

Amoéba

An amoebalicious adventure from fungus fighters to wrinkle warriors

Pharmaceuticals and Biotechnology | France

We initiate coverage on Amoéba, an industrial biotechnology company based in Chassieu, France, that focuses on innovative uses of the amoeba *Williaertia magna* C2c Maky. The company aims to become a major player in the global biocontrol market for plant protection as well as the cosmetics market. Based on a DCF/SOTP analysis, we issue a € 1.7 TP and Buy rating.

Amoéba's product has shown antifungal effectiveness as biocontrol

Amoéba plans to commercialize a lysate formulation of *Williaertia magna* C2C Maky (WmCM) as a biocontrol product (Axpera) against pathogenic fungi. Axpera offers a efficacious natural alternative to chemical crop protection products. Final products could gain EPA approval in the US this year. In Europe, EFSA issued a positive final report, hence AS approval by the European Commission is now expected 2H25, with final product approvals possible by the end of 2025.

The company is already in discussions with the Dutch company Koppert, a leading player in biocontrol, regarding a potential partnership. While the partnership is not yet formalized, it aims to focus on the distribution of Amoéba's biocontrol products for specific crops and geographies, but could potentially also include co-development, manufacturing and/or a potential financing agreement. This collaboration is a key part of Amoéba's strategy to establish its position in the global biocontrol market.

Products can also be used in cosmetics, first partnership possible with OBV

Amoéba's lysate has shown strong anti-aging effects in the lab and in clinical studies, and the company plans to commercialize it as an active ingredient in skin care products. The global anti-aging cosmetics market is growing rapidly, and Amoéba has obtained INCI registration and a COSMOS label. It is ready for market entry as an active ingredient producer, and already closed a MoU with Oriental Beauty Valley.

Amoéba is the only company in the world able to feed and grow amoeba

Amoéba has optimized the production of WmCM for cultivation in a high-yield continuous bioreactor. It is the only company in the world that is able to feed and grow amoeba on industrial scale in the world thanks to its proprietary technology. Products can be manufactured in-house in Chassieu, or could be considered in partnership with a CDMO. This enables a flexible, low fixed-cost scale-up for Amoéba.

Financial projections confirm the growth story, breakeven possible by 2027

We have developed detailed financial projections for Amoéba, with expected sales growth and gross margins from 2025 to 2029. We expect the company to reach breakeven in 2027, with significant growth in both the high-volume, low-margin biocontrol and low-volume, high-margin cosmetics markets.

Amoéba's reference shareholder Nice & Green holds approximately 30% of the shares and has been supportive throughout the company's development. While the company is still cash burning, we deem it an interesting growth story at an attractive valuation. Based on our DCF/SOTP analysis, we land at a fair value of € 1.70 per share, representing approx. 85% upside to the current share price, and issue a Buy rating.

Share Price: €0.9
Target Price: €1.7
Upside/Downside: 84.8%

Recommendation: Buy
Previous Recommendation:

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Key Data

Bloomberg: ALMIB.FP
Reuters: ALMIB.PA
URL: <https://amoeba-nature.com/>

Market Cap. (m): €46.2
Shares Out. (m): 49.7
Volume (Daily): 150018
Free Float: 70.6%
Price 12m Hi/Lo: 1.1 / 0.4

Performance	1m	3m	12m
Absolute (%)	11.1	25.0	150.0
Rel. CAC40	21.4	29.1	161.2

Next Corporate Event

Memorandum of Understanding with Koppert: 13/05/2025

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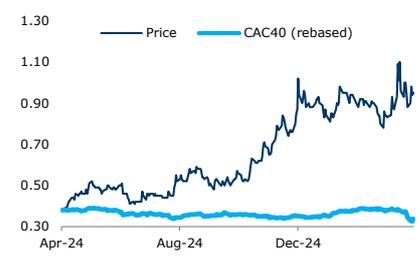
Year To:	2024A	2025E	2026E	2027E
Sales (€m)	0.0	0.6	6.8	17.6
REBITDA (€m)	(4.9)	(5.3)	(2.3)	3.4
Net earnings (€m)	(6.6)	(6.6)	(5.6)	(0.1)
Diluted, adjusted EPS (€)	(0.13)	(0.13)	(0.11)	0.00
Dividend per share (€)	0.00	0.00	0.00	0.00
PE (diluted, adjusted)	(2.85)	(7.17)	(8.52)	(425.31)
EV / REBITDA (x)	(6.23)	(13.18)	(34.53)	22.82
Free cash flow yield (%)	(29.9)	(20.3)	(12.5)	4.3
Dividend yield (%)	0.0	0.0	0.0	0.0

Source: KBC Securities

<https://research.kbcsecurities.com>

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Price Chart



Source: Refinitiv Datastream

Investment Thesis

Amoéba presents a compelling investment case due to its innovative use of the amoeba *Willaertia magna* C2c Maky for plant protection and cosmetics. The company offers a natural alternative to chemical crop protection products, addressing ecological and health-related risks. It is the only company in the world able to grow and extract amoebae at an industrial scale. Financial projections indicate strong sales growth, supported by strategic partnerships and a revamped governance structure.

Bull Case

Amoéba could secure faster than anticipated regulatory approvals for its biocontrol products, which could unlock to an earlier route to market. Partnerships with various biocontrol and cosmetics players could significantly accelerate market penetration. Financially, higher-than anticipated margins and the closing of a favourable CDMO contract could enable faster breakeven.

Bear Case

Amoéba might obtain anticipated regulatory approvals for its biocontrol products slower than anticipated, which could delay its route to market. Partnerships with various biocontrol and cosmetics players might not materialise and would significantly hamper commercial uptake, while the company would need to invest in inhouse marketing and sales. The company is still cash burning and might not obtain required additional financing.

Catalysts

Amoéba's most important catalysts include securing regulatory approvals for Axpera, leveraging commercial partnerships with for distribution and market penetration across crops and geographies, successfully commercializing its anti-aging lysate in the cosmetics market, achieving financial milestones like first sales and breakeven, efficiently scaling production with a CDMO, and raising additional capital.

Source: KBC

Business Description

Founded in 2010, Amoéba is an industrial greentech company based in Chassieu (Lyon, France) whose ambition is to become a major player in the deployment of amoebae in the plant protection and cosmetics sectors. Thanks to its unique and patented knowhow, Amoéba is the only company capable of exploiting the full potential of amoebae on an industrial scale and growing it in sufficient volumes to offer biological solutions that constitute a viable alternative to the chemical products widely used today. Amoéba is currently focusing on the global biocontrol market for plant protection and the cosmetics market.

Risk To Our Investment Thesis

Amoéba faces key risks including potential delays in obtaining regulatory approvals for Axpera, challenges in market adoption of its products, issues in closes commercial partnerships, financial risks due to high cash burn and reliance on external funding, intense competition in the biocontrol and cosmetics markets, and difficulties in scaling up production to meet market demand.

Source: KBC

Major Shareholders	% Held
Nice & Green	29.4
Other shareholders	70.6

SWOT

Strengths

Amoéba's strengths lie in its unique and patented knowhow, being the only company capable of exploiting the full potential of amoebae on an industrial scale and growing it in sufficient volumes to offer biological solutions that constitute a viable alternative to chemical products widely used today. The company focuses on the dual use of amoebae for biocontrol and cosmetics, providing a competitive edge in two markets where demand for innovative products is high. The company has already obtained regulatory approval for its biocontrol product in the USA and anticipates EU approval in the near-term. The company has also optimized production methods for high-yield continuous bioreactors, allowing for scalable and flexible production.

Opportunities

Amoéba has significant opportunities in the expanding global biocontrol and anti-aging cosmetics markets, providing substantial revenue growth potential. The company can also diversify its product offerings by combining Axpera with other active substances to enhance efficacy and reduce resistance development. Exploring additional strategic partnerships for different crops and regions or cosmetics applications could further strengthen Amoéba's market position. The company could also expand its development platform with partners to investigate additional use cases (e.g., acne, wound healing, burn treatment, custom proteins).

Source: KBC Securities

Weaknesses

Amoéba faces weaknesses such as financial dependence, as it is still in a cash-burning phase and relies on external funding. Any delays in obtaining regulatory approvals could hinder market entry and revenue generation. Moreover, the commercial ramp-up of its products depends on appetite by partners and end customers, which can be unpredictable.

Threats

Amoéba faces threats from the highly competitive biocontrol and cosmetics markets, requiring continuous innovation to maintain a competitive edge. Challenges in scaling up production to meet market demand could impact revenue. Additionally, financial risks such as difficulties in securing additional funding could affect the company's ability to sustain operations and invest in growth initiatives.

Source: KBC Securities

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INVESTMENT CASE

A unique company founded on innovative amoeba technology

Founded in 2010, Amoéba is an industrial biotechnology company based in Chassieu (Lyon, France) whose ambition is to become a major player in the deployment of amoebae in the plant protection and cosmetics sectors.

Thanks to its unique and patented knowhow, Amoéba is the only company capable of exploiting the full potential of the amoeba *Willaertia magna C2c Maky* (WmCM) on an industrial scale and growing it in sufficient volumes to offer biological solutions that constitute a viable alternative to chemical products widely used today. Amoéba is currently focusing on the global biocontrol market for plant protection as well as the cosmetics market.

Biocontrol products are nearing market approval, Koppert could be a backer

Due to the ecological and health-related risks associated with chemical crop protection products, general aversion to chemicals is growing. Amoéba offers a solution by providing a natural alternative to these chemicals while still offering a similar efficacy. The company aims to commercialize a lysate formulation of WmCM as a biocontrol agent against pathogenic fungi (Axpera), and has already obtained approval for its active substance in the USA as well as a positive final opinion by the European Food Safety Agency (EFSA) in Europe. Regulatory approval for the active substance is therefore expected in 2H25 in the EU. We expect first sales of Axpera in the EU and the US by the end of 2025. Amoéba has closed a memorandum of understanding with the Dutch biocontrol player Koppert in December 2024 and is currently in discussions to formalise a partnership.

A second, higher-margin application in cosmetics can diversify the topline

The global anti-aging cosmetics market is in dire need of innovation beyond chemical active ingredients. Amoéba's lysate has shown strong anti-aging effects in clinical studies, and the company therefore plans to commercialize its formulation as an active ingredient in anti-aging cosmetic products. Cosmetic applications generally do not require prior market approval from a competent authority in Europe or the United States, hence the company can move more freely in this space and first sales could materialise approx. 6-12 months after a partner/customer can be announced.

Cornerstone shareholders support the renewed equity story

Amoéba has been listed on Euronext Growth (ALMIB) in France since 2015. The Swiss investment firm Nice & Green has been a cornerstone investor in the company since 2018, and helped shape its future strategy. Nice & Green holds approx. 30% of Amoéba shares, and has been supportive throughout Amoéba's cash burn. While the company currently has limited cash on the balance sheet (YE24: € 0.5m), we expect this constellation to hold up until additional capital can be attracted, e.g. through Koppert or elsewhere.

We value the company at € 1.70 p.s. and issue a Buy rating

Based on our current projections, we anticipate first commercial sales for Amoéba in 2025 in order to reach € 53m revenues by 2029. Taking into account attractive gross margins and a highly scalable partnership model for production and commercialisation, we anticipate the company to reach breakeven in 2027. Based on a DCF/SOTP analysis, we initiate coverage on Amoéba with a € 1.70 target price and Buy rating, representing approx. 85% upside versus the current share price.

Amoéba is a biotechnology company in Lyon, France, specializing in industrial-scale amoeba-based biological solutions for plant protection and cosmetics.

Amoéba offers a natural alternative to chemical crop protection products, with its biocontrol agent Axpera expected to be sold in the EU and US by the end of 2025.

Amoéba plans to commercialize its lysate as an active ingredient in anti-aging cosmetics, with potential sales starting once a partner or customer is announced.

Amoéba, listed on Euronext Growth since 2015, has been supported by Nice & Green, which holds 30% of its shares, supporting the company through its current limited cash balance and high burn rate.

Amoéba is projected to reach € 53m in revenues by 2029, with breakeven expected in 2027, and has been given a Buy rating with a € 1.70 target price, representing 85% upside.

AMOÉBA'S MAIN PRODUCT HAS A WIDE ARRAY OF USES

Amoebae have a key role in microbial population control

Amoebae are single-celled organisms that can move using "pseudopods," plasma membrane extensions that allow them to crawl in a certain direction and/or capture prey. Most amoebae are free-living in water, damp soil, or moss, but some can cause diseases. There are around 17,000 recorded amoebae species, yet only 5 known to be pathogenic. Amoebae are about 50 times larger than bacteria, which they can consume through phagocytosis. They help regulate bacterial populations in natural ecosystems and are themselves eaten by organisms like nematodes and earthworms, making them key regulators in the environment.

Amoebae are single-celled organisms that move using pseudopods, regulate bacterial populations, and are key environmental regulators, with only 5 out of 17,000 species known to be pathogenic.

Plethora of amoeba species



From left to right: Amoeba proteus, Actinophrys sol, Acanthamoeba sp., Nuclearia thermophila, Euglypha acanthophora, neutrophil ingesting bacteria.
Source: Wikipedia, KBC Securities

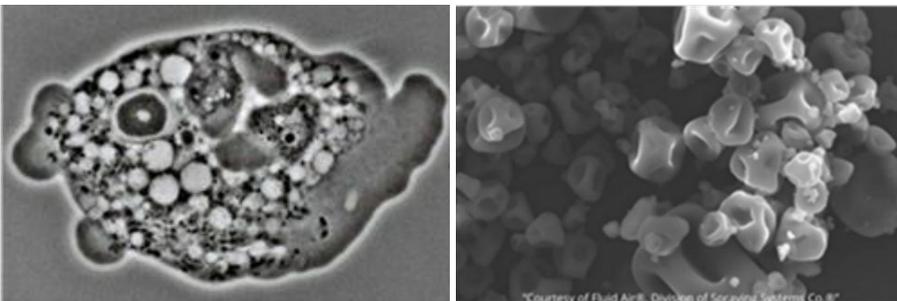
WmCM has potential as a biocide and is non virulent

Willaertia magna C2c Maky (WmCM) was discovered in 1998 in Aix-Les-Bains, France. WmCM is a non-pathogenic amoeba that preys on water-borne pathogens like *Legionella* and *Pseudomonas*. It also inhibits spore germination in 20 fungal strains. Its genome lacks any known virulent genes, thereby confirming its safety to humans. The WmCM genome is 36.5 Mb, encoding for 18,519 proteins. Some genes encode potential pharmaceutical compounds such as penicillin amidase and polyketide synthases (Hasni et al., 2019). The combination of its non-virulence and biocidal properties make WmCM a valuable biocide for industrial applications.

Willaertia magna C2c Maky (WmCM), discovered in 1998, is a non-pathogenic amoeba that preys on water-borne pathogens and inhibits fungal spore germination, making it a valuable biocide for industrial applications.

WmCM amoeba

Lysate from WmCM amoeba



Source: company information, KBC Securities

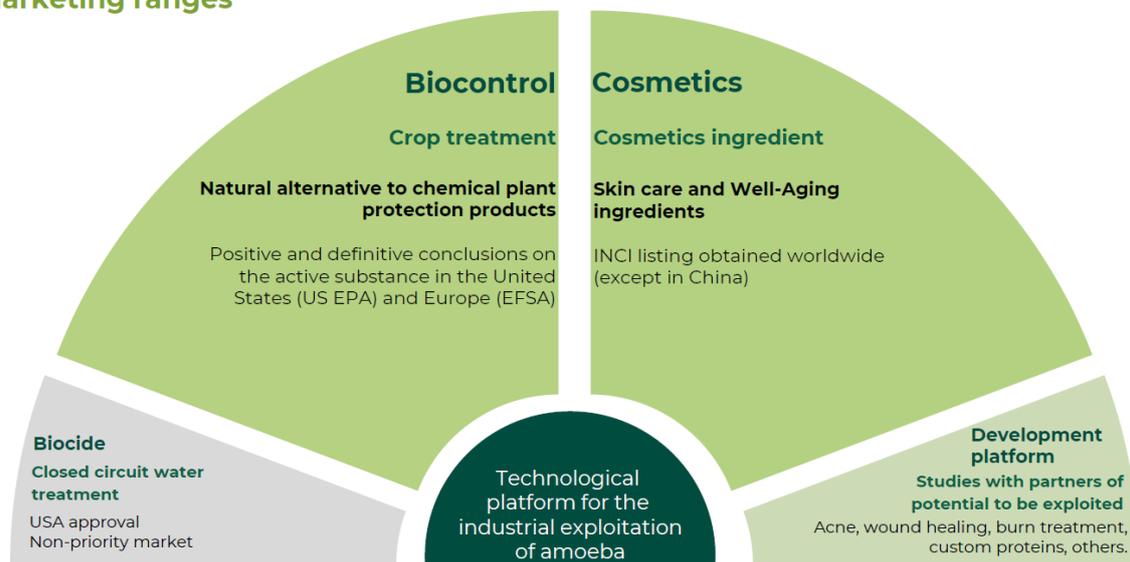
Multiple applications show promising results

Amoéba has developed both living and lysed (non-living) forms of amoebae for different applications. The living form can be used for biocidal purposes, such as destroying bacteria in water and surface treatments. The lysed form retains its fungicidal properties and avoids the risk of bacterial proliferation. This formulation can be used in biocontrol applications to combat plant fungi and in cosmetics to address aging and UV exposure. Their production process is nearly identical, with the distinction occurring at the amoeba recovery phase where they are either kept alive or lysed using mechanical grinding.

Amoéba has developed both living and lysed forms of amoebae for biocidal and fungicidal applications, with the production process differing at the recovery phase where they are either kept alive or lysed.

Amoéba’s technology platform with multiple applications

2 pre-marketing ranges



Source: company information, KBC Securities

Strong IP position protected by several patent families

Amoéba was started based on research and a patent licensed from the University of Lyon. The foundational patent is valid until October 12, 2027 and protects the use of WmCM as biocide against *Legionella pneumophila* proliferation. In subsequent years, Amoéba has expanded its IP protection with five additional patent families related to WmCM applications and its different formulations:

Amoéba, founded on research and a patent from the University of Lyon, has expanded its IP protection with five additional patent families related to WmCM applications and formulations, valid until 2031-2038.

- 2012: Patents filed for biological control processes targeting *Listeria* and *Pseudomonas* species, using WmCM as a biocide. These patents are granted in multiple countries. They remain valid until 2031 and 2032, respectively.
- 2013: A patent for a method to control *Naegleria fowleri*, employing WmCM as a biocide. This patent is granted in several countries and is valid until 2033-2034.
- 2017: A patent concerning the use of WmCM as a fungistatic and/or fungicidal agent against pathogenic yeasts and moulds, including those resistant to existing fungicides. This patent is granted in various countries and is under examination in others, valid until 2037-2038.
- 2023: A patent filed to protect a cosmetic skincare composition containing Willaertia species. The international application phase is scheduled for 2025.

