

Amano Enzyme Group

Corporate Presentation

Amano Enzyme Inc. August 2024



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About Amano Enzyme

Amano Enzyme corporate philosophy

Making The Intangible Tangible

- Jizen—Spirit of Giving and Caring
- Pioneering Spirits
- Philosophy of Coexistence



Genichi Amano (1948 – 1971 President)

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Corporate history

1899	Ennosuke Amano started a household medicine distribution business in
1939	Genichi Amano entered the household medicine market in China
1948	Established Amano Pharmaceutical Co., Ltd and started the production pharmaceutical-grade malt diastase
1950	Opened Nishiharu plant for the production of pharmaceutical-grade mic diastase
1957	Patented Amano-style aeration koji production instrument
1960	Opened Central Research Institute
1961	Started the production of food-grade enzymes
1969	Opened Nagoya plant
1970	Started the production of diagnostics enzymes
1976	Opened Yoro plant
1980	Agreement signed with Nanjing, China, on compensation trade of pancr
1981	Established Amano International Enzyme Co., Inc. (AIEC) in U.S. \rightarrow 1992 Renamed AIEC to Amano Enzyme USA Co., Ltd.

n Japan	1983	Established Frankfurt office in Germany \rightarrow 1992 Integrated European office to Amano Enzyme Europe Ltd. In	
of	1996	Shift the resources to the enzyme business; "World No.1 Speciality En Producer"	
crobial	2000	Changed the corporate name to Amano Enzyme Inc.	
	2001	Opened Gifu R&D center	
	2001	Acquired the majority stake of Daiwa Kasei K.K. →2013 Merged Daiwa Kasei K.K. as Amano Enzyme Shiga Plant	
	2007	Opened Amano Enzyme China Inc. (AEC)	
	2009	Opened Amano Enzyme Manufacturing (China) Ltd.	
	2018	Merged AEC into Amano Enzyme Manufacturing (China) Ltd. and rena AEC to Shanghai branch.	
	2018	Opened Amano Enzyme Asia Pacific Co., Ltd. In Thailand	
reatin			
		120+ years of history	
		70+ years in enzyme business	



the U.K. nzyme

amed

70 years in enzyme business



Amano Enzyme has been researching nature's enzymes to develop and manufacture microbial enzymes for over 70 years since 1948.











What are enzymes?

Enzymes are proteins that act as catalysts in all living organisms – microorganisms, plants, animals, and humans. As catalysts, enzymes serve as compounds that increase chemical reactions in biological systems.

How do enzymes work?

- Break down the food to digest and convert them into energy
- Act as part of the body's defence system, generating and breaking down substances in the body

Advantage of enzymes in chemical reactions

- Eliminate undesirable by-products
- Sustainable use of resources as enzymes are produced mainly by microbial fermentation 3

* NC-IUBMB = Nomenclature Committee of the International Union of Biochemistry and Molecular Biology



• Allows some industrial reactions to happen at lower temperatures and pressures than traditionally needed.





The discovery of enzymes and history of industrial uses

1814	Kirchhoff (Russia) used malt extract to convert s
1833	Payen and Persoz (France) isolated enzyme to
1836	Schwann (Germany) discovered enzyme respo
1874	Chistian Hansen (Denmark) commercilised renr
1878	Kühne *Germany) proposed the name "enzyme
1895	Takamine (Japan) developed and launched taka
1897	Buchner (Germany) discovered that protein in y
	for Chemistry)

- starch into sugar.
- convert starch to sugar in malt extract (named Diastase)
- nsible for digestion in the porcine stomach (named Pepsin)
- net derived from calf for cheese making process.
- " ("in yeast" in the Greek)
- a-diastase derived from Aspergillus oryzae for the digestive medicine.
- reast extract can form alcohol from a sugar solution (Awarded Nobel Prize

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ENZYMES WITH UNLIMITED POSSIBILITIES

We only identified 0.01% of all microorganisms







About our business

For a world with tastier foods

We have a long history of using nature's enzymes in our food culture even before we discovered enzymes and their properties and functions. Amano will continue applying enzyme technology to solve various challenges in food processing.









For a healthier world

Amano started pharmaceutical-grade diastase business and has grown its portfolio to contribute to a healthier world.







R&D and Sales & Marketing

Amano has an extensive strain library (over 20,000 microorganisms obtained from a variety of environments such as deep sea)

Innovation center and production technology center continue working on the discovery of new enzymes and yield improvement whilst regional application centers to offer technical support to our customers.





