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13
EDITION

AQUA
NEXT





Welcome to **AQUA**NEXT

& OVERCOME THE CHALLENGES
DISCOVER OPPORTUNITIES!

We want farmers to have access to high quality feeds that address the needs of the fish at its various development stages. Striving towards the best performance for your farm, we offer several solutions.

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DEDICATED
TO **YOUR**
PERFORMANCE

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Health System Support

Due to rapid changes in farming conditions, fish are facing highly stressful periods. These can be difficult times for the fish and the farmer.

Fish farming is characterised by various species and farming circumstances. Keeping the stocks healthy and in good condition appeared quite challenging. A reduced feeding level can help initially, but if these suboptimal conditions last longer, the fish will need more support.

So, how to keep your stocks healthy?



When to use COFIT?

Exceptionally long periods of draught, resulting in water shortage- brief periods of heavy rain (through spring to autumn).

Extreme water temperatures and fluctuating oxygen levels.

Sudden periods of intense rainfall causing unexpected floods and dirt flushing through your systems.

Pathogens (parasites, bacteria, viruses) decreasing your fishes' health and your farm performance.



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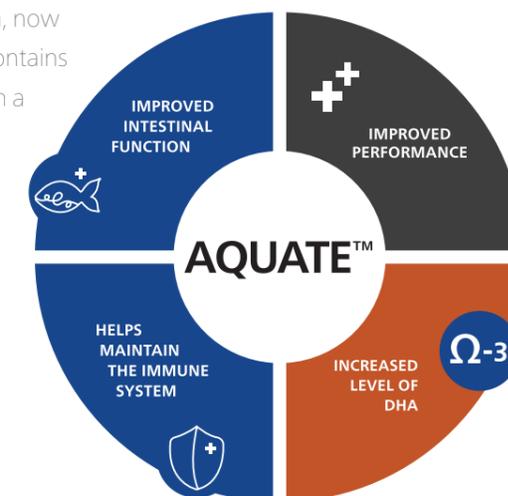
We, at **Alltech Coppens** developed a special feed with extra nutritional health support: **COFIT**

COFIT has a medium low energy level for a low metabolic pressure. The ingredients have been selected on palatability and digestibility for maximal feed efficiency. Extra emphasize was put on balancing the micro nutrients to meet the increased requirements during times of stress.

Nutrients that are important for the production and differentiation of immune cells have been increased. Bio-Mos and Actigen are added to support the fish's own defenses. By using a prebiotic fibre the gut flora and intestinal health is optimized. This is an important aspect in preventing pathogens to enter the body. Oxidative stress during suboptimal conditions can cause a lot of trouble to the fish. This is counteracted by including a strong antioxidant defense system. One of these components is vitamin C which is also important in wound healing on its own.

If stressful periods can be anticipated it is best to feed Cofit already 2 weeks beforehand. COFIT can always be fed during the periods of suboptimal conditions. This can be done continuously for a longer period of time or by feeding COFIT for 1 week per month depending on the conditions. Cofit is available in 3mm and can help to prevent and alleviate problems during suboptimal fish farming conditions.

The **AQUATE™** premix from Alltech, now added to the entire range of feeds, contains organically bound trace elements, with a superior bioavailability to conventional inorganic trace elements. This ensures optimal anti-oxidant protection and that essential vitamins and minerals can easily cross the gut epithelium and be mobilized as and when they are required. The increased efficiency of the retention of these organic trace elements in the animal's tissue reserves results in lower excretion and consequently also ensures that the water quality is maintained within the farm environment which is of particular importance in RAS.



Bossington Estate

We visited our customer **Bossington Estate** situated in the glorious Test Valley in Hampshire, United Kingdom.

The Test Valley is home to the finest chalk stream trout fishing in the world, and the river Test is perhaps the best known of the chalk stream rivers. It flows through the village of Houghton where we joined Head River Keeper **Matt Hodder** who has seen real benefits from using **Alltech Coppens** feeds and in particular our **Cofit** feed.



Matt has been a river keeper here for 14 years and is responsible for 4 kilometers of river fishing. The estate also controls 445 hectare of the Test Valley including arable ground and water meadows for grazing cattle. Matt grows and stocks the river with around 1500 rainbow trout per year averaging 6lb weight up to double figures, and around 2,100 pristine brown trout averaging 1/2,70 kilograms. The estate allows 27 season ticket rods to fish 1 day per week during the trout season, as well as offering corporate days and day tickets.