A NOVEL BIOCONTROL AGENT FOR PLANT PROTECTION

Amoéba is developing WmCM lysate as a biocontrol product against fungi (Axpera). The global fungicide market is rapidly moving away from traditional chemicals which brings a tailwind to the biocontrol market. Amoéba is set to profit from this trend, as Axpera has shown on par efficacy with chemical fungicides in various settings. With a regulatory approval in the EU set for 2H25 and approval already obtained in the US, Axpera could generate first sales in 2025.

Amoéba is poised to benefit from the shift away from traditional chemical fungicides.

THE PESTICIDE MARKET IS MOVING AWAY FROM TRADITIONAL CHEMICALS

Rising food demand calls for crop yield improvements

The demand for food is increasing due to a rising global population and growing affluence in China, India, and South-East Asia. Global food consumption is projected to grow by 1.2% annually over the next decade, with agricultural production increasing by 1.1% per year (source: [OECD & FAO, 2024](#)). Crop yield improvements will account for 80% of this growth, cropland expansion for 15%, and increased cropping intensity for 5%. These yield improvements are expected to have a material impact on combatting climate change since agriculture is responsible for 12% of global greenhouse gas emissions, or 21% if including land use changes. Since the 1960s, yield improvements have allowed the amount of cultivated land per capita to be halved, even as food needs have continued to rise.

The rising global population and affluence in emerging regions like China, India, and South-East Asia are driving an increase in food demand, projected to grow by 1.2% annually over the next decade.

Global gap between food production and consumption by 2050

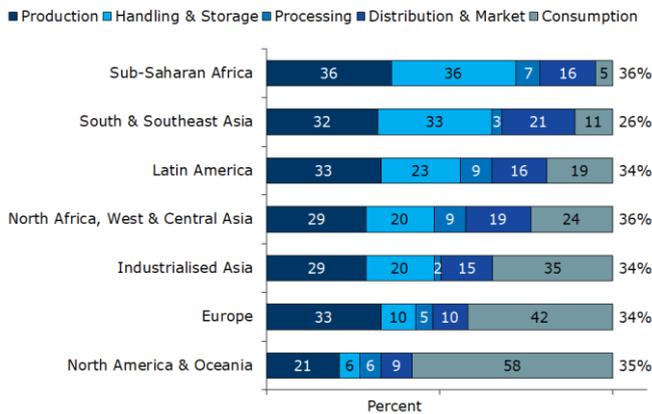


Crop protection products are critical for improving yield

Each year, up to 40% of global agricultural production is lost due to pests that cost the global economy \$ ~290bn each year (source: [FAO, 2024](#)). Climate change is expected to exacerbate these losses by increasing the risk of pests spreading in agricultural and forestry ecosystems, particularly in cooler regions such as the Arctic, boreal, temperate, and subtropical zones. Even a single unusually warm winter can help invasive pests establish themselves. For instance, the fall armyworm, which feeds on maize, sorghum, and millet, has already spread due to warming climates, with predictions indicating that other pests will also alter their migratory routes and geographical distribution. Additionally, global travel and trade contribute to the spread of plant diseases.

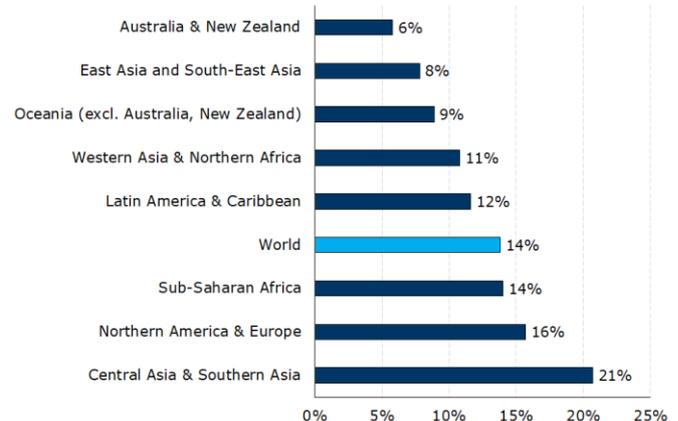
Climate change and global travel are increasing the spread of pests, leading to significant agricultural losses and economic costs of around \$ 290bn annually.

Share of food loss and waste throughout the value chain



Source: [FAO \(2019\)](#), KBC Securities

Food losses from post-harvest to distribution



Source: [World Resources Institute \(2019\)](#), KBC Securities

Chemical pesticides are unsustainable because they lose effectiveness

Since World War II, farmers have boosted crop yields using chemicals to control pests and weeds, but these have introduced challenges and controversy. Despite efforts to reduce chemical use with Integrated Pest Management, pesticide consumption keeps rising, hitting 3.7m tonnes in 2022 with an average of 2.38 kg per hectare, a 13% rise over ten years and 94% since 1990 ([FAO, 2024](#)). This increase is mainly due to pest resistance, necessitating higher doses and new pesticides. The ineffectiveness and societal aversion to chemicals highlight the need for sustainable alternatives like biopesticides to ensure food security and protect health and the environment.

The rise in pesticide use due to pest resistance and societal aversion to chemicals highlights the need for sustainable alternatives like biopesticides.

The transition toward integrated pest management

The shift from harmful chemicals to biocontrol is driven by the need to protect the environment, as well as the increasing ineffectiveness of traditional chemicals. Integrated pest management (IPM) is a combination of biological, cultural, and chemical practices to control insect pests in agricultural production. It seeks to use natural predators or parasites to control pests, using selective pesticides for backup only when pests are unable to be controlled by natural means. IPM does not discourage spraying chemicals, but promotes spraying with selective pesticides only when the crop needs it, which generally means that less pesticide is used. Biocontrol products are generally less affected by resistance, however less effective against severe pests. Increased attention to soil health over the past four decades has shifted regulations and consumer demand toward biocontrol.

The shift from harmful chemicals to biocontrol is driven by environmental protection and the ineffectiveness of traditional chemicals, with the European Green Deal aiming to reduce chemical pesticide use by 50% by 2030 and accelerate biological alternatives' approval.

In line with the transition toward IPM, key regulatory objectives in the European Green Deal include:

- Reducing chemical pesticide use by 50% by 2030.
- Ensuring farmers use IPM, with chemical pesticides as a last resort.
- Accelerating the approval of biological alternatives.
- Supporting sustainable agriculture in exporting countries and adopting environmental approaches to pesticide residues in imports.

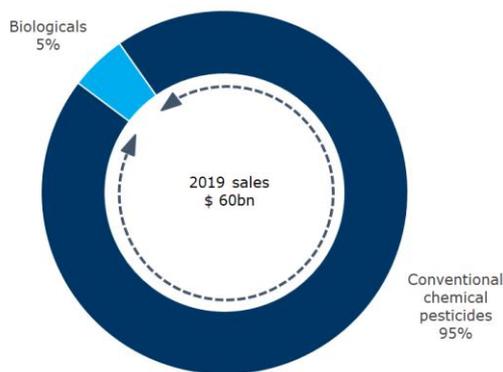
The European Commission is also banning key pesticides. These include neonicotinoids (e.g., clothianidin, imidacloprid, thiamethoxam) due to their risks to bee health, chlorothalonil due to its DNA damage and associated risks to amphibians and fish, mancozeb due to reproductive toxicity, and potentially a restriction on Bordeaux mixture (sulphur and copper mixture) to 4 kg/ha p.a. due to its harm to worms and grazing restrictions.

The crop protection market is vast, with biocontrol as a growing opportunity

The global crop protection market was valued at \$ ~75bn in 2023, and is projected to grow at a 3.7% CAGR from 2023 to 2030 (source: [AgriBusiness Global, Grand View Research](#)). The fungicide segment, which represents 22-26% of crop protection, was estimated around \$ 16.5bn in 2023 ([FAO, 2024](#)). The penetration of biological products within this market is expanding rapidly. The biocontrol agents market was \$ ~9.4bn in 2024, and is expected to reach \$ ~22.8bn by 2030 (16% CAGR). Biofungicides, making up ~25% of this segment, and could create a \$ ~6bn market by 2030. The fungicide market's largest regions are the US (27%), the EU (23%), and RoW (~50%) ([FAO, 2024](#)).

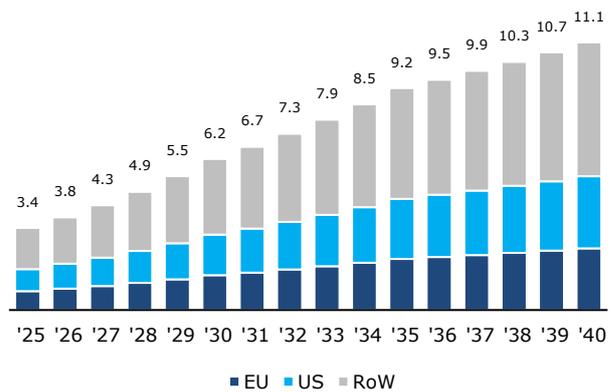
The global crop protection market, valued at \$75bn in 2023, is projected to grow at a 3.7% CAGR to 2030, with the biocontrol agents market expected to reach \$22.8bn by 2030.

Global crop protection market



Source: IHS Markit, KBC Securities

Biofungicide market [\$ bn]



Source: FAO, Agribusiness global, Beckerman, 2022, KBC Securities

There is room for growth in the biocontrol market

The potential for biocontrol products to replace pesticides is significant. In France, 69% of farmers already use biocontrol solutions ([IBMA, 2021](#)). Over 50% of these farmers plan to increase their use, and nearly 75% of non-users are considering or planning to adopt biocontrol products (French Ministry of Agriculture). While farmers are inclined to use biocontrol in the future, there are still notable gaps in the market. Currently, biocontrol products often lack efficacy, and some diseases remain challenging to treat effectively. Consequently, farmers frequently use biocontrol products alongside conventional ones to achieve better results. Although there are products available for *Botrytis*, powdery mildew, and downy mildew on vines and

The potential for biocontrol products to replace pesticides is significant, with 69% of French farmers already using them, but gaps in efficacy and treatment for certain diseases remain.

vegetables, effective solutions for late blight in potatoes and tomatoes, rusts in crops like wheat and soybeans, *Septoria* in wheat, *Cercosporiosis* in bananas, and apple scab are still to be developed.

SEVERAL KEY FUNGI CONTINUE TO RAISE THE PRESSURE ON AGRICULTURAL YIELDS

Powdery mildews ravage warm and humid areas

Powdery mildews are the most commonly prevalent pathogenic fungi, and infect plants as obligate, external parasites. They cover plant surfaces with a grey/white felting containing spores and draw nutrients through suckers. High humidity, not liquid water, is needed for germination. They thrive in higher temperatures and dry climates like the Mediterranean, California, South Africa, Chile, and Australia.

Economically significant powdery mildews include those affecting grapevines (*Erysiphe necator*), cucurbits like zucchini and cucumber (*Podosphaera xanthii* and *Golovinomyces cichoracearum*), apple trees (*Podosphaera leucotricha*), tomatoes (*Leveillula taurica* and *Oidium neolycopersici*), cereals (*Blumeria graminis*), strawberries (*Podosphaera aphanis*), and hops (*Podosphaera macularis*). The global market for managing powdery mildew is large, and estimated at € ~1bn (Amoéba estimate).

Powdery mildews are pathogenic fungi that infect plants, thrive in high humidity and dry climates, and significantly impact crops like grapevines, cucurbits, apple trees, tomatoes, cereals, strawberries, and hops.

Powdery mildew on grapes, cucumbers and tomatoes



Source: KBC Securities

Downy mildews are highly persistent and require frequent treatment

Downy mildews, caused by oomycetes, infect plant leaves in water. Crops like grapevines (pathogen: *Plasmopara viticola*), melons and squash (pathogen: *Pseudoperonospora cubensis*), lettuce (pathogen: *Bremia lactucae*), cabbage (pathogen: *Hyaloperonospora parasitica*), onion (pathogen: *Peronospora destructor*), and hops (pathogen: *Pseudoperonospora humuli*) are susceptible. The diseases thrive in favourable conditions and require multiple annual fungicide treatments to prevent significant losses (10x on average for vines, 3x for lettuce). The anti-mildew fungicide market is valued at approximately €800m globally, with €500-550m in Europe.

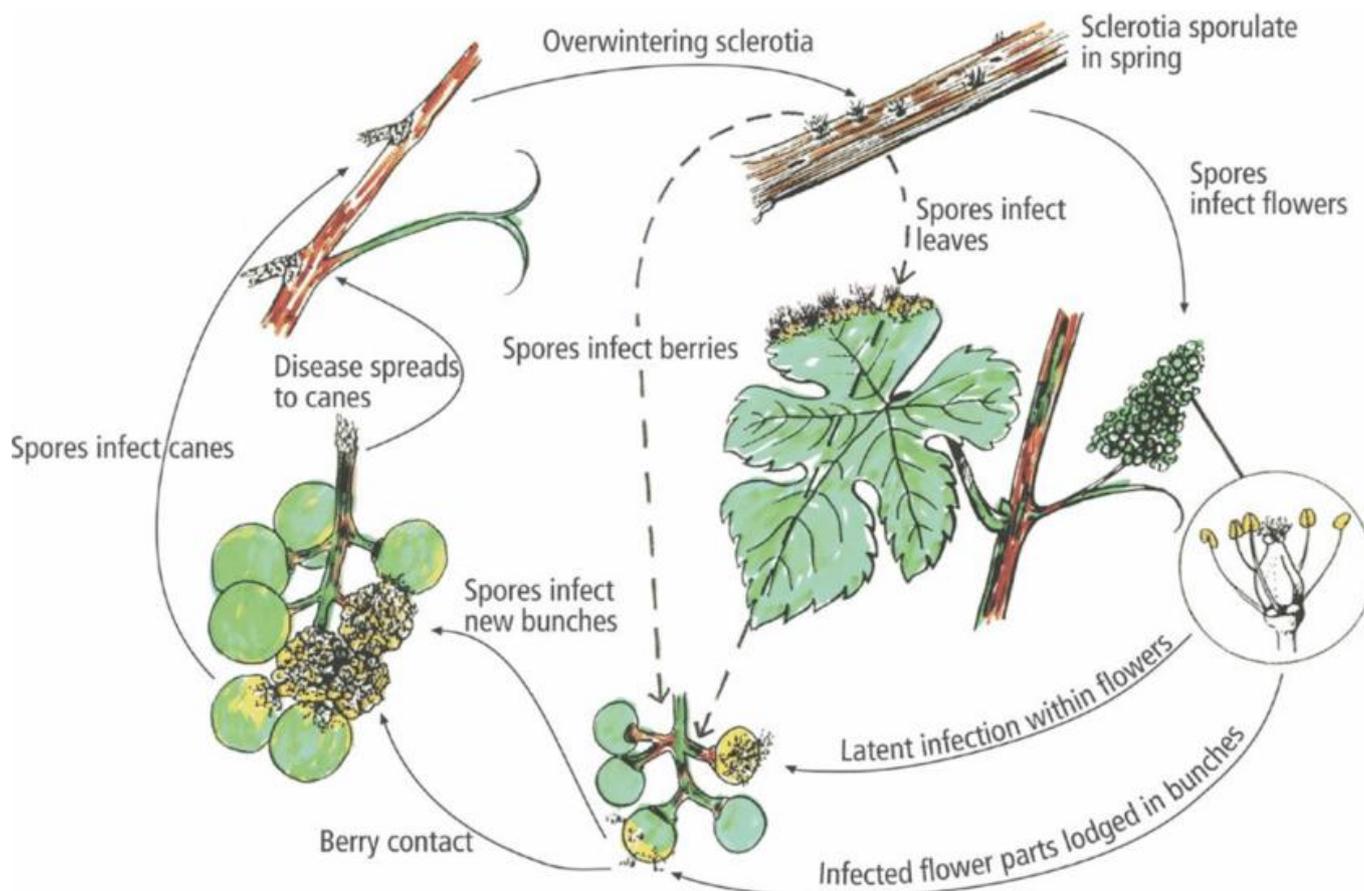
Downy mildews, caused by oomycetes, infect various crops and require multiple annual fungicide treatments, with the global anti-mildew fungicide market valued at approximately € 800m.

Downy mildew on grape, melon and lettuce



Source: KBC Securities

Development cycle of grapevine downy mildew



Source: company information, KBC Securities

Cereals are often attacked by a plethora of fungi

Cereals like wheat and barley are crucial global crops but their monocultures are particularly prone to fungi. High-yield, disease-sensitive varieties, excessive fertilization, low crop rotation, and monoculture all elevate disease risks. Europe, with intense cereal cultivation, faces significant disease pressures, including rusts, wheat septoria and *Fusarium* head blight. Rusts cause major economic losses, key types include:

- Yellow rust (*Puccinia striiformis*): Affects wheat and barley, thrives in mild winters and cold, wet springs, mainly in Northern Europe.
- Brown wheat rust (*Puccinia recondita*): Prefers warmer climates, common in southern Europe, and is particularly harmful to durum wheat.
- Barley brown rust (*Puccinia hordei*): Similar to brown wheat rust but targets barley.

Wheat septoria (*Zymoseptoria tritici*) is the main wheat disease, developing slower than rusts, but becomes serious when affecting upper leaves crucial for grain nutrition. *Fusarium* head blight (*Fusarium spp*, *Microdochium spp*) impacts grains, causing yield and quality losses, especially during wet periods extending into heading-flowering. It primarily targets wheat but can also affect barley. The overall fungicide market for cereals was estimated at € ~2.4 billion by Amoéba in 2023, representing the largest fungicide market segment.

Cereals like wheat and barley are prone to fungi, with Europe facing significant disease pressures, including rusts, wheat septoria, and Fusarium head blight, making the fungicide market for cereals the largest segment at € 2.4bn in 2023.

Yellow rust on wheat



Wheat septoria



Fusarium head blight



Source: KBC Securities

Other fungi could contribute another € ~200m to the fungicide market

Other oomycetes, such as *Pythium*, *Phytophthora*, and *Aphanomyces*, are soil microorganisms that harm various crops by infecting roots, crowns, or seedlings. Protection involves soil or seed treatments (1 or 2x per year), and some chemicals effective against mildew also work here. Biocontrol products like bacteria (*Bacillus* sp) or fungi (*Trichoderma* sp) that compete with such pathogens for resources, are relatively effective, contributing to a market valued at approximately € ~200m worldwide.

Other oomycetes like Pythium, Phytophthora, and Aphanomyces harm crops by infecting roots, crowns, or seedlings, contributing to a € 200m market worldwide.

Phytophthora on tobacco plant



Phytophthora blight on cucurbits



Aphanomyces on beet



Source: KBC Securities

BIOCONTROLS REPRESENT AN EMERGING CLASS OF INNOVATIVE SOLUTIONS

Biocontrol products are a group of plant protection methods based on the use of natural mechanisms and interactions between species. They can be used alone or in combination with other plant protection methods. Biocontrol is focussed on managing the balance of pest populations rather than eradicating them. Currently there are different types of biocontrol in use. Although there is no harmonised classification, there are four general classes of the biological pesticides can generally be divided in four classes: microbial, plant extracts, macrobials and biochemicals. The cleaner safety profile is probably the key positive feature of the current biologicals vs chemicals, while the main possible drawbacks vs chemicals include the less consistent performance and in the case of microbials and plant extracts the more challenging scalability.