Global network

From Japan to the world

Amano has a global network with the headquarters, three plants and innovation center in Japan as well as overseas business across 5 regions.









Quality Assurance

Deliver consistent and high quality and compliance worldwide

Manufacturing the products with

consistent and high quality

- GMP for API
- FSSC22000
- ISO13485
- ISO14001
- Regional regulatory requirements

Meeting various requirements

- Kosher, Halal
- Vegan
- Non-GMO





About our future

Corporate Social Responsibility

Amano group and the SDGs

Amano Enzyme has put the Japanese culture of coexistence with nature at the heart of our business. Biotechnology is our wisdom to achieve coexistence with nature and enzymes are the key technology.

In 21st century, we are facing sustainability challenges in food, energy, resources and environments. We believe enzymes play a pivotal role in the sustainable development.



Contribute to sustainability



The Three Synergies and Tailor-Made

120+years of history and 70+ years of experience in enzyme technology support Amano to further contribute to sustainability.

Food x Medical applications

No.1 Speciality





Medical x Food applications

Medical Application



- Digestive enzymes
- Dietary supplement
- Chiral synthesis
- Diagnostics
- Regenerative medicine



Food application





- Protein
- Sugar
- Fats & Oils
- Seasoning & Flavour
- Fermentation

Leveraging our expertise in medical and food areas to develop innovative applications with consistent and high quality









Koji x Liquid fermentation

Koji fermentation







Microbiology quality control / Fermentation / Extraction / Purification / Commercialisation (powder, granulation, liquid)

Liquid fermentation





Bacteria



Production technology

Enable the production of a wide range of unique products with Koji and liquid fermentation and production technology







Modern x Classical biotechnology

Modern biotechnology



- GMO
- Protein engineering
- Genetic screening



Classical biotechnology



- Screening from natural samples
- Classical mutagenesis







The national microorganisms of Japan (Aspergillus oryzae)

Koji-kin (Aspergillus oryzae) is registered as the national microorganism of Japan by Japanese Society for Brewing Science in 2006.

Koji-kin is an essential part of the Japanese diet and contributes to 1% of GDP. It is widely recognised as it were a national treasure of Japan.

Microbe Gravestone

Microbe Gravestone was built in order to pay our deepest re to the innumerable souls of microbes who have dedicated and sacrificed for the existence of humans







Koji-kin (Aspergillus oryzae)

The National Flower

The National Bird



The National Butterfly



The National Fish



Searching for new microorganism

Japan is rich in microbial resources

The islands of Japan stretch a long distance from north of Hokkaido to south of Okinawa and cover a wide range of climatic zones.

Japan also has a sixth largest Exclusive Economic Zone (EEZ) in the world, including deep sea such as Ogasawara trench.

As a result, Japan is considered rich in microbial resources.

Length of Japan : Approx. 2,800km from Okinotorishima (south) to Wakkanai (north)

Elevation of Japan : Ogawasara Trench -9,780m Mt. Fuji +3,776m

Searching for new microorganism

From desert in Mongolia to rainforest in Vietnam, Myanmar and Indonesia (part of NITE joint project)





Even in extreme environments

We have also searched for microorganism in the extreme environments that it is considered possible to find zero trace of life.

- From deep sea (JAMSTEC)
- From Earth's Stratosphere (ISS-IEM Mission Tanpopo)

Extremophi	ilic microorganisms
Temperature	Thermophiles, Psychrophiles
рН	Acidophilies, Alkaliphiles
Oxygen	Anaerobes, Aerobes
Salt	Halophiles
Pressure	Barophiles
Nutrients	Oligotrophies
Solvent	Solvent-resitant microorganism
Radiation	Radiation-resistant microorganism









Appendix

Amano Enzyme Science and Technology Foundation

Established in 2017 to support Enzyme Symposium in the long term – Amano Enzyme group's corporate social responsibility programme. Board members including the industry experts believe in unlimited possibilities of enzymes and the foundation promotes advanced research and development for enzymes.

• Enzyme Symposium

Launched in 2000 as part of the 100th anniversary project. The symposium awards research grant for applied research projects that demonstrate the impact on the wider economy and society







Enzyme Application Studio

Co-Creation Space

Communication space for co-creation.



available.





- Laboratory and kitchen facilities are also
- You can try our enzymes in person.

Literature library for enzymes

A comprehensive resource section about the history of enzyme utilization. Books mainly related to enzymology are exhibited.









Enzyme-Explore Unlimited Possibilities

Amano Enzyme

Contact

www.amano-enzyme.com

https://www.linkedin.com/company/amanoenzyme

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