The brown trout have suffered with furunculosis infections every year at Bossington for as long as Matt can remember. The fish are not vaccinated against the disease as the bigger fish require repeat vaccinations which is not practical. In previous years Matt has experienced mortalities varying between 30-150 fish per pond. With fish of this size that results in considerable losses for a small site. However, April 2018 Alltech Coppens UK Sales Manager Matthew French recommended that they try our new health promoting feed concept Cofit on a batch of fish that were infected.

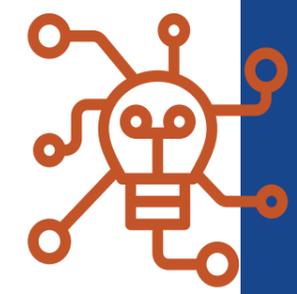
“For the first time ever the fish have shown no signs of furunculosis infections.”

“With **Alltech Coppens** as a partner, I am confident to be able to supply the healthiest and best conditioned fish possible to our fishery and our customers.”



“The results were **amazing!**”

“Within 6 weeks of feeding Cofit the fish completely recovered from the furunculosis. We were so impressed that we tried it on a batch of fish that were not yet infected. This was the first ever batch of brown trout in 14 years that have not become infected by April and I can only put it down to the health benefits provided by the Cofit feed.”



Did you know?

Furunculosis has been a significant issue for Rainbow Trout since 1964 when it was first diagnosed. Sweden and Norway have reported serious issues with Furunculosis in Rainbow Trout farms. Treatment and prevention in the form of vaccinations and antibiotics demanded an estimated 160-220 SEK (160-225 thousand euro) annually, in Sweden. It was the most important disease for Rainbow Trout in Norway between 1991 and 2000. Furunculosis causes high mortality in fish, with death coming a matter of days after symptoms appearing. Sudden death, perhaps with slight exophthalmos (popeye) can be observed, along with characteristic furuncles (or boils) on the skin and muscle and haemorrhages on the skin, mouth and fin bases.

Fish may also show lethargic swimming or swimming just below the surface, loss of appetite, respiratory distress or jumping from the water.

Consistent results

Traditional aquafeeds have been formulated on crude nutrients like protein and fat, and over the last decade mostly on digestible protein and energy. However, research has shown that not all forms of this digestible energy (either from protein, fat or carbohydrates) are utilised for growth with the same efficiency. Fat is for example used for growth with a higher efficiency than carbohydrates.

Our continued commitment to tailoring nutrition and health programmes allows fish farmers to achieve a better feed efficiency. That's why we introduce the NET energy concept. By improving nutrition by this concept, we are able to realise a significant increase in feed efficiency and maximizing profitability.

All animal feeds contain a certain amount of energy, which is mainly derived from protein, fat and carbohydrates. This dietary energy has been used as a predictor for growth in feed formulation for years, but when a feed is eaten by the fish, some of this energy is not digested and therefore not available to the fish. Of this digestible energy, again a part is lost as the result of metabolism. The energy which is available in the end for maintenance and growth of the fish is called net energy.

Even though the digestible energy can be calculated relatively simply if the digestibility of the various feed ingredients are known, not all forms of this digestible energy (from protein, fat and carbohydrates) are being utilised with the same efficiency. The use of a net energy evaluation system, where the different proportions of energy are taken into account, should therefore increase the accuracy with which feed can be formulated, especially in times where fishmeal is getting limited and the proportion of plant protein sources is still increasing in commercial feeds.



ONESTEPFURTHER

All animals require protein and energy to grow and are therefore the main focus in animal feed evaluation. In the past, this has been done by looking at the crude nutrients in feeds (protein, fat and carbohydrates), but over the years the focus has more shifted at looking into the part which is actually available to the animal. Because when a feed is eaten by an animal, some of the protein and energy is not digested and therefore not available to the fish. Of the digestible part, again a part is lost as the result of metabolism. The energy which is available in the end for maintenance and growth of the fish is called net energy and it is the evaluation of this net energy in aquafeeds where **Alltech Coppens** will focus on the coming years.