Biocontrols use natural mechanisms and species interactions to manage pest populations, either alone or with other plant protection methods.

Microbial products based on certain bacteria and fungi can compete with pathogens

Antagonistic and competitive bacteria and fungi, tend to grow faster than pathogens and thus occupy space and trophic resources in the soil. These micro-organisms can be applied to crops to root out other malevolent plant pathogens.

Bacillus sp. such as Serenade and Rhapsody (*Bacillus subtilis* QST713, Bayer), Sonata (*Bacillus pumilus* QST2808, Bayer), Taegro (*Bacillus amyloliquefaciens* FZB24, Syngenta) and Double Nickel (*Bacillus amyloliquefaciens* D747, Certis Bio) are easy to produce and are generally considered broad spectrum pesticides. They are deemed most effective against powdery mildew and *Botrytis*, but not against other mildews or rusts.

Antagonistic and competitive bacteria and fungi, such as Bacillus and Trichoderma species, are used as broad-spectrum biofungicides to root out plant pathogens, showing effectiveness against various diseases.

Trichoderma sp. was one of the first micro-organisms to be developed as a biofungicide and numerous strains are developed: Tris-Soil (*Trichoderma atroviride* I-1237, Agrauxine), Vintec (*T. atroviride* SC1, Certis Belchim), Trianum (*T. harzianum* T22, Koppert) and Asperello T34 (*T. asperellum* T34, Biobest). These

products show good results against certain diseases in the soil, and against wood diseases on grapevines.

Plant-extract based biologicals like elicitors and essential oils show broad-spectrum activity

Elicitors are molecules that stimulate the plants' natural defences in a vaccine-like fashion, and are derived from plant extracts, fungi, phytohormones, pathogens and secondary metabolites. They activate the plants' inducible immunity by initiating responses involving numerous defense genes. Examples include seaweed extract laminarin (Vinivax, Sival), cerevisan, yeast cell walls (Romeo, Agrauxine), COS-OGA from crustacean shells and apples (Ibisco, Gowan), and *Reynoutria sachalinensis* extract (Regalia, Marrone Bio). These products are generally not very effective, and they are rather labelled as "plant defence stimulators" in the EU and are often used in combination with chemicals. In general they are primarily used on specialized crops like vines and vegetables.

Elicitors are molecules that stimulate plants' natural defences, derived from various sources, and are often used in combination with chemicals on specialized crops like vines and vegetables.

Essential oils like orange essential oil (e.g., Limocide, Vivagro & Prev-Am, Rovensa) are widely authorized globally as a fungicide and an insecticide/acaricide, though its dual efficacy limits greenhouse use due to its adverse effects on beneficial organisms. They are generally effective in vineyards for drying out mildew spots. Recently, tea tree essential oil (Timorex, Syngenta) has also been used in market gardens and bananas. *Swinglea glutinosa* essential oils (Ecoswing, Gowan) are approved in Latin America and the USA for powdery mildew and *Botrytis*. Other essential oil components like geraniol, eugenol, and thymol are used in mixtures (Mevalone, Eden Research) against *Botrytis*.

Essential oils like orange, tea tree, and Swinglea glutinosa are used globally as dual-use fungicides and insecticides.

Macrobials include beneficial pollinators, as well as predatory/parasitic organisms

Macrobials, or invertebrate biocontrol agents (IBCA), are living organisms that can control crop pests. They are small animals, such as beneficial insects, nematodes, and mites. They control pests by direct consumption or infection. Some examples of commercialized macrobial products are predatory mites that control spider mites (Spical Ulti-Mite, Koppert), parasitic wasps that control the European corn borer (Trichosafe, Biocare), rove beetles that control thrips, fungus gnats and other pests living in the soil (BioAtheta, Biobest) and nematodes that control vine weevil (Nematop, e-nema). Macrobials can be separated into three groups based on their characteristics and how they work: 1) predators: insects or mites that kill and feed on pests; 2) parasitoids: insects that live and feed inside or on pests, eventually killing them, and 3) entomopathogenic nematodes: parasitic nematodes that infect and kill insect pests.

Macrobials, or invertebrate biocontrol agents (IBCA), are living organisms like beneficial insects, nematodes, and mites that control crop pests through direct consumption or infection.

Biochemicals cover a wide range of pheromones, peptides, natural minerals etc.

Pheromones are used as mating disruption tools to interfere with the interactions between males and females, thereby preventing reproduction. These pheromones need to be released in confusing zones which should be of sufficient size to be effective.

Pheromones are used as mating disruption tools to prevent reproduction.

Natural mineral products include potassium bicarbonate (Armicarb, DCM) and similar potassium or sodium hydrogen carbonates. These are effective against fungi such as powdery mildew and certain insects. Sulphur is another major antifungal. Copper is not considered a biocontrol product in many geographies due to its toxicological and ecotoxicological profile.

Natural mineral products like potassium bicarbonate and sulphur are effective against fungi and insects.

<i>Biological crop protection</i>	<i>Microbials</i>	<i>Plant extracts</i>	<i>Macrobinials</i>	<i>Biochemicals</i>
Current segment size	\$ 2.0bn	\$ 1.4bn	\$ 0.3bn	NA, very small
Number of products on the market	±44	11	±150	NA
Technology/platform features	Cleaner safety profile than chemicals	Cleaner safety profile than chemicals	Cleaner safety profile than chemicals	Cleaner safety profile than chemicals
	Variability in performance is/can be an issue	Quality control consistency is an issue	Technology use limited to beneficial insects and pollinators	Expected to deliver consistent performance & efficacy in line with chemicals
	Scalability challenges	Scalability challenges		
Other	Limited differentiation, as e.g. witnessed by 21 launches of <i>Bacillus</i> spp	IP for plant extracts can be challenging	Technology focused mainly on insecticide segment & covered crops. Distribution can be challenging	Solid IP portfolio
Players	Marrone, AgBiome, AgraQuest, etc.	STK Bio-AG Technologies	Koppert, Biobest	Biotalys, Vestaron, GreenLight Bio, Amoéba

Source: KBC Securities

THE COMPETITIVE LANDSCAPE IS RAPIDLY EVOLVING

To date, there are approximately 600 biocontrol companies worldwide. While reducing the reliance on chemicals is a major global challenge, manufacturers and users are faced with the problem that natural substitutes are generally less effective. Replacing these chemical substances, designed and deployed to improve product health or productivity, requires drastic changes, both on the part of manufacturers in product design, and on the part of professionals in their use.

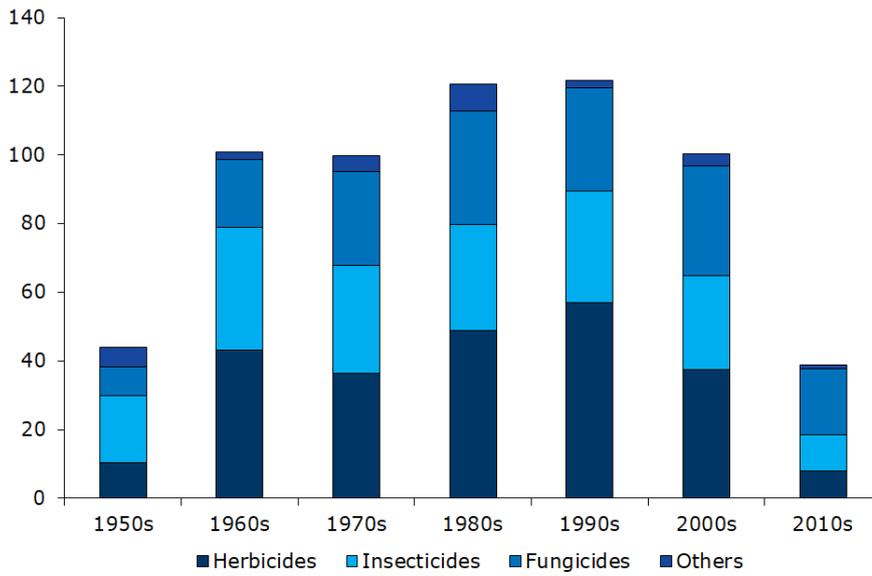
There are around 600 biocontrol companies globally, but replacing chemical substances with natural substitutes remains challenging.

The Ag majors are falling behind in biocontrol

The most important agrochemical players worldwide, who also develop biocontrol products, are Syngenta, Bayer, BASF, Sumitomo Chemical, FMC, and Corteva. Apart from new strains of *Trichoderma* or *Bacillus*, there are few innovative biofungicides under development. For instance, Bayer Crop Science has a catalogue of 167 pesticides, yet only 8 biocontrol products are included. Similarly, around € 2bn is invested in R&D annually, but only € 50m per year is invested in new biocontrol products. Nevertheless, according to Bayer, "developing biocontrol solutions is at the heart of the company's strategy". This discrepancy underlines that Ag majors want/have to invest significantly more in biocontrol in the future either internally or externally. In the biologicals segment, the top five players only represented 25%, while the top eight represented approximately one third of the total segment.

The major agrochemical companies invest significantly less in biocontrol products compared to traditional pesticides, despite their stated commitment to developing biocontrol solutions.

New active ingredients introduced per decade



Source: Phillips McDougal, KBC Securities

Specialized biocontrol players are filling in the market gap

Due to the lack of presence from the Ag majors in the biocontrol market, other smaller biocontrol companies have emerged. These companies dominate the biocontrol market and have several commercial biocontrol products.

Koppert is a Dutch privately-owned group, founded in 1967 by cucumber grower Jan Koppert, who became allergic to the chemical pesticides he was using and searched for a natural alternative. Today, Koppert is one of the leaders in biological protection and natural pollination and its products are available in more than 100 countries. Koppert offers nearly 120 biocontrol products sold globally in 34 countries directly and through distribution networks. Their products, targeting greenhouse horticulture, fruit, vegetable, and ornamental markets, include biological pest control, pollination solutions, biostimulants, and integrated crop management tools. In the biofungicides market, they provide beneficial organisms like Trianum-P and Noli, as well as biological seed treatments such as Cerall and Cedress. In 2023, Koppert reported sales of € 417m and an operating income of € 36m, with 2,700 full-time employees. The company was supported through a € 140m investment in preferred share capital by listed holding HAL Thrust in February 2024.

Biobest is a global leader in integrated crop management, specializing in biological pollination and pest control across 60+ countries. Headquartered in Belgium and supported by Floridienne Group, they export bumblebees, beneficial insects, mites, and nematodes while continuously innovating through in-house R&D. Their broad portfolio spans biopesticides, biostimulants, and advanced IPM tools that support sustainable farming practices. Their flagship biofungicide include products like Asperello T34 BioControl (*Trichoderma asperellum* to suppress root rot pathogens).

Based out of Denmark, **Novonesis** pioneers biological innovation by developing enzyme and microbial solutions that improve soil health and crop performance. In the biofungicide arena, Novonesis commercializes Taegro. Taegro is based on the naturally occurring *Bacillus amyloliquefaciens* bacterium. Novozymes also has Actinovate against foliar and soil fungi diseases and is based on *Streptomyces lydicus*.

Smaller biocontrol companies like Koppert, Biobest, and Novonesis have emerged to dominate the biocontrol market with innovative products, as major agrochemical players have a limited presence in this sector.

Belgium-based **Certis** offers a broad range of integrated crop protection tools that blend biological and chemicals for sustainable agriculture. Certis' biofungicide lineup includes Toltek, a seed treatment product based on *Bacillus amyloliquefaciens D747* that manages Take-All disease in cereals. In addition, they have introduced Problad that controls a broad spectrum of fungal diseases across several crops.

Vestaron produces cysteine-rich peptide-based crop protection products through fermentation. The company has two bioinsecticides approved by US authorities: Spear-T, approved in 2018, is a bioinsecticide against a broad range of insect and mite pests in the greenhouse and Spear-Lep, approved in 2019, targets lepidopteran (caterpillar) pests in outdoor and indoor crops.

Andermatt Biocontrol in Switzerland specializes in sustainable, biological plant protection, focusing on environmentally friendly alternatives to chemical pesticides. The company's portfolio includes insect-pathogenic baculovirus products, widely used in IPM programs. With multiple products already on the market, the company is focused on expanding its range and market reach. Among its key biofungicide offerings are Amyprotec, Curatio, and Vitisan, designed to combat a variety of fungal diseases across different crops. Andermatt has a wide distribution network.

Biotalys (Belgium) is developing a protein-based biocontrol solution using recombinant yeasts via its proprietary AGROBODY platform. Its lead candidate, Evoca, has shown strong efficacy against Botrytis and powdery mildew in vegetable crops. Evoca's efficacy has been tested in over 200 field and greenhouse trials. On the regulatory side the European dossier was submitted in 2021, and as of January 14, 2025, a positive draft opinion report from the Dutch regulatory authority was obtained. The product is now entering the next steps—further regulatory reviews (including EPA evaluations in the U.S.) and large-scale demonstration trials—paving the way for its first commercial launch.

Antofenol (France) employs an innovative eco-extraction process to derive high-value polyphenols from vine shoots. Its active substance, Antoferine, is effective against apple scab and *Botrytis* and can be used as a postharvest treatment. The European dossier was submitted in 2022 and is currently under evaluation.

Immunerise (France) is focused on developing sustainable crop protection by harnessing microalgae to create a biocontrol product targeting downy mildew on grapevines. After several years of R&D, the product is now in the advanced pre-registration stage. Toxicological studies required for its active substance dossier are currently underway, marking its transition from early development toward eventual regulatory submission.

Agrauxine (France/USA) markets Romeo, a biofungicide that functions like a vaccine by simulating a pathogen attack to boost the plant's innate defenses. Romeo has completed development and has been fully registered and approved in California. It is already commercially available for use on grapes, almonds, leafy greens, and cucurbits, offering growers a sustainable alternative for managing powdery and downy mildew.

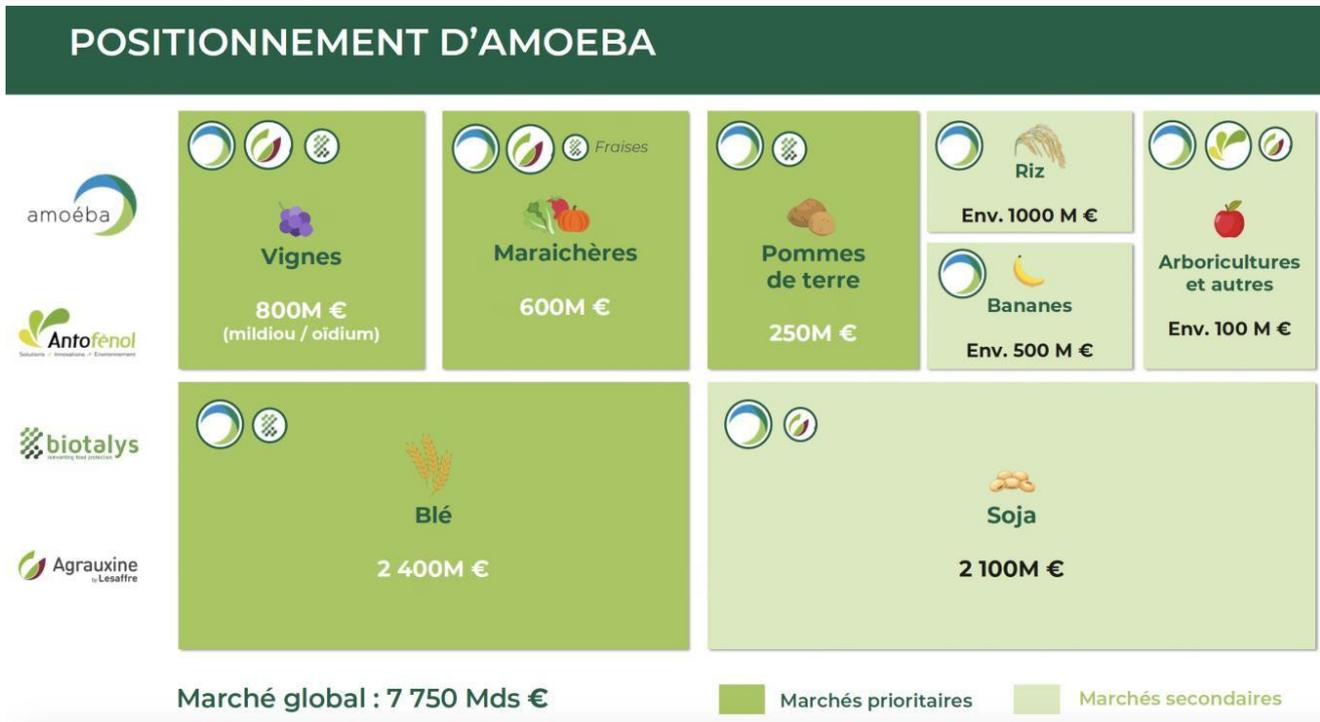
Eden Research (UK) is developing a number of products aimed at combating diseases like powdery and downy mildew. Its flagship biofungicide, Mevalone, is based on naturally occurring terpenes contained in biodegradable, slow-release microspheres. Mevalone has secured regulatory approval in key markets—including the southern EU zone, Kenya, and Australia—and is actively being commercialized. The company is now pushing further into Central Europe and other high-value markets, with additional registrations underway.

GreenLight Biosciences (USA) is leveraging its advanced dsRNA design, development, and manufacturing platform to create a diverse pipeline of RNA-based agricultural solutions, spanning both insecticides and fungicides. It has received EPA approval for its solutions targeting the Colorado potato beetle and varroa mite, with commercial sales anticipated in 2024. Early-stage research on systemic RNA delivery into plants is opening doors for future RNA-based fungicides against mildews, grey moulds, *Fusarium*, and blights which are all in field trials at the moment.

Lavie Bio, a subsidiary of Evogene, is developing a novel biofungicide against fruit rots, downy mildew and Pythium. The fungicide are derived from a naturally occurring bacterium selected through Evogene’s MicroBoost AI system. The company has submitted its registration package to the EPA, and regulatory approval is expected in 2025. This positions Lavie Bio on the cusp of approval for its first product in fruit rots (LAV311), they are preparing for commercialization.

Plant Health Care (Brazil, USA) launched Saori, a peptide-based biostimulant, in 2021 in Brazil. The same peptide fungicide has gained EPA approval for use in the U.S. Saori is marketed by Wilbur-Ellis Agribusiness—a major U.S. agricultural products retailer—under the brand Obrona.

