2025

Asahi GROUP

RESEARCH AND DEVELOPMENT

Asahi Breweries, Ltd.

Asahi Soft Drinks Co., Ltd.

Asahi Group Foods, Ltd.

Asahi Biocycle Co., Ltd.

Asahi Quality & Innovations, Ltd.

Message

Continuing to create “glocal※ value unique to Asahi Group” as a business that develops sustainably alongside society.

The Asahi Group operates alcohol beverage, soft drink, and food businesses around the world, primarily in Japan and East Asia, Europe, Asia Pacific. In January 2019, we enacted an Asahi Group corporate philosophy called the “Asahi Group Philosophy (AGP)” with the aims of sharing our philosophy among Asahi Group employees throughout the world and increasing our sustainable corporate value. Under the AGP, the mission of the Asahi Group is to “Deliver on our great taste promise and bring more fun to life”. As we seek to accomplish this mission, the Research & Development Division will continue to seek out better technology and new knowledge.

In addition to product development in the areas of alcohol beverages, soft drinks, and food, our R&D programs seek out analytical and quality assurance technologies that support our search for outstanding health-promoting ingredients and food safety, as well as promote the development of environmentally-friendly containers, the utilization of by-products, and the development of green technologies to realize a more affluent and sustainable society.

Supporting these R&D programs is a vast store of technical know-how cultivated over many years, and developed by the individual researchers who inherit and build on that know-how. Furthermore, a research approach of seeking to incorporate the latest science at an early stage, in addition to a corporate culture of working together across departmental boundaries, has provided us with a platform to support these activities. The Asahi Group will continue to contribute to the development of a sustainable society, and to take on the challenge of creating unique glocal value.

Asahi Group Philosophy

Our Mission

Deliver on our great taste promise and bring more fun to life

Our Vision

Be a value creator globally and locally, growing with high-value-added brands

Our Values

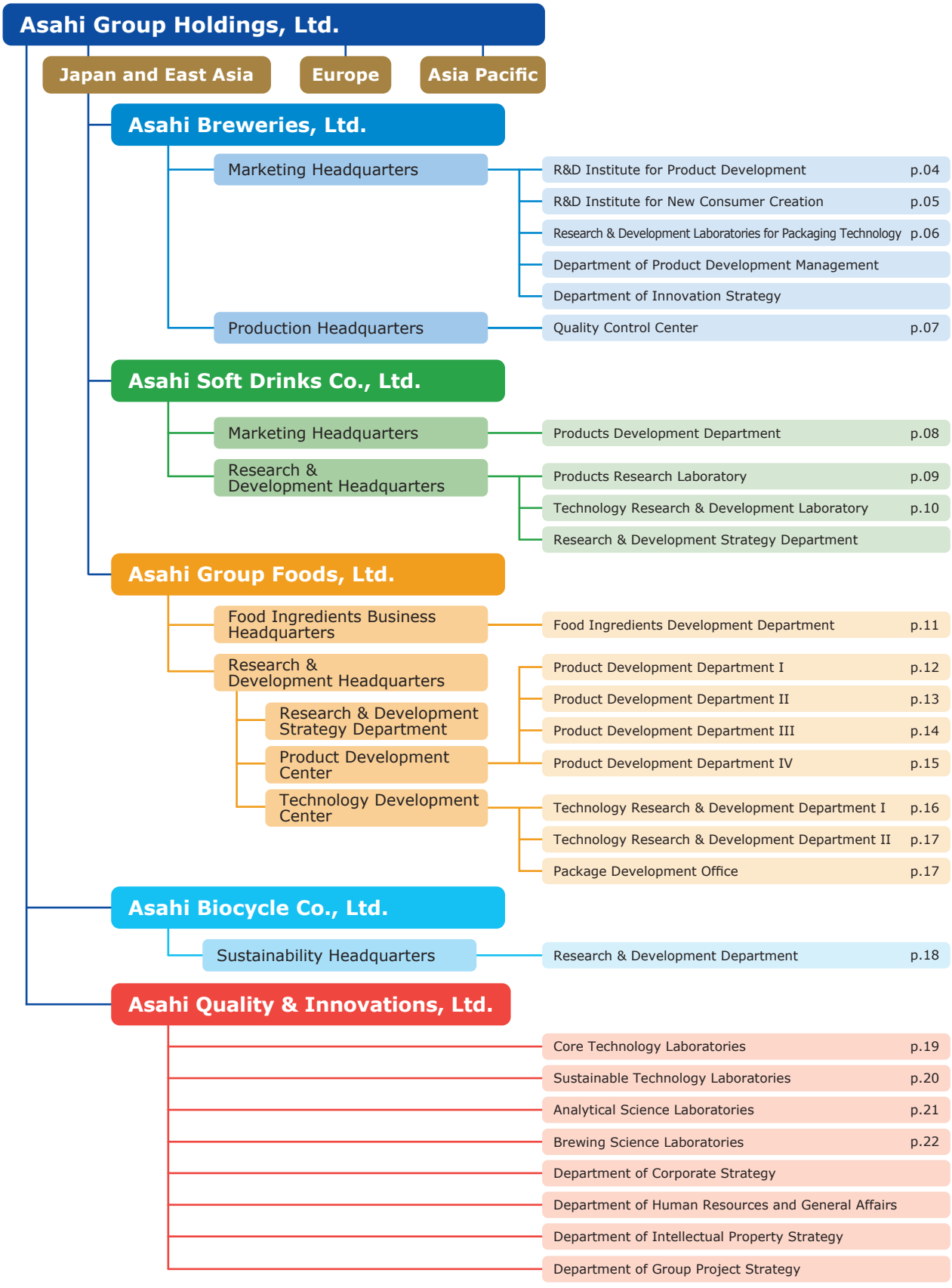
Challenge and innovation
Excellence in quality
Shared inspiration