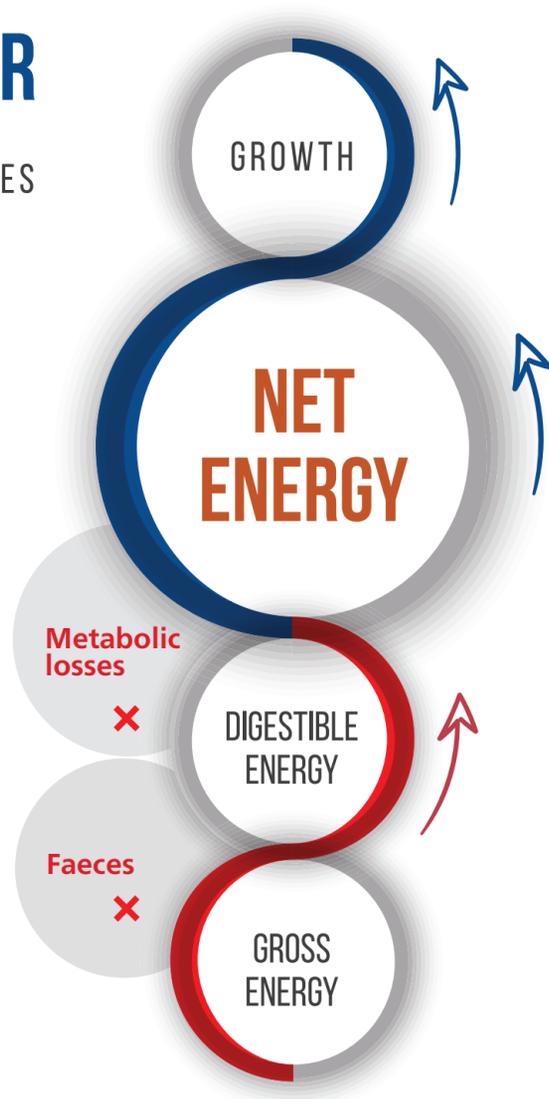
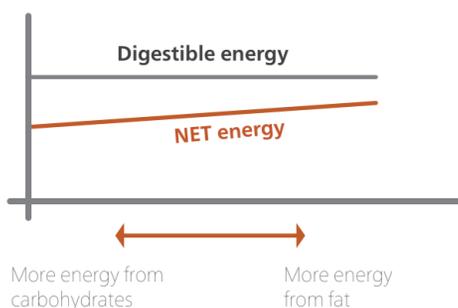
The use of net energy in feed evaluation is not a new concept in animal nutrition and has been already considered standard industry practice in pig feed evaluation for decades. However, feed evaluation in aquaculture is at the moment still commonly based on digestible energy levels and is therefore running behind in comparison with pig nutrition.

ONE STEP FURTHER

- > CONSTANT NET ENERGY VALUES
- > CONSTANT PERFORMANCE

With feeds formulated on the **NET ENERGY** concept, we go one step further in order to ensure constant feed performance. We do not only neutralize the natural variation of the raw material, but also focus on the differences in efficiency of the different macronutrients.

NET ENERGY VS DIGESTIBLE ENERGY



“We believe that with the use of this **net energy** approach we can make the next step in aquafeed evaluation.”



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The reason that digestible energy is still the most common parameter in aquafeed evaluation is due to the fact that in fish it is rather difficult to measure metabolic losses.



Digestibility of raw materials on the other hand can be predetermined in digestibility studies and the digestible protein and energy of a feed can therefore be calculated relatively simply. The efficiency of digestible energy for net energy is then assumed to be constant and independent on the feed composition. However, multiple studies over the last years have shown that the different forms of the digestible energy are actually not utilised with the same efficiency. Energy from fat can for example be used more efficiently than energy from carbohydrates and can lead to a difference in the net energy of the feed.

One of the main problems in aquaculture is the increasing price and limited availability of fish meal, which is already leading to the use of more plant protein sources as a replacement for fishmeal. Increasing amounts of plant protein sources in fish diets will however also increase the carbohydrate content of a diet. This increase in carbohydrates might however also have an impact on the utilisation efficiency of energy in the feed and can thus potentially also impact the amount of net energy available for the fish. The first net energy models for some fish species have already been published in scientific literature but still need to be explored for use in practice.

energy evaluation in feed formulation for salmonids in aquaculture. It will explore the use of net energy evaluation for salmonid feeds and will therefore potentially increase the accuracy with which feed can be formulated in aquaculture.