Market segments targeted by Amoéba and competition



Source: company information, KBC Securities

AMOÉBA’S PRODUCT IS HIGHLY EFFECTIVE AGAINST MULTIPLE FUNGI

Plants are highly susceptible to disease, leading to significant income losses for farmers. Similar to water treatment, there are limited alternatives to pesticides. Amoéba’s research on amoeba-fungus interactions has demonstrated the fungicidal qualities of its WmCM lysate, which can serve as a biocontrol agent against pathogenic yeasts and moulds, particularly those resistant to fungicides.

Amoéba's WmCM lysate has fungicidal properties, making it a potential biocontrol agent.

Axpera has a dual mode of action

Amoéba's main product is called Axpera and is a lysate of WmCM cells. The lysate is produced by breaking the amoeba's cell membrane, causing it to disintegrate. The active substance in the lysate has a dual mode of action: it stimulates natural plant defences, making plants more resistant to stress, and it inhibits the germination of pathogen spores. Various studies have confirmed this dual action, showing an elicitor effect on grapevine ([Demanèche et al., 2020](#)), potato ([Troussieux et al., 2022](#)) and tomato ([Troussieux et al., 2023](#)), as well as a direct action by inhibiting the germination of spores. The product is effective at concentrations of 0.3 g/L in several fungal plant diseases, particularly downy mildew, powdery mildew, and cereal rusts.

Axpera stimulates natural plant defences and inhibits pathogen spore germination, effectively combating several fungal plant diseases.

Field trials confirmed real-world efficacy in a myriad of diseases, environments and plants

Amoéba performed a host of field trials to show that Axpera is effective to prevent fungal infections of plants. To date, the company has carried out over 540 trials in 19 countries on 4 continents. Several products have been tested in different formulations and ultimately two formulations, AXP12 (215 g/L active substance) and AXP13 (200 g/L active substance) have shown the best results. Product efficacy was assessed on the following disease targets:

Amoéba's field trials have demonstrated that Axpera is effective in preventing fungal infections across various crops and climates, showing strong results both as a sole active ingredient and in combination with chemical fungicides.

- Downy mildew (*Plasmopara viticola*)
- Potato late blight (*Phytophthora infestans*)
- Tomato blight (*Phytophthora infestans*)
- Squash blight (*Pseudoperonospora cubensis*)
- Grapevine powdery mildew (*Uncinula necator*)
- Cucurbit powdery mildews (*Podosphaera xanthii* and *Golovomyces cichoracearum*)
- Lettuce mildew (*Bremia lactucae*)
- Wheat yellow rust (*Puccinia striiformis*)
- Wheat brown rust (*Puccinia recondita*)
- Wheat septoria (*Zymoseptoria tritici*)
- Wheat fusarium (*Fusarium* spp)
- Fusarium head blight (*Microdochium nivale*)
- Asian soybean rust (*Phakopsora pachyrizi*)
- Soybean target spot (*Corynespora cassicola*)
- Coffee leaf rust (*Hemileia vastatrix*)
- Black cercosporiosis of banana (Sigatoka) (*Mycosphaerella fijiensis*)

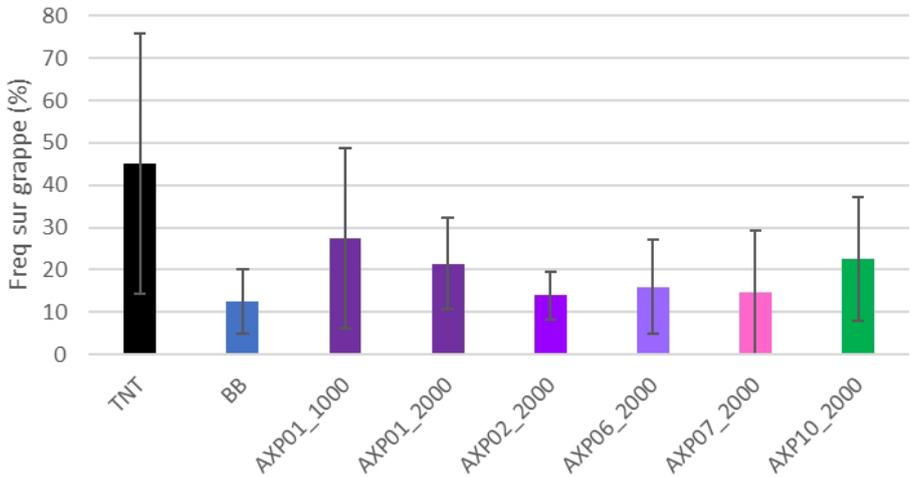
The field trials showed that Axpera can control fungal diseases in both temperate climates and tropical climates on grapevines, vegetables, soy, wheat, banana, tomato and potato. Amoéba has tested Axpera as the sole active ingredient but also in combination with chemical fungicides, such as mancozeb, chlorothalonil, and copper. Axpera was safe and non-toxic and the company expects no limits to be placed on the amount of residue that can be left on produce or restrictions on how close to harvest a farmer can apply the biofungicide.

In grapevines, Axpera outperformed current biocontrols against mildew

In grapevine, Amoéba tested 4 Axpera formulations (AXP01, AXP02, AXP06, AXP07, AXP10). In a field trial in the Bourgogne, results showed that 45% of untreated bunches were attacked by mildew, whereas AXP02, AXP06 and AXP07 (2000g/ha) protected bunches as effectively as Bordeaux mixture (copper-based chemical reference), which reached a protection of ~70%. On the leaves, AXP07 (2000g/ha) showed highest efficacy and proved to be more effective than the current biocontrol reference (86% efficacy versus 72%).

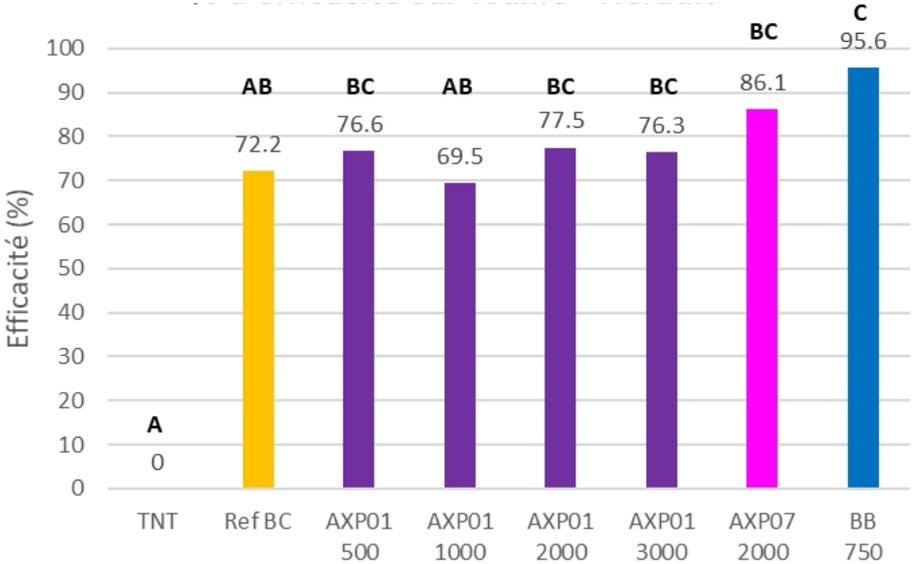
Amoéba tested multiple Axpera formulations on grapevines, which showed grape bunch protection from mildew as effectively as the chemical reference Bordeaux mixture.

Frequency of mildew attack on bunches in Bourgogne



Note: TNT = Untreated control; BB = chemical reference (Bordeaux mixture); AXP01, AXP02, AXP06, AXP07 = formulated products; AXP10 = pure amoeba powder; 1000 = 1000g/ha active substance (AS); 2000=2000g/ha AS. Source: company information, KBC Securities

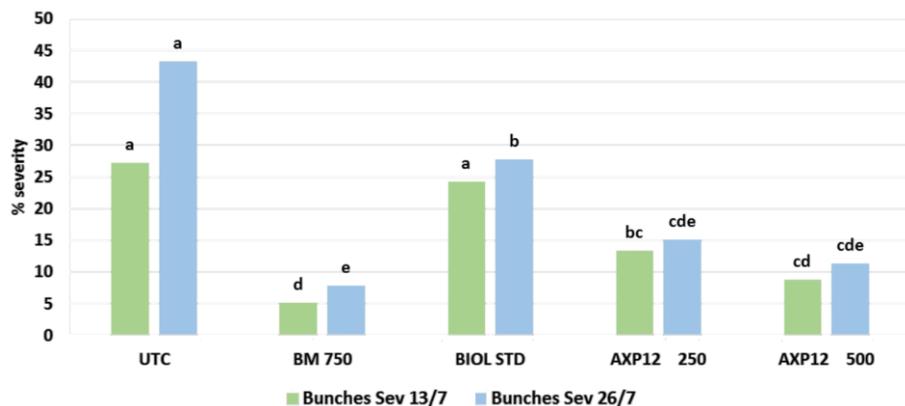
Protection efficacy of Axpera and reference products against mildew on leaves



Note: TNT = Untreated control; Ref BC = biocontrol reference; AXP01, AXP07 = formulated products; 1000 = 1000g/ha active substance (AS); 2000 = 2000g/ha AS; 3000 = 3000g/ha AS; BB = chemical reference (Bordeaux mixture). Source: company information, KBC Securities.

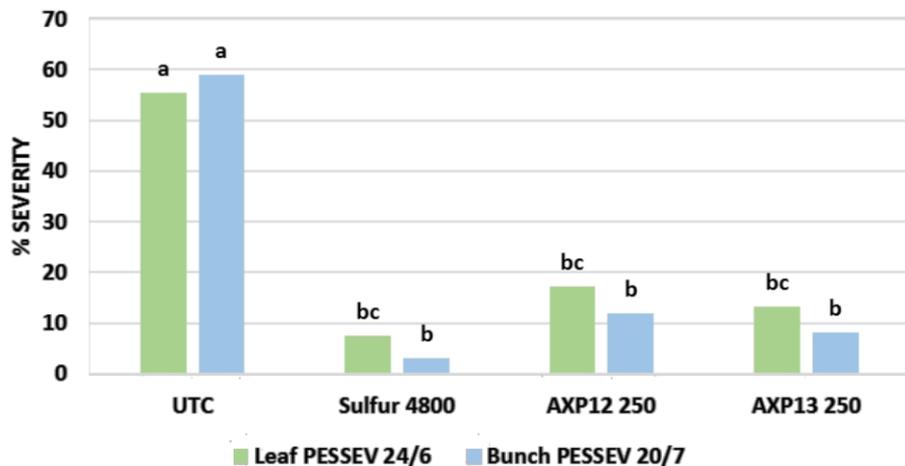
Both in Chardonnay (FR) and Dolcetto (IT), Axpera appears to be effective to prevent powdery mildew. Bordeaux mixture appears to be somewhat more effective than Axpera, while biological control samples are clearly less effective at reducing the severity of an attack. Amœba shows a marked improvement against the untreated control and the biological reference. This shows that Axpera is effective against powdery mildew in several varieties of grapevines.

Efficacy of Axpera to protect Dolcetto grapevine against powdery mildew



Note: UTC = untreated control; BM 750 = Bordeaux mixture at 750g/ha; BIOL STD = biocontrol reference; AXP12 = formulated product; 250 = 250g/ha active substance (AS); 500 = 500g/ha AS SEV 13/7 = disease severity on July 13; Sev 26/7 = disease severity on July 26. Source: company information, KBC Securities.

Efficacy of Axpera to protect Chardonnay grapevine against powdery mildew



Note: UTC = untreated control; Sulphur 4800 = sulphur reference at 4800g/ha; AXP12 = formulated product; 250 = 250g/ha active substance (AS); 500 = 500g/ha AS; PESSEV 24/6 = disease severity on June 24; PESSEV 20/7 = disease severity on July 20. Source: company information, KBC Securities.

The field trials demonstrate the higher efficacy of Axpera against downy mildew and powdery mildew in grapevines compared to current biological control.

Mildew attack on untreated vine (left) and vine treated with Amoéba formulation (right)



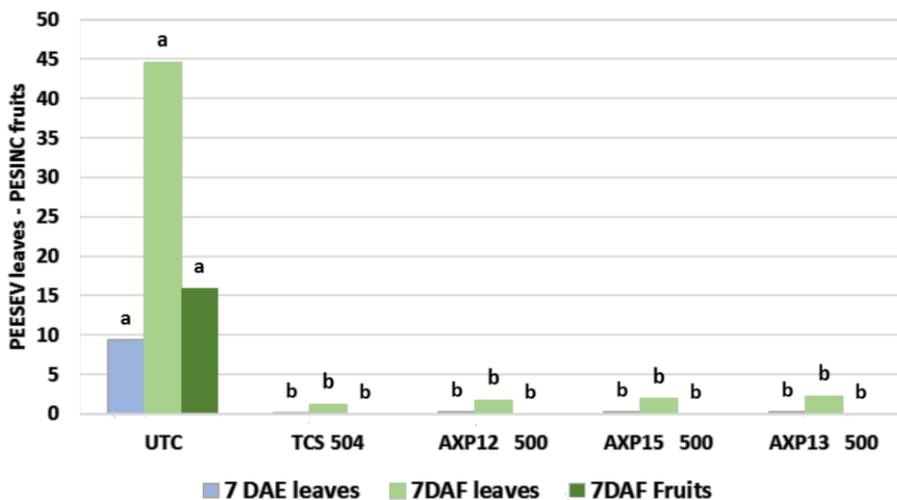
Source: company information, KBC Securities.

In tomatoes, Axpera appears on par with chemicals against mildews

Field trials were also conducted in Italy to test the efficacy of lysate formulations AXP12, AXP13, and AXP15 (500g/ha) against downy mildew on field tomatoes. The results showed that these three formulations were on-par with a copper sulphate formulation for both leaves and fruits.

In tomatoes, Amoéba's lysate formulations are as effective as copper sulphate in controlling downy mildew.

Late blight protection of tomato leaves and fruits in Italy

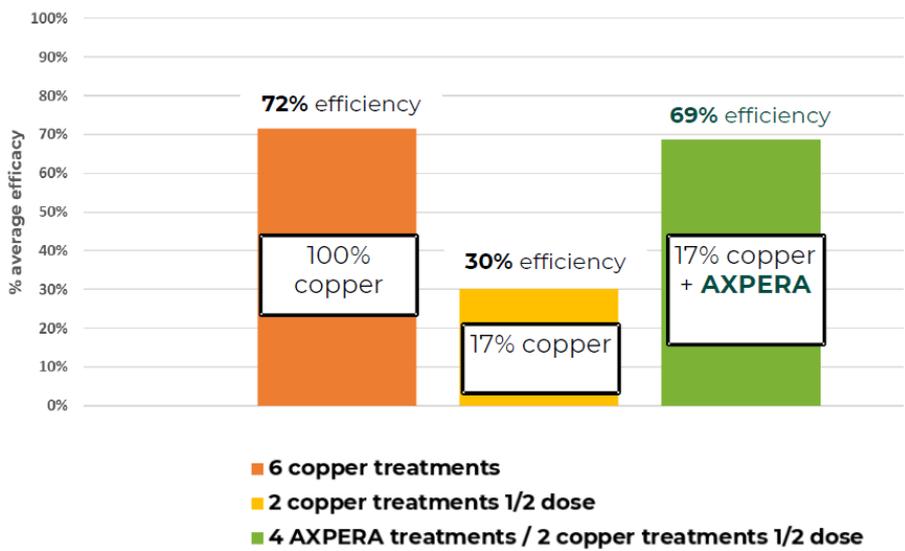


Note: UTC = untreated control; TCS 504 = reference tribasic copper sulphate at 504g/ha; AXP12, AXP13, AXP15 = formulated products; 500 = 500g/ha active substance (AS); 1000 = 1000g/ha AS; 7DAE = rating 7 days after application E; 7DAF = rating 7 days after application F. Source: company information, KBC Securities.

Amoéba also tested the combination of Axpera with low dose copper sulphate against powdery mildew on tomatoes. The results indicate that a combination treatment offers similar efficacy to full copper sulphate treatment, while reducing copper usage by 83%. This could be a great opportunity to boost Axpera's efficacy and offer an environmental benefit by reducing excessive copper build-up in the soil.

Combination with low-dose copper sulphate showed similar efficacy to full copper sulphate treatment for powdery mildew on tomatoes.

Axpera plus low dose copper restores efficacy of high dose copper



Source: company information, KBC Securities.

Untreated powdery mildew on tomato plants **Powdery mildew on tomato plants treated with Amoéba product**



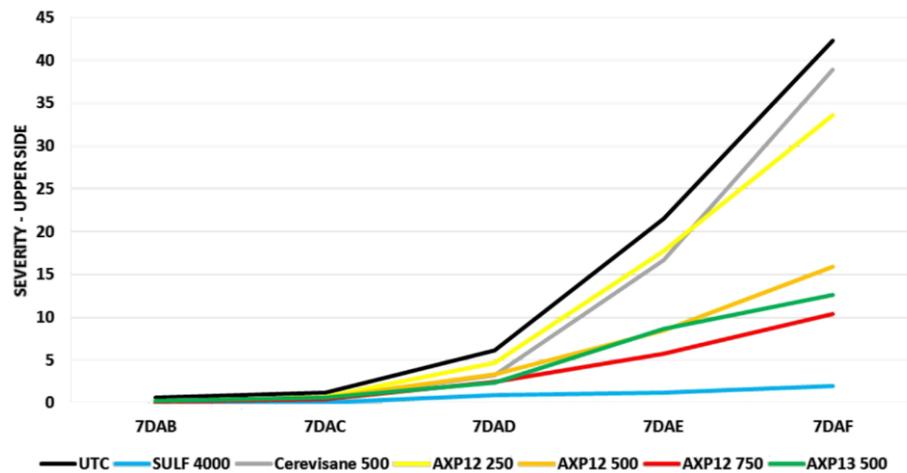
Source: company information, KBC Securities

Cucurbit trials showed a dose-dependent response against powdery mildew

The AXP12 formulation of Axpera, applied at 750 g/ha, and the AXP13 formulation, applied at 500 g/ha, proved effective against powdery mildew on zucchini leaves in Spain. Sulphur was the most effective in protecting zucchini leaves, while Axpera exhibited a dose-dependent response. The biocontrol reference, however, proved ineffective, highlighting a significant unmet need for effective biocontrol treatments against powdery mildew in cucurbit leaves.

Axpera formulations effectively controlled powdery mildew on zucchini leaves, while the biocontrol reference was ineffective.

Powdery mildew protection of zucchini leaves in Spain



Note: UTC = untreated control; SULF 4000 = sulphur reference at 4000g/ha; Cerevisane 500 = biocontrol reference at 500g/ha; AXP12, AXP13 = formulated products; 250 = 250g/ha active substance (AS); 500 = 500g/ha AS; 750 = 750g/ha AS; 7DAB to 7DAF = rating 7 days after applications B to F. Source: company information, KBC Securities.

