximum capacity of animals in Western Europe. Therefore, the impact of this study will be enormous, it determines the area where HemCell can sell.

R5: Requires a whole new study to the effects of the nitrogen emission. It is a difficult study to execute and will have a high impact on the sales opportunities of HemCell.

R6: Requires little effort to make a connection with the proposed institutions. It will take a little more effort to create a fruitful partnership. The impact will be visible, but not of enormous proportions.

R7: Contacting an already existing company to propose a cooperation in which products are presented and sold together is quite a challenging task. When they agree, the impact for HemCell will be very big as that is their entrance to the livestock market where they can introduce their prebiotics.

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