Alltech Coppens has already started to implement this net energy approach in feed evaluation for some trout feeds where the utilisation efficiency of the different macronutrients are accounted for as well. Implications of the use of this net energy approach are that the crude analytical values of these products can deviate slightly between batches while keeping the same level of net energy, leading to constant performance. We believe that with the use of this net energy approach we can make the next step in aquafeed evaluation.

A PhD project in cooperation with Wageningen University will initially focus more deeply on net



ULTRA

- ✓ High performance
- ✓ Intensive farming
- ✓ High energy phase feeding diet
- ✓ Beneficial DP:DE ratio
- ✓ Very suitable for char and hybrids



ULTRA ASTAX

- ✓ High performance
- ✓ Intensive farming
- ✓ High energy phase feeding diet
- ✓ Beneficial DP:DE ratio
- ✓ Very suitable for char and hybrids

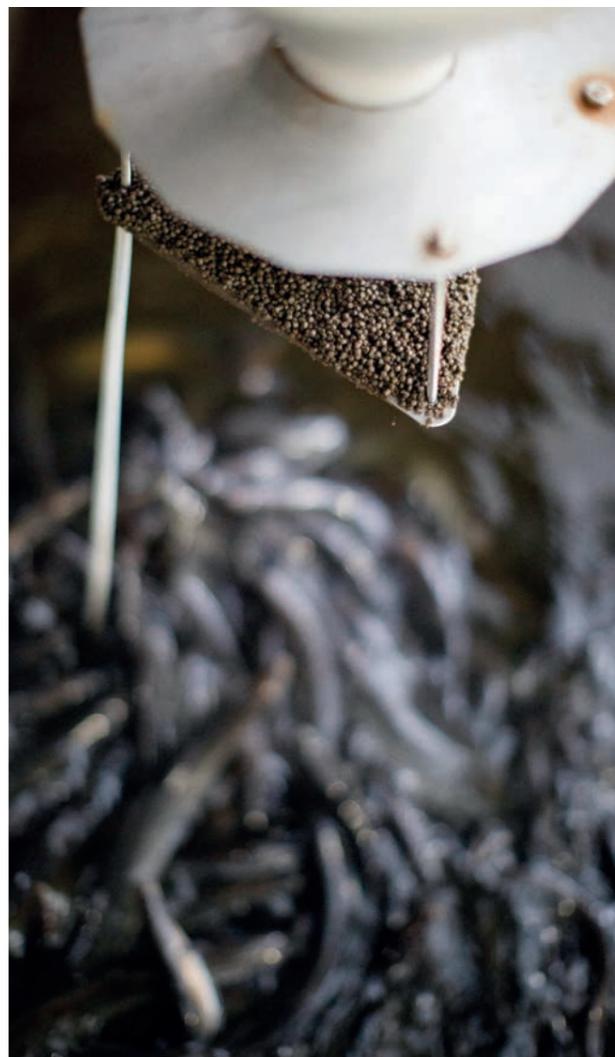
Feed efficiency in RAS

To achieve the farm's full potential, Alltech Coppens continuously improves our diets in order to make RAS farming more economically profitable. Together with the production of high quality feed, Alltech Coppens will contribute in this way to professionalization and more efficient production in RAS. Feed formulations and feeding strategies, are associated with efficiency rates. **Alltech Coppens focuses on maximizing growth, feed efficiency and the health of the fish**

For a fish farmer operating recirculating aquaculture systems (RAS), the ultimate goal is to optimize feed efficiency and performance while maintaining, optimal water quality, product quality and the health of the fish - all in a stable, balanced and healthy environment.

A healthy digestive system, with a robust gut structure and microflora, is crucial for ensuring optimal nutrient uptake, growth and performance. It is also essential in managing enteritis and maintaining fecal stability, a critical aspect of RAS water treatment management.

The feed efficiency rates of RAS depends greatly on feed formulations, feed strategies, biofilter and management. Commercial RAS require a relatively high level of stocking density and increased management awareness.