AXPERA'S REGULATORY RISK IS NOW LARGELY REMOVED

Amoéba has obtained approval of its active substance in the US in 2022, in the EU the process is ongoing with a final decision of the EC expected by 2H25/1H26, in Brazil the approval should be obtained in 1H26 as well. Subsequently, Amoéba submitted marketing applications for its formulated products in the US and the EU, the approvals of these products are expected in the following years. This largely removes the regulatory risk overhang. Given the low-risk profile of the active substance, these authorizations are expected to be valid for 15 years.

Amoéba's active substance was approved in the US in 2022, with EU and Brazil approvals expected in 2025. Marketing applications for formulated products have been submitted.

Regulatory approval timelines for crop protection



Source: company information, KBC Securities

EC decision on final report could lead to first product approvals by 2025-'26

In the EU, dossiers are assessed by the European Food Safety Authority (EFSA) together with a Rapporteur Member State (RMS). Timelines in the EU are usually lengthy (~36-45 months), as data requirements endorsed by EFSA fall under the same regime as conventional chemical products, which are labelled plant protection products under Regulation EC 1107/2009.

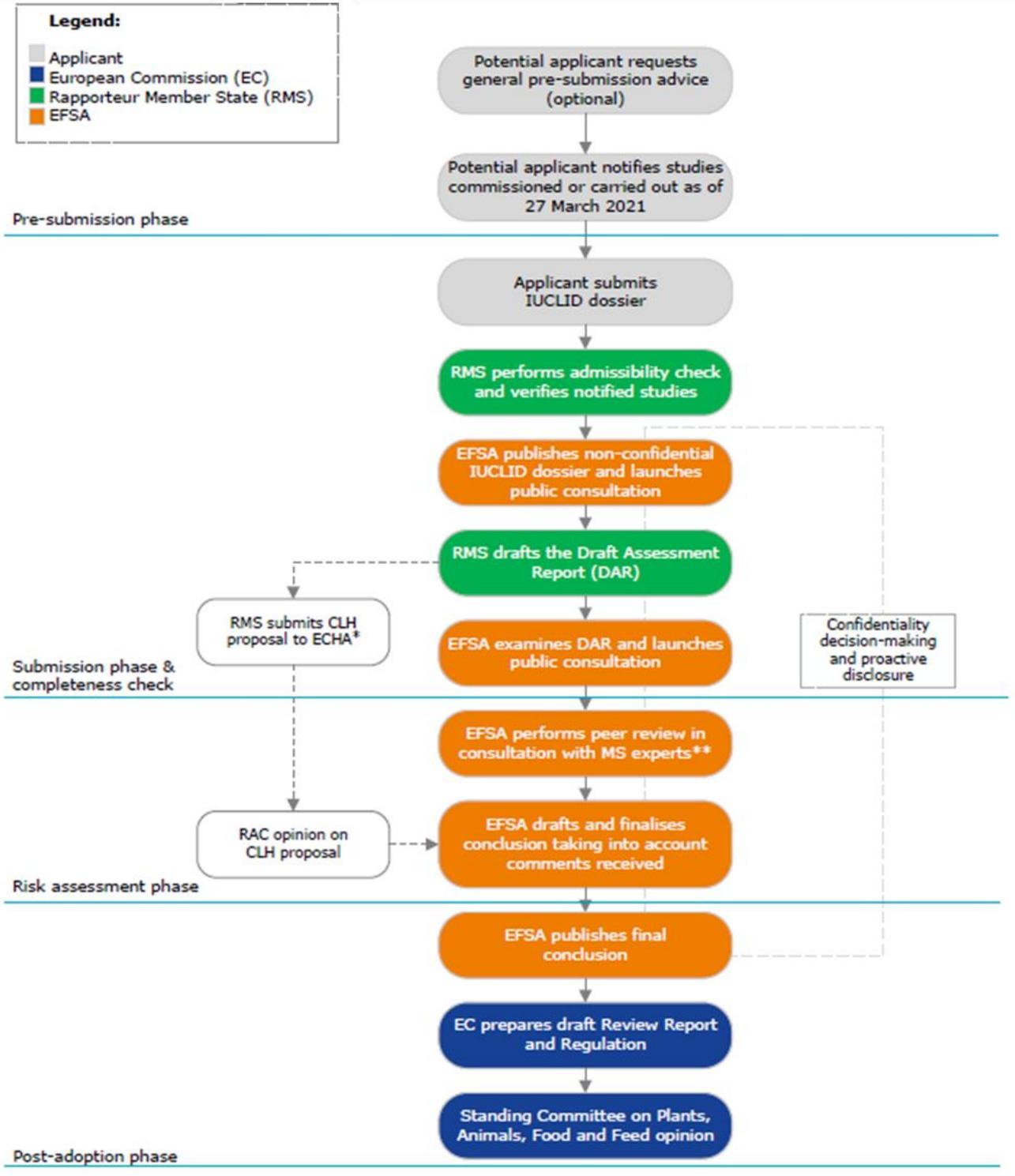
Regulatory approval in the EU uses a two-step process with centralized review at the European level followed by individual approval by each Member State. For the first step, Amoéba submitted its dossier to a Rapporteur Member State (RMS) of its choosing, in this case Austria. The RMS has performed a completeness check and then evaluated the dossier to prepare a Draft Assessment Report. This report was subsequently presented to EFSA in April 2022, which circulates it to the European Commission and all other Member States for public consultation. During this period, EFSA also organized peer reviews by experts. In December 2024, Amoéba announced that EFSA validated the efficacy and low-toxicity risk of its WmCM lysate. EFSA's final report highlighted its proven fungicidal efficacy, low-risk profile, and exemption from the maximum residue limit ([EFSA, 2025](#)).

Based on the DAR and EFSA conclusions, the European Commission then takes a decision to approve or reject the new product, which is expected in 2H25. After EC approval, the final product must be authorized separately by each Member State before it can be placed on individual member markets. For this it requires a complete dossier that includes both an active substance dossier and a product dossier.

Amoéba will submit applications for specific formulated products in early 2025 for crops affected by downy mildew (lettuce, cucurbits, tomato, eggplant, basil and grapevine) and powdery mildew (cucurbits, tomato, eggplant and grapevine.) in Southern Europe, further applications are planned for 2026-2027. Based on the nature of its products, Amoéba is likely to apply for a "low-risk" classification option in EU, which can be granted by EFSA the moment the active ingredient is added to the Annex I list. This would result in a shorter second phase, with country level approvals within 4 months instead of 0.5-1 year.

In the EU, regulatory approval for Amoéba's products involves a lengthy two-step process with centralized review by EFSA and individual approval by each Member State. Amoéba's dossier was validated by EFSA in December 2024 for its efficacy and low-toxicity risk. The European Commission's decision is expected in the second half of 2025, followed by country-level approvals.

Application procedure for approval of new pesticide active substances in the EU



Note: CLH = Harmonised classification and labelling; ECHA = European Chemicals Agency; EFSA = European Food Safety Authority; RAC = Committee for Risk Assessment. Source: EFSA, KBC Securities

In the US, product approvals are also expected in 2025

In the US, dossier submissions are assessed by the Biopesticide and Pollution Prevention Division (BPPD) of the Environmental Protection Agency (EPA), according to regulations laid out in the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). The process starts with the registration of the biochemical active ingredient as well as the end-use product at the Federal level. After a 1-month completeness check, the review process takes approximately 18 months. In November 2022, the US EPA approved WmCM lysate for controlling fungal plant diseases in agriculture, exempting it from residue limits and harvest timing restrictions.

In a second step, the company must now secure regulatory approval for its end-use products containing the lysate with individual states. In 2023, Amoéba applied for market authorization for Axpera to treat downy mildew (lettuce, cucurbits, tomato, eggplant, basil, grapevine) and powdery mildew (cucurbits, tomato, eggplant, grapevine). Additional applications include oidium (strawberry), clasdoporiose (tomato), Black Sigatoka (banana), mildew (ornamental flowers & plants), oidium (ornamental), and *Fusarium* (turf), with authorization expected in 2025. In California, an additional process requires a product application, and marketing authorization is anticipated for 2026/2027.

In the US, the EPA approved WmCM lysate in November 2022. Amoéba is now seeking state-level approvals for Axpera end products to treat various fungal diseases, with authorizations expected in 2025.

Amoéba expects to market its products in Brazil in 2025

Similar to Europe and the US, Brazil requires a registration application before marketing any product. Amoéba obtained an experimental permit in February 2021 and applied for marketing authorization in 2024 based on field trial results. The regulatory dossier is reviewed by IBAMA, ANVISA, and MAPA. Registration of biocontrol products takes about one year, in part due to recent regulations allowing accelerated assessment. Amoéba expects to market its products in Brazil by 2025.

In Brazil, Amoéba applied for marketing authorization in 2024. Amoéba expects to market its products in Brazil by 2025.

FOCUS IS ON HIGH-VALUE CROPS WITH KOPPERT AS LIKELY BACKER

Amoéba will focus on specialized, high-value crops as initial markets

In its early years, Amoéba will focus on specialized crops: vegetables, herbs, and ornamental plants. These segments allow high pricing, demand residue-free products, and often use organic methods. The target segments at product launch (2025-2026) will be:

- **Grapevine and table grapes:** High-value markets with significant disease pressure, growers' willingness to diversify into biological crop protection
- **Greenhouse vegetables** like tomato and cucumber: High-value market, mainly affected by powdery mildew and other diseases.
- **Field vegetable crops** like lettuce and spinach: Targeting mildew and powdery mildew.
- **Field tomatoes** (for processing): Major segment in Italy, Spain, and California, tackling mildew. Axpera performs well against copper in Italian trials, with a direct market approach.
- **Aromatic herbs** (basil): Significant in Italy, where mildew is a major issue with limited fungicides.
- **Ornamental species:** Addressing unresolved mildew and rust problems.

These crops offer high pricing potential per hectare compared to lower-value crops like wheat and soybeans. Farmers growing vines and vegetables are already using biological preparations extensively, unlike row crop farmers.

Amoéba will initially focus on high-value crops like grapes, greenhouse & field vegetables, field tomatoes, aromatic herbs, and ornamental species, which allow for premium pricing.

Amoéba's commercial plans involve a mix of potential distribution methods

Amoéba plans to commercialize Axpera differently across various markets, based on its potential to market Axpera themselves and/or the distributional ability of potential partners.

In the case of distribution partnerships, Amoéba could commercialize through partnerships with large agrochemical companies directly, or using a two-stage distribution system where agrochemical companies sell to cooperatives/ local distributors, which then sell to end-user farmers. This leverages the distributor's network, which allows for higher volumes but reduces margins.

Amoéba also aims for direct-to-end-user sales in certain markets, enhancing margins and customer relations, but requiring local market knowledge and logistics. To avoid a large sales team, Amoéba plans to use key opinion leaders such as renowned wine houses, large production companies, and cooperatives to attract initial customers.

In some markets, Amoéba will use an intermediary strategy, directly going to local distributors to support direct sales, as seen with private distributors in Southern France for vineyard and market garden products.

Amoéba plans to commercialize Axpera through various strategies, including partnerships with large agrochemical companies, direct-to-end-user sales, and intermediary strategies with local distributors.

A partnership with Koppert could materialise in the near future

In December 2024, Amoéba entered into a memorandum of understanding (MoU) with Koppert, a Dutch private company specializing in biocontrol products. Amoéba and Koppert are negotiating an exclusive partnership for the distribution, production, registration, financing, and co-development of Axpera. Details are expected to be shared in mid-April 2025. Amoéba aims to leverage Koppert's extensive distribution network in the vegetable and grapevine market.

Amoéba and Koppert signed an MoU to negotiate an exclusive partnership for Axpera's distribution, production, registration, financing, and co-development.

Combining Axpera with other active substances could unlock further value

Additionally, Amoéba is looking into combining Axpera with other products in a combination product that has higher efficacy and lower resistance development than Axpera alone. They could do this with copper and sulphur in the grapevine business. They could also partner with big agrochemical companies to formulate Axpera alongside a chemical pesticide. This could further grow the value of Axpera's potential market.

Amoéba is exploring combinations or co-formulations of Axpera with other products, which allow further partnering with agro companies.

STRONG POTENTIAL AS AN ACTIVE INGREDIENT FOR COSMETICS MARKET

The anti-aging market is expanding rapidly, driven by a growing middle-aged population and increasing demand for safe and natural active ingredients. In clinical studies WmCM lysate has been shown to be effective at combatting the effects of aging and UV exposure. WmCM lysate could be ready for market entry once a commercial partner has been found.

WmCM lysate has shown anti-aging and UV protective effects, ideally suited for the growing anti-aging cosmetics market.

THE GROWING ANTI-AGING COSMETICS MARKET IS ADOPTING NATURAL PRODUCTS

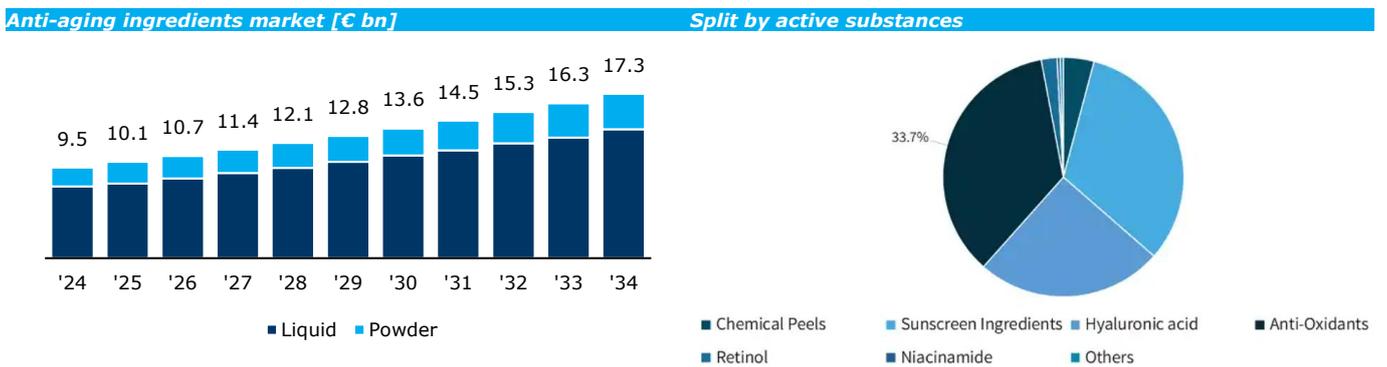
A growing middle-aged population is set to buy more anti-aging products

The global skincare market is valued at \$ ~200bn ([McKinsey, 2024](#)), while the anti-aging ingredients segment represents \$ ~10.6bn. This segment is projected to grow to \$ ~19.2bn by 2034 ([Precedence Research, 2024](#)).

The global skincare market is valued at around \$ 200bn, with the anti-aging ingredients segment projected to grow from \$ 1.5bn to \$ 2.8bn by 2034.

In terms of active substances, retinol, antioxidants, and hyaluronic acid clearly dominate the market, primarily produced by major chemical companies such as BASF, Clariant, Ashland, Croda, and Solvay. The anti-aging active ingredients market is expected to grow at a compound annual growth rate (CAGR) of around 7% from 2022 to 2027, driven by the increasing demand from the expanding middle-aged global population and the rising middle class in emerging economies ([GMI, 2024](#)). The premium segment of the market is anticipated to grow more rapidly, providing a significant boost to Amoéba's branding potential, which sources its active ingredient from natural springs in the south of France and has exclusivity on WmCM lysate.

The cosmetic industry faces increased regulation due to safety concerns over active ingredients, such as the EU's restrictions on retinol. Amoéba offers a new natural ingredient that can substitute or complement retinol, antioxidants, and hyaluronic acid. Additionally, the exclusivity of WmCM lysate could allow them to charge a premium.



Source: Global Market Insights, Precedence Research, KBC Securities

Amoéba faces competition in the fragmented cosmetics spaces

The cosmetics active substances market is dominated by several big chemical companies such as BASF, DSM-Firmenich, Dow Chemical, Solvay, Ashland, Akzo Nobel. However, these players have a limited portfolio of biological active ingredients. The competitive landscape for biological/sustainable cosmetics active ingredients with a focus on anti-aging is therefore more tailored and fragmented.

The cosmetics active substances market is dominated by large chemical companies, but the biological anti-aging ingredients segment is more fragmented.

Givaudan is one of the largest flavour and fragrances producers in the world. It is a Swiss multinational with a market cap of \$ ~41.7bn and revenue of \$ 8.4bn in 2024. The beauty division of the company produces molecules from a variety of sources such as oceanic sources, plants and gemstones.

International Flavours and Fragrances (IFF) is an American company with a market cap of \$ 20.7bn and a revenue of \$ 11.5bn. The company offers a wide array of molecules and functional ingredients.

Croda Beauty is a division of Croda International (market cap: \$ 5.7bn with \$ 2.1bn revenues in 2024), which specializes in the development and supply of cosmetic ingredients. They produce active ingredients for skin care, hair care, and sun care applications. Croda Beauty is has a portfolio for the anti-aging market, as they sell both Calmosensine and Dermaxyl which have an anti-wrinkle effect.

Clariant is a specialty chemicals company headquartered in Switzerland. Clariant reported 2024 sales of approximately \$ 4.7bn, with a market cap of around \$ 3.7bn. The company produces active ingredients for skin care, hair care, and sun care markets.

Mibelle Biochemistry is a Swiss company specialized in active ingredients for the cosmetic industry. They create products that address various skin problems. Their anti-aging product line includes PhytoCellTec *Malus Domestica* (plant stem cells derived from a rare Swiss apple which should protect skin stem cells and delay the signs of aging) and PerfectionPeptide P3 (a biomimetic peptide that promotes cell renewal).

Deveraux Specialties is a U.S.-based manufacturer and distributor of specialty ingredients for the cosmetic and personal care industry. They collaborate with various partners to bring anti-aging, self-tanning, and hydration products to the market. In anti-aging they commercialize BGT TDP-1 (neurotransmitter peptide that inhibits muscle movement in botox-like manner) and other products through partnerships with manufacturers.

Natura-Tec is a French company specializing in natural solutions for the personal care industry. They offer a diverse portfolio of vegetable and marine-based ingredients, focusing on developing plant-based alternatives to synthetic compounds. One of their notable anti-aging products is Abysoft (Crambe oil + phytosterols).

Shanghai EGT Synbio Group, established in 2016, is a Chinese company that aims to use synthetic biology and plant extraction technologies to develop natural anti-aging ingredients such as Ergothioneine (antioxidant from fungi) and Reishi Spore Oil (extract from Reishi mushroom spores).

AMOÉBA PROVED EFFECTIVENESS TO COMBAT AGING AND UV EXPOSURE

***In vitro* studies revealed WmCM lysate's anti-aging potential**

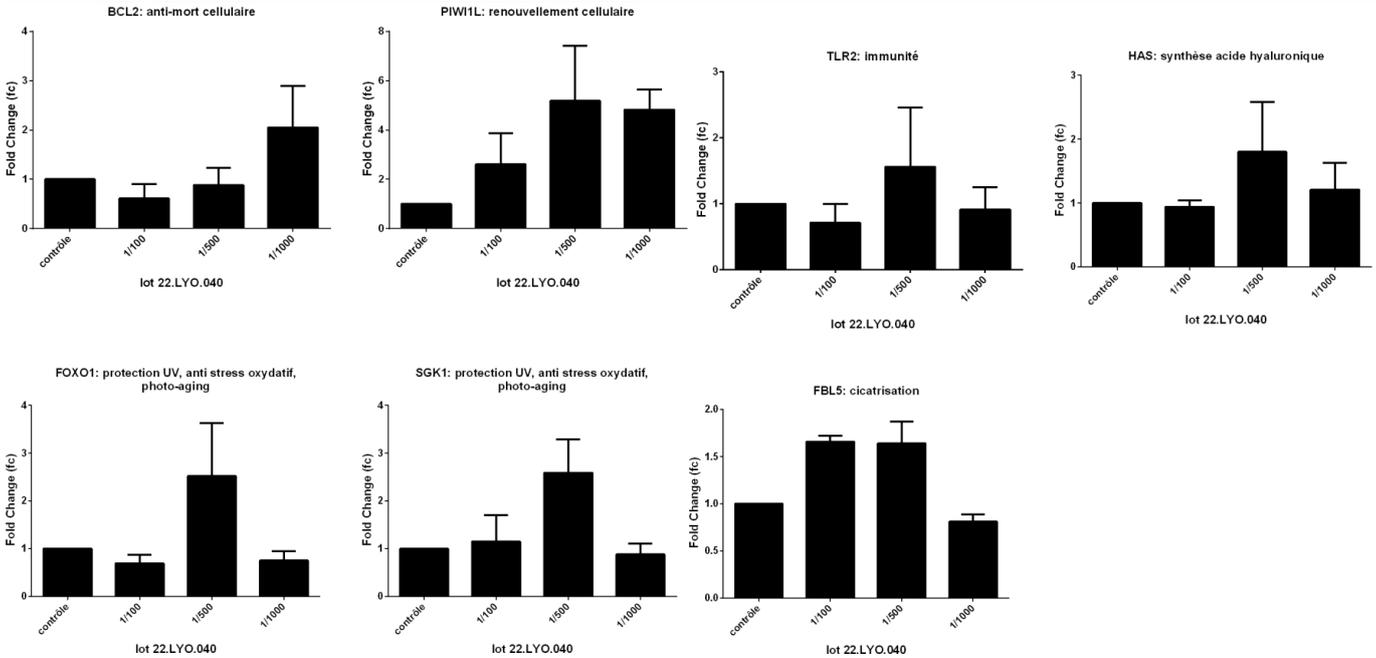
Two *in vitro* studies have demonstrated the potential of lysed WmCM in cosmetics. A first study was carried out by a specialized external laboratory with the aim of assessing the level of induction of target genes of cosmetic interest, following contact of laboratory-grown human skin cells with the lysed amoeba.

The results showed that treatment of human cells with lysed ferment stimulates two cellular functions of importance in cosmetics:

- Upregulation of genes associated with inhibition of cell death (BCL2 gene), increased cell renewal (PIWIL1 gene) and UV protection, anti-oxidative stress and photoaging (FOXO1 and SGK1 genes)
- Moderate upregulation of genes associated with wound healing (FBL5 gene), hyaluronic acid synthesis (HAS gene) and anti-infectious immunity (TLR2)

Laboratory studies demonstrated that lysed WmCM can enhance cell renewal, protect against UV damage, and improve skin structure & healing.

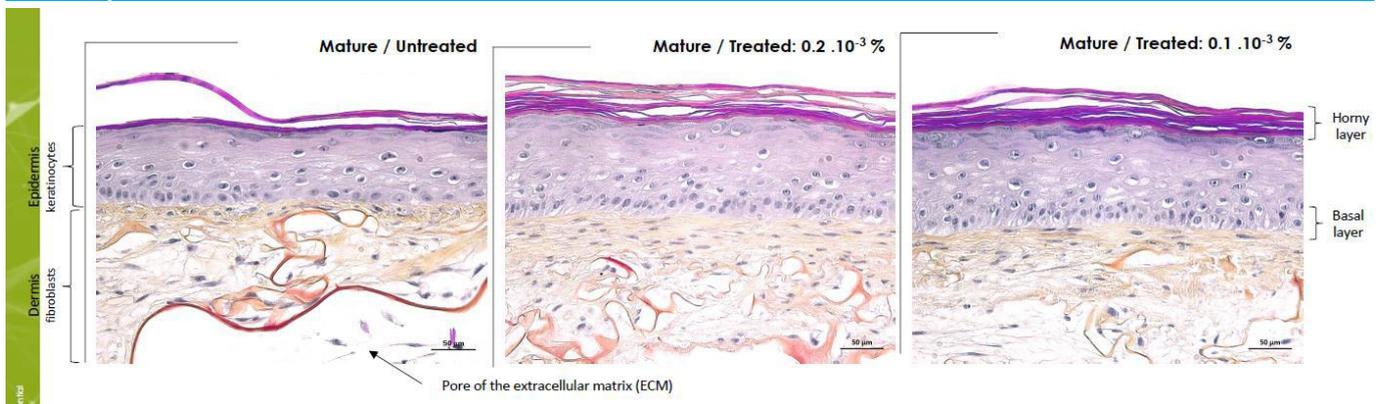
Induction of genes of interest for cosmetics



Source: company information, KBC Securities

These results prompted the company to test the lysed ferment on a 3D skin model. LabSkin Creations, an expert in 3D skin engineering, conducted the study by applying the ferment every 2-3 days for 30 days. They assessed its effect on aging skin and its protection against UVB exposure. The results showed that treatment with lysed ferment increased epidermal thickness, enhanced cell differentiation, and improved the extracellular matrix.

Effect of lysed ferment on a 3D skin model



Source: company information, KBC Securities

A clinical study validated the *in vitro* lab results

A clinical study, implemented by the *Institut d'Expertise Clinique*, involving 30 volunteers, was carried out in early 2024, and showed positive results, validating the findings of the *in vitro* studies. The lysate showed wrinkle reduction, improved the thickness of the dermis, skin density, skin firmness and radiance, and skin texture and elasticity after 28 days. The lysate was safe and due to the regulatory studies carried out for the biocontrol application has been shown to be non-toxic to humans.

A clinical study confirmed that the lysate reduces wrinkles, improves skin thickness, density, firmness, radiance, texture, and elasticity, and is safe for human use.

Results of *in vivo* studies on anti-aging effect of Amoeba lysate



Source: company information, KBC Securities

REGULATORY PATHWAY IS STRAIGHTFORWARD, LYSATE IS READY FOR PARTNERS

A patent and registration ready for market entry

In 2023, Amoéba filed a patent for WmCM in cosmetic skin care. By March 2024, it was listed on the International Nomenclature of Cosmetic Ingredients (INCI) and the EU's CosIng Cosmetics Ingredients list. No additional regulatory obligations apply to ingredient manufacturers, however product manufacturers must comply with regulations and authorized concentration limits. In the EU and US, no marketing authorization is required for cosmetic ingredients or products, but manufacturers must ensure product safety. Thus, WmCM lysate is fully ready for market entry.

Amoéba's WmCM lysate is patented, listed on major cosmetic ingredient registries, and ready for market entry with no additional regulatory obligations for manufacturers.

Oriental Beauty Valley set to become the first cosmetics partner

Management has moved to prioritise the selection of a commercial partnership with a major consumer brand, ideally a premium brand that can pay a higher price for exclusivity of WmCM lysate. There are approx. 60 cosmetics firms globally with more than € 1bn in sales with one or more brands. This should allow Amoéba a wide range of potential commercial partners. The company also indicated plans to partner with a potential manufacturer when its lysate gains serious commercial traction.

Amoéba is aiming to secure commercial partnerships with premium consumer brands for (exclusive) access to WmCM lysate.

In this context, Amoéba has already signed a memorandum of understanding (MoU) with Metron Technology, a subsidiary of the Oriental Beauty Valley group, which is the undisputed leader in cosmetics in China. Based in Shanghai, the Oriental Beauty Valley group is an industrial centre of excellence officially supported by the Chinese authorities as part of their national development strategy for the cosmetics sector. Recognised as a pilot area by the Chinese government, the hub embodies the Chinese government's desire to accelerate innovation, raise quality standards and strengthen the attractiveness of the Chinese market in the field of beauty and well-being. It focuses on promoting the beauty and health industry, as well as creating a "Silicon Valley" for the cosmetics industry and brings together more than 1,000 companies (including L'Oréal, Shiseido, etc.), laboratories, research centres and specialist bodies, forming a strong ecosystem that fosters synergies between innovation, production and regulation. Oriental Beauty Valley provides the right environment to support innovative projects, from formulation to regulatory compliance, while meeting growing demands in terms of safety, efficacy and sustainable development. The group actively plays the role of a market entity to enrich industrial resources, accelerate industrial development, carry out mergers and acquisitions and acquire stakes in high-quality enterprises in the entire beauty and health industry chain, consolidate industrial ecology, and promote the agglomeration and development of the beauty and health industry cluster in Fengxian District (Shanghai).

Metron Technology is a strategic subsidiary of Oriental Beauty Valley, specialising in regulatory, scientific and technological support for innovative cosmetics projects. Created with the support of the local authorities and as part of the development of the beauty ecosystem in Shanghai, Metron's mission is to facilitate the integration of international innovations on the Chinese market, by ensuring their compliance with local standards. Positioned at the interface between research, industry and government, Metron offers expertise in regulatory approval, safety assessment and validation of cosmetic ingredients, working directly with the relevant authorities. Through its partner laboratories, scientific teams and consultancy services, it supports foreign companies throughout the registration and marketing process.

The MoU will enable Amoéba and the Oriental Beauty Valley group to open a period of negotiations in order to reach an agreement covering both the regulatory aspects and the marketing of Amoéba's ingredient on Chinese territory. In particular, this includes:

- Support and advice from the Oriental Beauty Valley group to obtain registration for Amoéba's cosmetic ingredient in China
- A distribution agreement for Amoéba's cosmetic ingredient with Chinese cosmetics groups, once registration has been obtained.

This signature with a strategic player in the cosmetics industry in China demonstrates the interest of major global groups in the solutions developed by Amoéba and their promising prospects. Not only will it be able to benefit from OBV's expertise, at both regulatory and commercial levels, but also join an industrial hub made up of several hundred world-renowned players in the cosmetics space.

Amoéba is open for business in other geographies

Once registered in China, Amoéba's cosmetic ingredient can be used worldwide, paving the way for future collaborations with international groups wishing to use the same formulas throughout the world. Amoéba is therefore preparing to considerably accelerate the development of its cosmetics business, which complements its biocontrol segment, since it is characterised by lower ingredient volumes but sold at very high margins.

Amoéba has signed an MoU with Metron Technology, part of the Oriental Beauty Valley group, which is a leading cosmetics hub in China supported by the government to foster innovation and development in the beauty and health industry.

Metron Technology, a subsidiary of Oriental Beauty Valley, specializes in regulatory and scientific support for innovative cosmetics projects, ensuring international innovations comply with local standards in China.

The MoU between Amoéba and Oriental Beauty Valley group will facilitate negotiations for regulatory approval and marketing of Amoéba's cosmetic ingredient in China, with support from OBV and a distribution agreement with Chinese cosmetics groups. This partnership highlights the global interest in Amoéba's solutions and the benefits of joining OBV's industrial hub.

Following Chinese approval, Amoéba's product can be used globally, enabling future collaborations with international cosmetics groups.

OTHER APPLICATIONS COULD ALSO BE PURSUED

BIOCIDE USE FOR WATER TREATMENT HAS BEEN DEPRIORITIZED

WmCM has shown potential as a biocide in cooling systems, addressing public health & environmental issues.

WmCM has also shown potential as a biocide in cooling systems. Currently, these plants pose a public health and environmental issue as conventional water treatments technologies are unsafe and ineffective. Amoéba's product Biomeba was proven safe and effective in various industrial conditions and obtained US approval, but decided not to move forward in the EU and Canada.

Water treatment is a public health issue and increasingly pressing environmental issue

Bacterial infections in water treatment facilities are a significant health concern. In 2015, the EU/EEA reported 7,034 cases of legionellosis with a mortality rate of 11%. Besides *Legionella*, infections from *Chlamydia*, *Pseudomonas*, and *Klebsiella* also pose a threat. Currently, chemical biocides like chlorine, bromine, and others are used for decontamination, but they are harmful to the environment and ineffective due to the emergence of bacterial resistance.

Bacterial infections in water treatment facilities are a significant health concern, with current chemical biocides being harmful and ineffective due to bacterial resistance and biofilms, while new methods remain unproven for large-scale networks.

Current treatments are ineffective and unsafe due to their properties and the emergence of biofilms (thick, impenetrable layer of micro-organisms that aggregate to form a colony) in treatment facilities. Chlorine, for instance, can form harmful by-products that cause cancer, affect reproduction, and lead to other health issues. Furthermore, it is less effective at pH levels above 7.5, necessitating the use of additional chemicals. Chlorine is also corrosive to pipes, requiring corrosion inhibitors. Isothiazolinone, another biocide, is highly toxic to aquatic life. Biofilms further reduce treatment effectiveness, as they induce bacterial resistance.

Amoéba estimates the U.S. biocide market for closed-circuit cooling towers to be worth up to € 220m. Despite new methods like UV light, engineered enzymes, membranes, and ozone being developed to address unmet needs, their effectiveness in large-scale networks remains unproven.

Biomeba appears to be effective, yet did not obtain approvals everywhere

To evaluate Biomeba biocide's effectiveness against *Legionella* in water treatment plants, over fifteen experiments in five countries were conducted. The tested cooling systems ranged from 1 to 800 m³. Results clearly showed that Biomeba effectively prevented *L. pneumophila* and *Legionella* growth under various conditions.

Biomeba effectively prevents Legionella growth in various cooling systems, leading to US EPA approval, but EU approval was denied due to insufficient efficacy. Amoéba is still seeking a US partner, though it is no longer an immediate priority.

In December 2022, the US Environmental Protection Agency (EPA) approved WmCM for use in closed cooling systems in the US. In the EU, the substance was considered harmless, but did not obtain approval in 2022 due to insufficient efficacy. In January 2024, the European Commission endorsed this decision, rejecting its use in biocidal products for cooling water. Amoéba is still on the lookout for a potential partner in the US, while this is no longer an immediate priority for the company.

TECHNOLOGY COULD BE LEVERAGED FOR OTHER INDICATIONS

With the exception of the closed-loop biocide application in the US, Amoéba is focusing mainly on applications based on amoeba lysate, which present a much lower regulatory risk than the live form, and therefore have a high chance of success. Amoéba is the only company in the world able to grow and feed live amoeba in a batch reactor and its R&D team is continuing to explore new potential applications, which will be made public once proof of concept has been achieved. Studies in this regard could be exploited with partners in areas like acne, wound healing, burn treatment, custom proteins or others.

Amoéba is continuing to explore new potential applications for partnerships in areas such as acne, wound healing, burn treatment, and custom proteins.

UNIQUE KNOW-HOW AND SCALABLE CAPACITY FOR MANUFACTURING

Over the years, Amoéba has optimized the production of WmCM for cultivation in a high yield continuous bioreactor at its production site in Chassieu, France. In the future, it plans to produce the bulk (above 10-15 tonnes) of WmCM in partnership with a CDMO, once the biocontrol and cosmetics business get commercial traction.

Amoéba has optimized WmCM production at its Chassieu site, and plans to partner with a CDMO for large-scale production.

Innovative proprietary manufacturing, from cultivation to production

Amoéba has optimized the cultivation of WmCM to grow in suspension in a bioreactor, which increased production yields vs. two-dimensional plates ([Hasni et al., 2020](#)). This method of cultivation requires different conditions from those for adherent cultivation, and was obtained thanks to the optimization of the culture medium. The technology allows for large-scale production of WmCM, and reduces the need for a post-fermentation separation phase.

Amoéba has optimized WmCM cultivation in a bioreactor, increasing production yields and reducing costs, with plans to scale up to larger reactors.

To date, WmCM is produced in a continuous 500-liter bioreactor process, a completely open system where microorganisms are continuously fed and raked at the same rate once a certain cell concentration has been reached in the tank. The advantages of this production mode versus a batch reactor are threefold: 1) the suspension is homogeneous throughout the tank, 2) there is no need to empty the tank, and 3) productivity is much higher than in batch mode. Amoéba plans to further scale production to reactors holding 5,000 litres of medium.

In parallel with this work, the company has been working on optimizing the medium needed to develop the amoeba WmCM in an industrial context. After several years of extensive experimentation, Amoéba has developed a proprietary culture medium that is free from components that are sensitive in terms of both toxicity and environmental risk, with no supply risk. This work also enabled Amoéba to reduce the overall cost of the culture medium by a factor of ten.

Amoéba's bioreactor facility



Source: company information, KBC Securities

Amoéba plans to produce all WmCM inhouse and later via partners

For **biocontrol**, WmCM is lysed and should be combined with adjuvants for better persistence in the field. Amoéba has been optimizing its field formulation since 2020. The active substance can be produced in Europe, by Amoéba or a subcontractor, and exported globally.

In **cosmetics**, WmCM will also be lysed, and production at the Chassieu site is deemed largely sufficient for this application, given the relatively small volumes. Amoéba aims to be an ingredient supplier, and is not planning to manufacture finished cosmetics products.

New management is planning much more measured investment in production, favouring a variable-cost model. Previous plans of a 40-ton production plant have been abandoned in favour of the purchase of two bioreactors, for a total budget of around €7 million, capable of producing 10-15 tonnes of material. Beyond that scale, the company aims to outsource production to a CDMO and is already in discussion with several of them.

Amoéba is optimizing WmCM for biocontrol and cosmetics, focusing on being an ingredient supplier with measured production investments and plans to outsource large-scale production.

AMOÉBA'S NEW STRATEGY, SUPPORTED BY ITS REFERENCE SHAREHOLDER

Company's history delivered fundamentals for biocontrol launch

Amoéba was founded by Mr. Fabrice Plasson in July 2010, and was originally focused on developing WmCM to control legionella. After a successful € 13.2m IPO on Euronext Paris in July 2015, the company optimized its production processes and developed a lysate formulation for use in the biocontrol and cosmetic market. In 2020, Amoéba's stock moved to Euronext Growth. By 2022, Amoéba received Austrian approval for the lysate as a biocontrol in plants and validated its efficacy in field trials and cosmetics. In 2024, EFSA published its positive evaluation for biocontrol in plants, and Amoéba signed an MoU with Koppert for Axpera development.

Amoéba shifted from legionella control to biocontrol and cosmetics, achieving significant milestones including a recent regulatory progress and a partnership with Koppert for Axpera.

A key shareholder that supports a new strategy

Since its pivot away from biocidal applications and into biocontrol and cosmetics, Amoéba's reference shareholder Nice & Green has been strongly supportive of the case. The Swiss impact fund Nice & Green holds approx. 30% of Amoéba's shares and has been providing financial support through convertible and straight debt financing since 2019. Nice & Green has simultaneously pushed for the new strategy and has shown willingness to financially support Amoéba regulatory approval.