01. Feed strategies

Besides using the best quality feed in the market, a proper feeding strategy is needed for the best results. Fish eat to meet their energy requirement, provided oxygen levels are not limiting.

02. Maximize growth

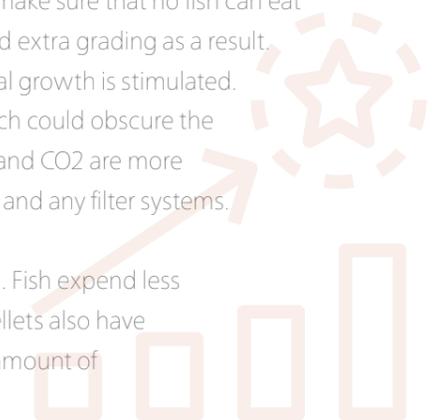
The most common strategy is to maximize growth. This strategy minimizes the time required to reach harvest weight and utilizes the growth potential of the fish to the most. The extra growth more than compensates the extra feed costs.

It is clear that, provided the water quality and especially the oxygen levels are not limiting, the strategy of growth maximisation provides interesting financial benefits. The type of feed required again is the high energy feed that allows for maximum protein utilisation. Only the feeding level is maximized.



The next challenge is to make sure that all fish in the system have simultaneous and easy access to the feed during feeding time. Therefore the feed has to be distributed evenly in the tank to make sure that no fish can eat substantially more than any other. This would be the start of growth differences and extra grading as a result. If there are enough pellets for each fish, competition for feed is prevented and equal growth is stimulated. Regular feeding of smaller amounts helps to prevent stress and avoid turbidity which could obscure the pellets from sight. In addition, oxygen requirements and productions of ammonia and CO₂ are more constant. In this way fluctuations are prevented, which is advantageous for the fish and any filter systems.

It is also a good practice to feed the largest pellet size which is acceptable to all fish. Fish expend less energy during feeding if their feed needs are met by fewer, larger pellets. Larger pellets also have a smaller surface-to-volume ratio than smaller pellets which reduces the rate and amount of nutrients that leach into the water before the pellets are consumed.



03. Efficiency Biofilter



The efficiency of the biofilter is directly linked to the amount of bacteria in the filter. For efficient nitrification, it is desirable to have a high specific open surface area filter medium on which the nitrifying bacteria can attach and grow. This gives a high surface/volume ratio to increase the biofilm area.

Different types of biofilters, each with their own specifications, are on the market. Besides surface area of the filter medium, other important factors determining the rate at which the conversion of ammonia to nitrate takes place are ammonia concentration, oxygen level, temperature, pH and organic matter in the system water.

Besides ammonia reduction, the fixed bed filters remove the smallest particles that were not captured by the microfilter. Partial decomposition of organic matter takes place, while CO₂ and water are generated. These filter systems require regular cleaning for optimum performance.

Fish expend less energy during feeding if their feed needs are met by fewer, larger pellets.

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04. Management

RAS requires more reliable systems that better monitor and control (7 days a week, 24 hours a day). The high-technology demands less labour, but operation of RAS requires skilled staff and commitment. RAS offer the advantages of better control and regulation over the water quality parameters and facilitate health control and management. It requires a high-quality feed for optimum performance. Furthermore, reduced water consumption and better management of waste production provide greater environmental sustainability and less dependency on production location.

05. Feeding Management

Feeding management is vital to achieve optimal performance in RAS. The frequency of feeding and amount of feed input depend on the size of the fish. Water temperature is one critical environmental parameter influencing growth and metabolism, and thus the feedintake. Commercial RAS may use mechanical feeders (i.e. belt, screw feeders or self-feeders) that can be programmed to deliver a set amount of feed, for a range of feeding durations, a number of times each day.

The introduction of new pathogens into the culture system and the risk of diseases can be greatly reduced by maintaining high biosecurity levels.

06. Biosecurity

Good hygiene is the first biosecurity measure that is easily carried out on farm level. Reliable disinfection and pathogen eradication methods are important. Another important measure is to prevent pathogens from entering the system by avoiding introduction of infected fish. This can be accomplished by purchasing eggs from disease-free broodstock. If this is not possible, fingerlings should be bought from a reliable, disease-free certified source, quarantined upon arrival, and checked for parasites and bacteria before they are stocked. The water should be spring or well water, because these sources are usually of stable quality and pathogen-free. When surface water is used, it should be disinfected before entering the system.