Since shifting focus to biocontrol and cosmetics, Amoéba has received strong support from its reference shareholder Nice & Green.

Revamped and renewed governance

In recent years, the company has revamped its Board of Directors and Management Committee to prepare the company for commercialization, in tune with the company's ambitions and strategy.

Amoéba has revamped its Board of Directors and management team.

Approval of Axpera in EU and a partnership with Koppert will be key triggers for 2025

We anticipate that 2025 will contain several key triggers for Amoéba. Firstly, the approval of Axpera in the EU and subsequent first commercial sales are essential for Amoéba to become a commercial company. Secondly, we look out to the formalisation of its partnership with Koppert, which could cover commercial, development, manufacturing and financial elements. Thirdly, we anticipate Amoéba to close a partnership with a cosmetics player to trigger initial sales in this segment.

Upcoming news flow		
Application	Event	Timeline
	Approval active substance EU	2H25
	Partnership agreement with Koppert	May 2025
	US commercial launch	2025
Biocontrol	Approval active substance Brazil	2025
	Product applications EU and commercial launch	2025/2027
	Approval active substance California	2026/2027
	Partnership agreement with Oriental Beauty Valley	2025
Cosmetic	CDMO partnership	2027

Source: KBC Securities

Management team



Jean-François Doucet
Chief Executive Officer

Jean-François Doucet brings over 25 years of corporate finance and administration experience. After a decade at PwC as an audit and transactional consultant, he served as CFO for various companies in the chemicals and healthcare industries, including BASF, Gibaud, and Ossür. His expertise spans operational, strategic, and international issues. Jean-François, an EM Lyon finance graduate, has also worked on corporate divestments and transformation projects.



Sandrine Troussieux, PhD
Scientific Director

Dr Sandrine Troussieux has more than 20 years of experience in research and development in the field of environmental microbiology. Before joining Amoéba in 2018, she was responsible for a sequencing platform and the execution of research projects in microbial ecology in the engineering school École Centrale de Lyon.



Hervé Testeil
Industrial Director

Hervé Testeil has more than 24 years of experience in the pharmaceutical and medical device industry. He has held a range of operational positions in industrial development, production, supply chain management, quality control and regulatory affairs. He has also managed the strategic transformation of numerous laboratories including Famar, Boiron, Merial, Alcyone, Gibaud, Johnson & Johnson Medtech, Delpharm, Kisco International, Dômes Pharma and Phytéo Laboratoire. Hervé holds a master's degree in mechanical design from the University of Lille.



Jean-Baptiste Eberst
Regulatory Affairs Director

Jean-Baptiste Eberst has more than 10 years of experience in regulatory affairs in various regulated fields, including health and pest control products. Before joining Amoéba in 2015, he worked in the pharmaceutical (Sanofi Pasteur, Merck Serono) and medical device (Integra LifeSciences) industries, where he was in charge of the regulatory management of product portfolios in various regions (US, Europe, Canada, Middle East). Jean-Baptiste is a pharmacist, and graduated from the University of Strasbourg.

Source: company information, KBC Securities

Board of Directors



Benoit Villers
Board chair

Benoit Villers is an executive board member of Nice & Green, and was appointed as a director of Amoéba and chairman of its board of directors in December 2023. Benoit brings vast experience in commercial strategies and market development, drawing on expertise built up with major groups, such as Barry Callebaut and ADM, as well as younger companies like Nice & Green and the various startups that he supports.



Jean-Luc Souche
Independent Director

Jean-Luc Souche has over 30 years of experience in life sciences, specializing in crop protection. Before joining Amoéba in 2018, he was general manager at Agrauxine and later business development manager after its acquisition by the Lesaffre group. He also managed the construction of a biotech plant for Metabolic Explorer and held roles at Rhône-Poulenc Agrochimie. Jean-Luc holds a degree in agricultural engineering and an executive MBA.



Valérie Lorentz-Poinsot
Independent director

Valérie Lorentz-Poinsot has leadership experience in Laboratoires Boiron, Publicis, Fournier and Urgo. She founded the International Women's Forum's Rhône Alpes chapter and was its president for five years. She is currently co-chair of the ETI AURA club (*Entreprises de Taille Intermédiaire d'Auvergne Rhône-Alpes*), a director of Jean-Moulin Lyon 3 University, a director of OL Fondation and a director of Mare Nostrum. Valérie Lorentz-Poinsot holds a master's degree in economics and marketing.



Patrice Sellès
Independent director

Patrice Sellès has over 25 years of experience in strategic agreements and commercial developments in the global agricultural and food technology industry. From 2019 to 2023, he was CEO of Biotalys, a Belgian company on Euronext, specializing in protein-based biocontrol solutions. He previously held several management roles at Syngenta, including Global Head of Digital R&D, and served as an investment manager at Life Science Partners Bioventures in Cambridge (MA). Patrice is a chemical engineer with a PhD in organic chemistry from Université Pierre et Marie Curie, Paris.



Jean-Marc Petat
Independent director

Jean-Marc Petat has over 30 years' experience at BASF in technical roles, European marketing, sustainable agriculture, and public relations. He was on the executive committee for France and Western Europe until 2024, launching BASF's agroecology strategy in France. He developed a 2030 biocontrol roadmap with an open innovation strategy, research alliances, and communication with public authorities and environmental groups. He is a graduate of the Ecole Nationale Supérieure d'Agronomie et des Industries Alimentaires in Nancy.



Valérie Filiatre
Independent director

Valérie Filiatre has more than 30 years of experience in administrative and financial management of European and American listed companies. Prior to joining Amoéba in 2014, she was CFO, Europe at ABnote Corporation (now called American Banknote Corporation). Valérie is a graduate of EM Lyon, where she specialised in finance and accounting.



Quentin Hua
Independent director

Quentin Hua is chief of staff at Laboratoires Boiron, reporting to the Executive Committee and responsible for the ESG approach. Previously, he was a consultant at DGM Conseil, a consultancy specialising in assisting the directors of listed companies and the founders of start-ups with their communication strategies. In this capacity, he advised the management teams of companies and investment funds in various corporate transformation processes and M&A operations.

FINANCIALS & VALUATION

2024 WAS A YEAR OF TRANSITION

Strict control of operational and development costs

In addition to the regulatory and collaborative advances that have ushered in a new stage of development for Amoéba, 2024 has been a year of significant progress for the company, with a slight reduction in expenses. As such, the company has closed the year with an operating loss of € -5.7m in 2024, an improvement of around € 1m compared to 2023, reflecting both the efforts made by Amoéba to keep its operating costs as low as possible and the shift towards an industrial and commercial company.

- Research and development costs were reduced 29% y/y, illustrating the maturity of the product ranges developed by the company, which now require less development expenditure, while preserving the innovation capacities of its development platform.
- Industrial deployment costs decreased 13% y/y, mainly due to the termination of the construction programme at the Cavaillon site. Meanwhile, Amoéba began extending its Chassieu site at the end of 2024 to support its commercial launch.
- General and administrative expenses were tightly controlled, down 6% y/y, reflecting the reduction in staff costs, partially compensated by fees relating to the search for financing.

Amoéba did not record any other income or expenses during the year, unlike in 2023 when it recorded an impairment of € 7.4m in connection with the termination of the construction programme at the Cavaillon site. After taking into account the financial result, consisting of the interest expense on the bonds, the net annual result for FY24 is € -6.6m (FY23: € -14.3m).

Financial visibility at least until YE25

Amoéba's YE24 cash position was € 0.5m, in line with € 0.5m at YE23. Cash requirements related to operations (€ -4.2m) and investments (€ -2.0m) were offset by financing issued during the year (€ +6.2m), mainly consisting of straight bonds subscribed by the reference shareholder, Nice & Green. Financial debt came to € 12.1m, compared with € 4.9m at YE23, mainly consisting of the loan in straight bonds from Nice & Green (€ 11.0m) which does not result in future dilution.

In order to enable Amoéba to approach the upcoming commercialisation phase, Nice & Green has renewed its financial support until at least YE25, which demonstrates the confidence of its reference shareholder in the promising prospects of the company. An amendment to the bond loan agreement was signed on March 27, 2025 relating to additional financing of up to € 5.1m, with a pledge over the patents and trademarks held by the company. With this support and on the basis of its expected cash flows, Amoéba believes it has sufficient net working capital to meet its obligations and cash requirements until at least the end of 2025.

Amoéba made significant progress in 2024 with regulatory and collaborative advances, while it reduced operating expenses.

Amoéba's YE24 cash position was € 0.5m, with financial debt increasing to € 12.1m, mainly due to straight bonds from Nice & Green.

Nice & Green has renewed its financial support for Amoéba until YE25, ensuring sufficient working capital for the company's upcoming commercialisation phase.

SALES ARE SET TO TAKE OFF IN 2025-2029

The group will address two complementary markets: the low-margin, high-volume biocontrol market, and the low-volume, high-margin cosmetics market. We expect the company to benefit from recent advances (regulatory, commercial, partnerships) as of the end of FY25, and more widely from 2026.

Amoéba will target both the biocontrol and cosmetics markets, with sales starting in 2025.

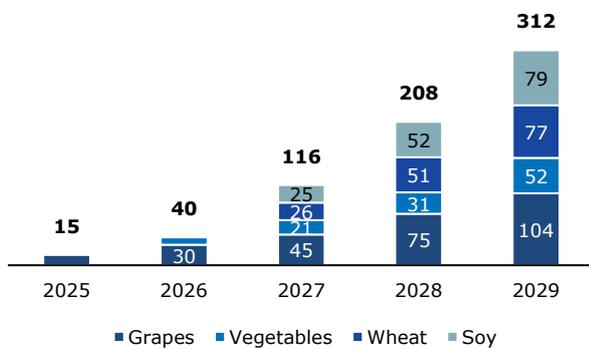
Biocontrol takes off across multiple crop types

We anticipate the first biocontrol sales as early as 2025, with exponential growth linked to diversification of the type of crops treated (vines from 2025, vegetables from 2026 and cereal crops from 2027). Furthermore, we expect an expanding market share and resulting increase in the number of hectares treated, in line with geographical development and the growing power of end customers. Furthermore, we assumed the number of annual treatments with Axpera for grapes and vegetables to ramp up from 1 to 4 in the first 3 years and remain constant thereafter. For wheat and soy, we assumed a single treatment with Axpera each year.

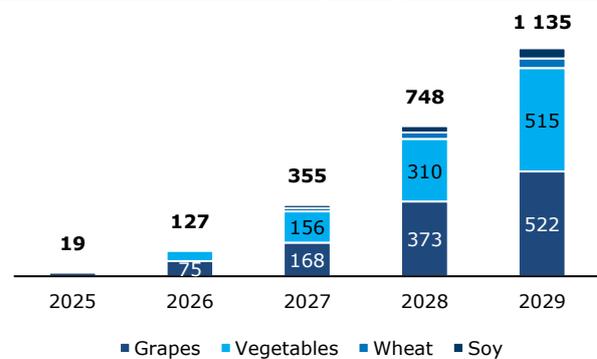
Amoéba anticipates exponential growth in biocontrol sales starting in 2025, driven by crop diversification and high product pricing due to effectiveness and quality.

In terms of pricing, Amoéba products are likely to be at the higher end of the range, given their effectiveness, quality and ease of use, as confirmed by discussions with industry professionals. In our hypotheses, we have assumed an identical price per litre for all types of crop (€ 33/L) at launch, but a different need per hectare and dosing frequency, depending on the type of crop.

Production area treated with Amoéba biocontrol ['000 ha]



Amoéba biocontrol volume sold ['000 L]



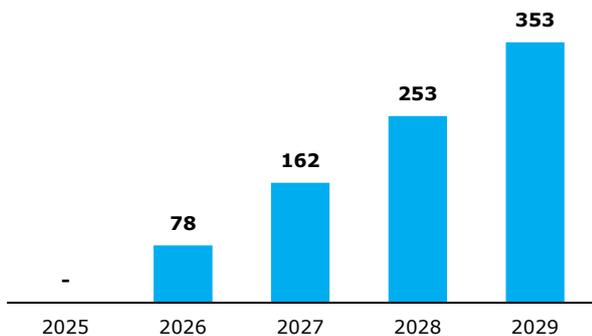
Source: KBC Securities

Cosmetics sales could also take off, pending a commercial partnership

We are also expecting the launch of the cosmetics business as early as 2026, albeit in small quantities compared with biocontrol volumes, but at a significantly higher selling price than biocontrol. In this market, Amoéba is positioned as ingredient supplier, so it will be up to the brands to develop their own products based on this ingredient. Quantities sold will therefore be small at the outset, but will increase once the product has been launched.

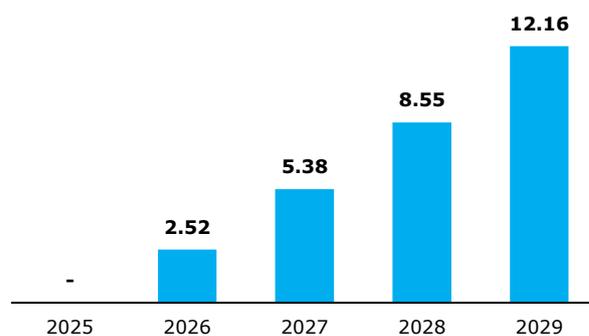
Amoéba plans to launch its cosmetics business in 2026, starting with small quantities at a higher price than biocontrol.

Amoéba cosmetics mass sold [kg AS]



Source: KBC Securities

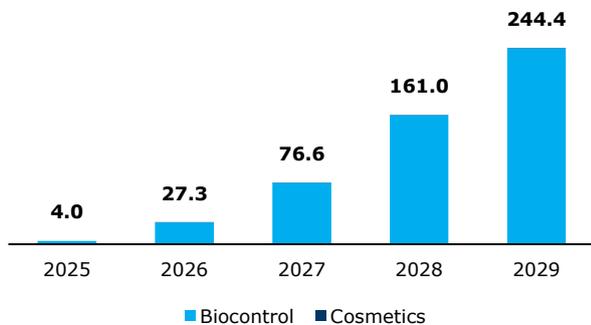
Amoéba cosmetics sales [€ m]



Source: KBC Securities

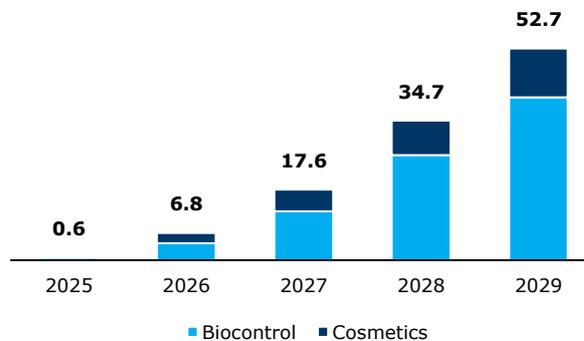
Taking all these parameters into account, we estimate that total group sales could reach € 53m by 2029. Growth, coupled with various levers, will also make it possible to gradually improve margins. *Group sales could reach € 53m by 2029, gradually improving margins.*

Total Amoéba product sold [tonnes AS]



Source: KBC Securities

Total Amoéba sales [€ m]



Source: KBC Securities

<i>Amoéba topline</i>	<i>unit</i>	<i>2024E</i>	<i>2025E</i>	<i>2026E</i>	<i>2027E</i>	<i>2028E</i>	<i>2029E</i>
BIOCONTROL							
Addressable grape production area ¹⁾	m ha	3.0	3.0	3.0	3.0	3.0	3.0
Addressable vegetable production area ¹⁾	m ha	2.1	2.1	2.1	2.1	2.1	2.1
Addressable wheat production area ²⁾	m ha	25.9	25.8	25.8	25.7	25.6	25.6
Addressable soy production area ³⁾	m ha	46.1	47.4	48.7	50.1	51.5	53.0
Total addressable production area	m ha	77.1	78.3	79.6	80.9	82.2	83.6
Share treated with Amoéba (grapes)	%	-	0.5%	1.0%	1.5%	2.5%	3.5%
Share treated with Amoéba (vegetables)	%	-	-	0.5%	1.0%	1.5%	2.5%
Share treated with Amoéba (wheat)	%	-	-	-	0.1%	0.2%	0.3%
Share treated with Amoéba (soy)	%	-	-	-	0.1%	0.1%	0.2%
Production area treated with Amoéba	ha	-	14,955	40,303	116,314	208,446	312,125
Amoéba product volume sold (215 g/L)	L	-	18,694	126,795	355,405	747,610	1,134,925
Amoéba AS mass sold	kg	-	4,019	27,261	76,412	160,736	244,009
Price per L	€/L	n.a.	33.00	33.66	34.33	35.02	35.72
Biocontrol sales	€ m	-	0.62	4.27	12.20	26.18	40.54
Gross margin	%	-	20.0%	25.0%	40.0%	45.0%	50.0%
Gross profit	€ m	-	0.12	1.07	4.88	11.78	20.27
COSMETICS							
Anti-aging ingredients market	€ bn	9.53	10.12	10.74	11.39	12.10	12.83
of which liquid ingredients	€ bn	7.53	7.85	8.40	8.96	9.50	10.14
Amoéba market share	%	-	-	0.0%	0.1%	0.1%	0.1%
Cosmetics sales	€ m	-	-	2.52	5.38	8.55	12.16
Amoéba product volume sold (20 g/L)	L	-	-	3,875	8,110	12,644	17,635
Amoéba AS mass sold	kg	-	-	78	162	253	353
Gross margin	%	-	-	80.0%	85.0%	90.0%	92.5%
Gross profit	€ m	-	-	2.02	4.57	7.70	11.25
GROUP TOTAL							
Total sales	€ m	-	0.62	6.79	17.58	34.73	52.70
_y/y change	% y/y	n.a.	n.a.	1000.2%	159.0%	97.6%	51.7%
Gross profit	€ m	-	0.12	3.08	9.45	19.48	31.52
gross margin	%	n.a.	20.0%	45.4%	53.8%	56.1%	59.8%

1) Including France, Greece, Italy, Portugal, Spain and the US; 2) Including Belgium, France, Germany and the US; 3) Including Brazil; 4) Up to 4 applications per year at 1.25L/ha for grapes, up to 4 applications per year at 2.5 L/ha for vegetables, 1 application per year at 0.6 L/ha for wheat and soy. Source: KBC Securities

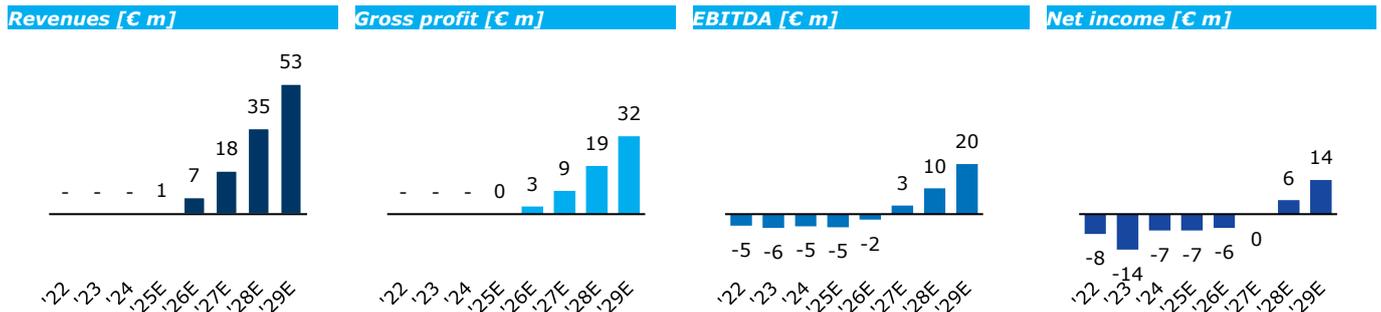
GRADUALLY REDUCING LOSSES, WITH FIRST PROFITS EXPECTED IN 2027

Over time, the growing scale of operations will enable the company to better negotiate its material purchasing costs and CDMO contracts, which should enable it to gradually lower its production cost. Furthermore, the growing contribution of the cosmetics business, which generates very high margins, can improve gross margin independently of any productivity gains.

Structural (operational) expenses should continue to rise in absolute terms, reflecting the need to scale the company, but their relative weight should decrease significantly over the period, in line with the introduction of a variable cost structure. Over the next few years, the most significant increase in costs will be linked to recruitment,

As Amoéba scales its operations and the high-margin cosmetics business improves the product mix, structural expenses will rise but decrease in relative weight due to a variable cost structure.

as headcount is expected to double by 2029. Taking into account these effects, we expect the company to generate its first profits from 2027 onwards.



Note: These estimates have been revised following discussions with the issuer. Source: KBC Securities.

AMOÉBA STILL REQUIRES SUBSTANTIAL FINANCIAL RESOURCES

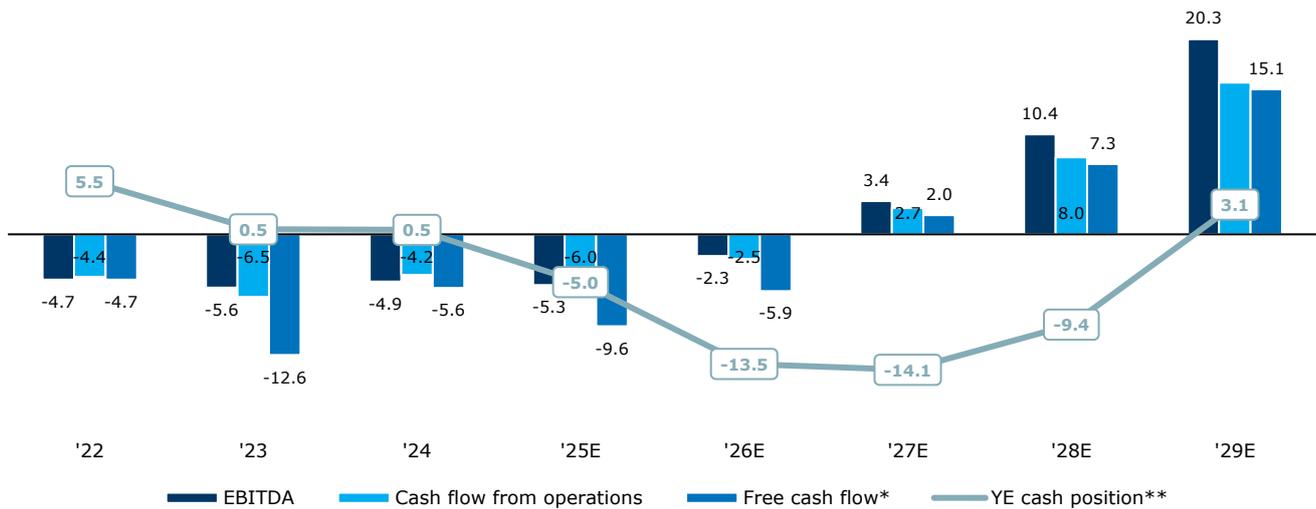
Despite this ramp-up in activity, a variable cost structure and limited capex, financial requirements will remain high until 2027. Our assumptions also take into account potential investments in production facilities (bioreactors) amounting to € 7m, spread over 2025 and 2026.

Amoéba had € 0.6m cash & equivalents on its balance sheet at the end of 1H24 and had approx. € 9.2m debt, including its debt facility with Nice & Green. These investors have remained supportive of the business case in 2H24 and likely throughout 1H25. Nice & Green initially invested in the form of convertible bonds, which have been fully converted into shares, and has continued its support through straight bond financing. Incorporating this into our model alongside expected cash burn, we arrive at an estimated net debt position of € 22.4m by YE25.

Based on our estimates, Amoéba might need to attract around € 15-20m in additional capital to implement its development plan. Numerous financing avenues are being explored, and at this stage various scenarios are possible. First of all, the ongoing discussions with Koppert could include an investment component. Secondly, Amoéba's reference shareholder Nice & Green has renewed its support for the company and pledged to cover its needs in the event of liquidity risk. Thirdly, an external capital increase could also further support the business case. Other options could include a refinancing of Amoéba's industrial facilities, a company split of its activities (cfr. a structure dedicated to the biocontrol business was created at the end of 2024), or a financing pledged by Amoéba's patent portfolio.

Despite the ramp-up in activity and a variable cost structure, Amoéba's financial requirements will remain high until 2027, with potential investments in bioreactors and an estimated need to attract around € 15-20m in additional capital.

Cash burn profile [€ m]



*Cash flow from operations + capital expenditures. **Excluding additional external funding (equity/debt/partnerships). Note: These estimates have been revised following discussions with the issuer. Source: company information, KBC Securities

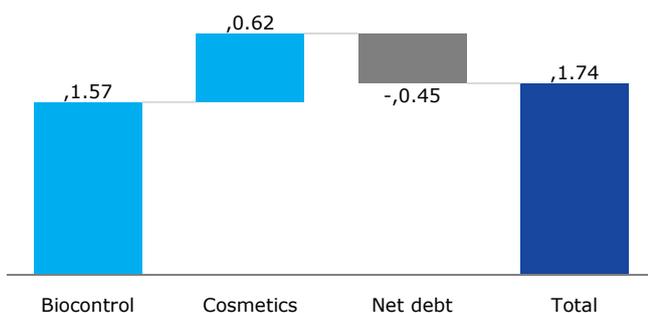
WE INITIATE COVERAGE WITH A BUY RATING AND € 1.70 TP

To value the company, we used a DCF/SOTP methodology. Our DCF approach includes a 20-year forecast period up to 2044. We have built our model on basis of an ambitious but realistic scenario. We used a discount rate of 18.8%, taking into account a 15% cost of debt (gross) and 20.0% cost of equity. We have taken into account 49.8m shares on a fully diluted basis and an estimated YE25 net debt position of € 22.4m.

We value Amoéba at € 109m, and initiate coverage with a Buy rating and a price target of € 1.70.

While Amoéba is still pre-revenue, our sum of the parts analysis attributes most value to the biocontrol program at this point in time, due to its larger volume potential and anticipated partnership with Koppert. Our fair value for the company lands at € 109.3m, translating into fair equity value of € 1.74 per share (diluted). We therefore initiate coverage with a price target of € 1.70 and a Buy rating, given the approx. 85% upside to the current share price.

Sum of the parts [€ p.s.]



Source: KBC Securities

FINANCIAL DATA

Income Statement (€ m)	2022A	2023A	2024A	2025E	2026E	2027E
Sales	0.0	0.0	0.0	0.6	6.8	17.6
COGS	0.0	0.0	0.0	(0.5)	(3.7)	(8.1)
Gross profit	0.0	0.0	0.0	0.1	3.1	9.5
Operating costs	(6.3)	(7.3)	(6.3)	(6.4)	(6.6)	(7.5)
Other income & costs	0.5	(6.7)	0.6	0.6	0.6	0.6
EBIT	(5.8)	(14.0)	(5.7)	(5.6)	(2.9)	2.5
Other non-operating	(0.3)	(0.1)	0.0	0.0	0.0	0.0
Net interest	(1.9)	(0.1)	(0.9)	(1.0)	(2.6)	(2.6)
Pre-tax earnings	(8.0)	(14.3)	(6.6)	(6.6)	(5.6)	(0.1)
Taxes	0.0	0.0	0.0	0.0	0.0	0.0
Associates	0.0	0.0	0.0	0.0	0.0	0.0
Discontinued & other	0.0	0.0	0.0	0.0	0.0	0.0
Consolidated earnings	(8.0)	(14.3)	(6.6)	(6.6)	(5.6)	(0.1)
Minority interests	0.0	0.0	0.0	0.0	0.0	0.0
Net earnings (€m)	(8.0)	(14.3)	(6.6)	(6.6)	(5.6)	(0.1)
Depreciation and amortisation	(1.1)	(1.1)	(0.8)	(0.4)	(0.7)	(0.9)
Non recurring elements included in EBIT	0.0	(7.4)	0.0	0.0	0.0	0.0
REBITDA (€m)	(4.7)	1.8	(4.9)	(5.3)	(2.3)	3.4
EBITDA	(4.7)	(5.6)	(4.9)	(5.3)	(2.3)	3.4
Adjusted net earnings	(8.0)	(6.9)	(6.6)	(6.6)	(5.6)	(0.1)

Source: KBC Securities

Balance Sheet (€ m)	2022A	2023A	2024A	2025E	2026E	2027E
Intangible assets	2.5	0.0	0.0	0.0	0.0	0.0
Tangible assets	2.2	2.8	3.5	6.7	9.4	9.2
Financial assets	0.0	0.0	0.0	0.0	0.0	0.0
Other fixed assets	0.6	0.9	0.7	0.7	0.7	0.7
Total fixed assets	5.3	3.7	4.3	7.5	10.2	9.9
Inventories	0.3	0.2	0.2	0.0	0.4	0.8
Receivables	0.0	0.0	0.0	0.1	1.0	2.6
Other current assets	1.3	1.9	1.9	1.9	1.9	1.9
Cash & equivalents	5.5	0.5	0.5	(5.0)	(13.5)	(14.1)
Total current assets	7.1	2.6	2.6	(2.9)	(10.2)	(8.8)
Total assets	12.4	6.3	6.9	4.5	0.0	1.2
Equity	8.2	(3.9)	(10.4)	(17.0)	(22.6)	(22.7)
Minorities	0.0	0.0	0.0	0.0	0.0	0.0
Provisions	0.0	0.0	0.0	0.0	0.0	0.0
Long term financial debt	0.1	2.8	1.8	1.8	1.8	1.8
Other long term liabilities	0.0	0.9	0.9	0.9	0.9	0.9
Total long term liabilities	0.1	3.8	2.7	2.7	2.7	2.7
Short term financial debt	2.3	2.1	10.6	15.7	15.7	15.7
Payables	1.3	1.4	1.0	0.1	1.1	2.4
Other current liabilities	0.6	3.0	3.0	3.0	3.0	3.0
Total short term liabilities	4.2	6.5	14.5	18.8	19.8	21.1
Total equity and liabilities	12.4	6.3	6.8	4.5	(0.1)	1.1
Net working capital	(1.0)	(1.2)	(0.8)	0.0	0.3	1.0
Net debt	(3.2)	4.4	11.9	22.4	31.0	31.6

Source: KBC Securities

Cash Flow Statement (€ m)	2022A	2023A	2024A	2025E	2026E	2027E
Consolidated earnings	(8.0)	(14.3)	(6.6)	(6.6)	(5.6)	(0.1)
Depreciation, amortisation & impairment	1.1	8.5	0.8	0.4	0.7	0.9
Change in working capital	0.3	(0.9)	(0.4)	(0.8)	(0.3)	(0.7)
Other cash flow from operations	2.2	0.2	2.0	1.0	2.6	2.6
Cash flow from operations	(4.4)	(6.5)	(4.2)	(6.0)	(2.5)	2.7
Net capital expenditure	(0.3)	(6.1)	(1.4)	(3.5)	(3.4)	(0.7)
Acquisitions / disposals	0.0	0.0	0.0	0.0	0.0	0.0
Other cash flow from investments	0.1	3.3	(0.6)	0.0	0.0	0.0
Cash flow from investments	(0.2)	(2.8)	(2.0)	(3.5)	(3.4)	(0.7)
Dividend payments	0.0	0.0	0.0	0.0	0.0	0.0
Shares issues	(0.2)	0.0	0.0	0.0	0.0	0.0
New borrowings / reimbursements	4.0	3.3	8.5	5.1	0.0	0.0
Other cash flow from financing	(1.0)	1.0	(2.3)	(1.0)	(2.6)	(2.6)
Cash flow from financing	2.9	4.3	6.2	4.1	(2.6)	(2.6)
Change in cash & equivalents	(1.7)	(5.0)	(0.1)	(5.4)	(8.5)	(0.6)
Free cash flow (before acquisitions)	(4.7)	(12.6)	(5.6)	(9.6)	(5.9)	2.0

Source: KBC Securities

Per Share Data (€)	2022A	2023A	2024A	2025E	2026E	2027E
Basic EPS	(0.24)	(0.29)	(0.13)	(0.13)	(0.11)	0.00
Diluted, adjusted EPS	(0.24)	(0.14)	(0.13)	(0.13)	(0.11)	0.00
Net book value per share	0.24	(0.08)	(0.21)	(0.34)	(0.45)	(0.46)
Dividend per share (€)	0.00	0.00	0.00	0.00	0.00	0.00
Weighted average number of shares, diluted (m)	33.57	49.28	49.82	49.82	49.82	49.82

Source: KBC Securities

Performance Criteria	2022A	2023A	2024A	2025E	2026E	2027E
Sales growth (%)	--	--	--	--	1,000.2	159.0
REBITDA growth (%)	(1.9)	138.8	(368.3)	(7.5)	57.1	252.5
Net earnings growth (%)	(2.6)	(78.2)	53.9	(0.1)	15.8	98.0
Gross margin (%)	n/a	n/a	n/a	20.0	45.4	53.8
REBITDA margin (%)	n/a	n/a	n/a	(855.6)	(33.3)	19.6
REBIT margin (%)	n/a	n/a	n/a	(913.0)	(43.3)	14.3
Net working capital / sales (%)	n/a	n/a	n/a	(1.0)	4.1	5.8
Net capital expenditure / sales (%)	n/a	n/a	n/a	(574.4)	(49.6)	(4.0)
Net debt / Equity + Minorities (x)	(0.39)	(1.12)	(1.14)	(1.32)	(1.37)	(1.39)
Net debt / EBITDA (x)	0.67	(0.79)	(2.42)	(4.25)	(13.69)	9.15
Pay-out ratio (%)	0.0	0.0	0.0	0.0	0.0	0.0
Adjusted return on equity (%)	n/a	n/a	n/a	n/a	n/a	n/a
Adjusted return on capital employed (%)	n/a	n/a	n/a	n/a	n/a	n/a

Source: KBC Securities

Valuation Data	2022A	2023A	2024A	2025E	2026E	2027E
PE (diluted, adjusted)	(4.47)	(6.01)	(2.85)	(7.17)	(8.52)	(425.31)
EV / Sales (x)	n/a	n/a	n/a	112.8	11.5	4.5
EV / REBIT (x)	0.5	(0.7)	(2.1)	(12.4)	(26.6)	31.4
EV / REBITDA (x)	(9.8)	25.2	(6.2)	(13.2)	(34.5)	22.8
P / NBV (x)	6.0	(10.6)	(1.8)	(2.8)	(2.1)	(2.1)
FCF yield (%)	(9.6)	(30.1)	(29.9)	(20.3)	(12.5)	4.3
Dividend yield (%)	0.0	0.0	0.0	0.0	0.0	0.0

Source: KBC Securities

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Stock Rating	Definition	% Of Cov Universe	% IB Client in Last Year
Buy	Expected total return (including dividends) of 10% or more over a 6-month period	49.2	34.5
Accumulate	Expected total return (including dividends) between 0% and 15% over a 6-month period	36.4	16.3
Hold	Expected total return (including dividends) between -5% and 5% over a 6-month period	14.4	23.5
Reduce	Expected total return (including dividends) between -15% and 0% over a 6-month period	0.0	0.0
Sell	Expected total return (including dividends) of -10% or worse over a 6-month period	0.0	0.0

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Our analysts assign one of those ratings based on their investment outlook and valuation for the concerned stock. The valuation can be based on different methodologies such as DCF (discounted cash flow), absolute multiples, peer group multiples, sum-of-parts or NAV (Net Asset Value). The valuation is reflected in a 6-month target price. Occasionally, the expected total return may fall outside of these ranges because of price movement and/or volatility. Such deviations will be permitted but will be closely monitored. Investors should carefully read the definitions of all ratings used in each research report. In addition, since the report contains more complete information concerning the analyst's view, investors should carefully read the entire report and not infer its contents from the rating alone. KBC Securities may disclose the drafts of its reports to the issuers before their dissemination for the purpose of verifying the accuracy of factual statements, except when the draft includes a rating or a target price. In case the draft has been amended following this disclosure, such amendments will be indicated in the concerned report.

Business Description for: Amoéba

Founded in 2010, Amoéba is an industrial greentech company based in Chassieu (Lyon, France) whose ambition is to become a major player in the deployment of amoebae in the plant protection and cosmetics sectors. Thanks to its unique and patented knowhow, Amoéba is the only company capable of exploiting the full potential of amoebae on an industrial scale and growing it in sufficient volumes to offer biological solutions that constitute a viable alternative to the chemical products widely used today. Amoéba is currently focusing on the global biocontrol market for plant protection and the cosmetics market.

Company Specific Disclosures

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- B. This company owns more than 5.0% of its own shares
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- E. KBC Securities NV makes a market and/or is liquidity provider for this company

Subject Company	Relevant disclosure(s) if any
Amoéba	

The price target for Amoéba is based on the following parameters:

Amoéba presents a compelling investment case due to its innovative use of the amoeba Willaertia magna C2c Maky for plant protection and cosmetics. The company offers a natural alternative to chemical crop protection products, addressing ecological and health-related risks. It is the only company in the world able to grow and extract amoebae at an industrial scale. Financial projections indicate strong sales growth, supported by strategic partnerships and a revamped governance structure.

The risks which may impede the achievement of our price target for Amoéba are:

Amoéba faces key risks including potential delays in obtaining regulatory approvals for Axpera, challenges in market adoption of its products, issues in closes commercial partnerships, financial risks due to high cash burn and reliance on external funding, intense competition in the biocontrol and cosmetics markets, and difficulties in scaling up production to meet market demand.

Below is an overview of the stock ratings and target price history in the last 12 months for the stock(s) described in this report. Rating and price history is delayed by 1 month.

Company	Date	Rating	Target Price
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