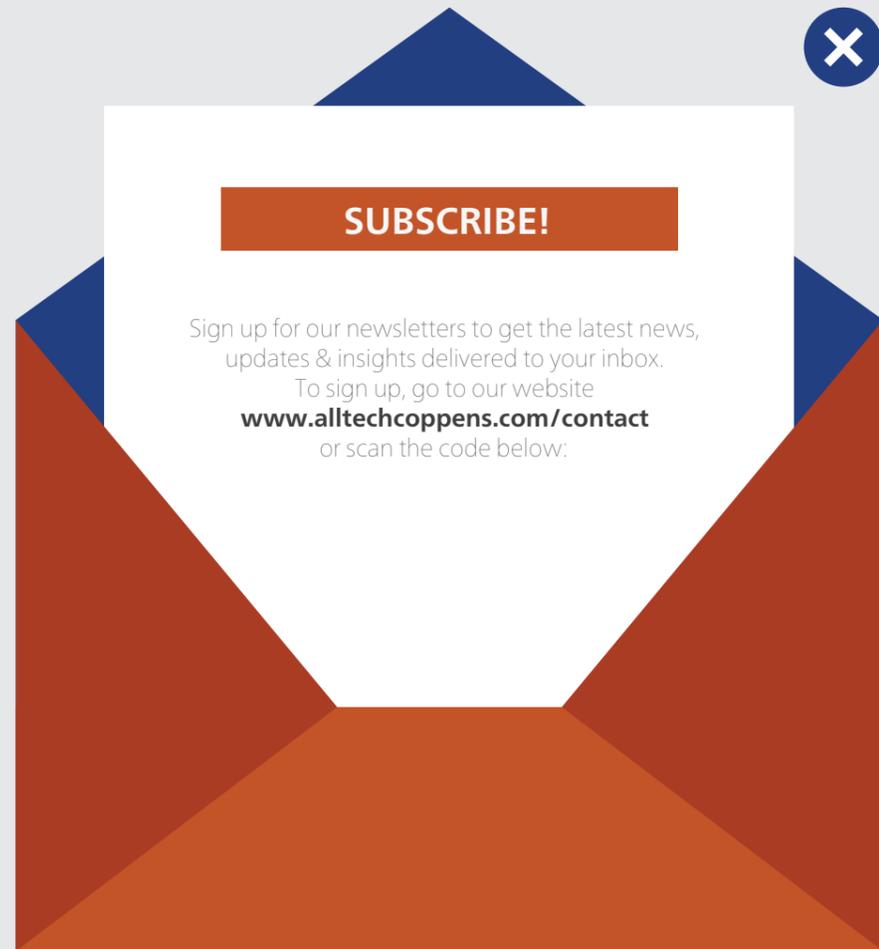
RELIABLE TROUT FEED WITH CONSISTENT PERFORMANCE & DIGESTIBILITY

Crystal is Alltech Coppens's most successful RAS feed for trout farming. It works equally well in outdoor as in indoor trout RAS farms. Crystal was specifically developed with optimal trout and filter performance in mind. Feed tests performed at the Alltech Coppens Aqua Centre, have helped to fine tune the recipe and the ratio between digestible protein and digestible energy (DP/DE). Crystal gives a high growth rate. The faeces are also firm and can easily be removed by the mechanical filter. This second generation RAS feed results in a surprisingly high protein retention and thus an extremely low ammonia excretion. That is good news for the biofilter as now the nitrifying bacteria can now handle considerably more feed per day than normal. The extra amount of feed that can be handled is about 30% compared conventional trout RAS feeds.

For these reasons Crystal has become the go to RAS feed for in and outdoor trout RAS farms across Europe.

- ✓ High energy diet
- ✓ Designed for RAS and intensive farming
- ✓ High performance
- ✓ Optimal DP:DE ratio for efficient growth
- ✓ Low nitrogen and phosphorus emission





THANK YOU!



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**THANK YOU
FOR READING**



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