※ Glocal
“Glocal” is a phrase coined from the words global and local. It refers to the approach “Think globally, act locally”.

(As of July 2025)

Organizational Structure of Research & Development

At the Asahi Group, the R&D divisions of Group Companies carry out relevant R&D that directly links to business operations such as product development and quality assurance, while laboratories run by Asahi Quality & Innovations, Ltd. engage in research themes that may lead to mid- to long-term business development through Group Companies in Japan and abroad. These R&D organizations collaborate with each other in the pursuit of their respective research goals.



Research & Development areas

Asahi Group focuses its efforts on R&D activities that will create new value, with the aim of delivering the best impression to our customers. We take on challenges in a wide range of research and development fields, based on the following pillars: "product development", through which we employ our unique technologies; "fundamental technologies", including quality assurance and the development of production technologies for delivering higher quality and safer products; and "search for new ingredients", through which we maximize the potential of functional microorganisms and expand their uses.

Search for new ingredients

Microorganisms play an important role in the manufacture of alcohol beverages and fermented milk. Various technologies, such as fermentation control and analytical technology, are required to make full use of microorganisms. Leveraging these microbial utilization technologies together with functional evaluation technologies accumulated through the development of various health foods, Asahi Group searches for novel ingredients with beneficial effects on human health.

Product development

We develop a wide range of food and drinks to offer customers products that will contribute to realizing a rich dietary culture. We also develop various health foods and drinks including Foods for Specified Health Uses (FOSHU) and Foods with Function Claims utilizing various functional ingredients identified through new ingredient research.

Fundamental technologies

We are continuously refining our fundamental technologies to ensure our innovative research findings can be applied to business and to deliver high quality and safe products to customers. Further, in addition to deriving benefits from products, as a company operating its business by receiving the gifts of nature, the Asahi Group is committed to passing such gifts on to the next generation by promoting proactive initiatives to address various environmental issues.

Asahi Breweries, Ltd.

R&D Institute for Product Development

Striving to create products that are sure to delight customers

We are engaged in the development of new products across product lines including beer and related products (beer, *happoshu* [low-malt beer], new genre, etc.), ready-to-drink (RTD) alcohol beverages (*chuhai*, cocktails, etc.), low-alcohol and non-alcohol beverages (beer-flavored and cocktail-flavored beverages, etc.). From small-scale production of prototypes to follow-up for mass production at breweries and distilleries, we are always striving to create products that are sure to delight customers.

Development of beer and beer-flavored beverages

When developing beer, beer-flavored beverages and other brewed alcohol beverages, we produce small batches of prototypes in a small-scale plant to create the initial framework for flavor design for the new product. Through this process, various factors and conditions will be determined including the type and quantity of ingredients to use, selection of fermenting yeast, fermentation temperature and time, or consideration of non-alcoholic production methods, and so on. Trial batches are repeatedly produced and evaluated to determine the optimal set of conditions from countless combinations of these conditions.

Development of RTD and cocktail-flavored beverages

For the development of canned *chuhai* and other beverages including hard seltzer (referred to as RTD alcohol beverages) and cocktail-flavored beverages, we study techniques for preparing and blending ingredients such as fruit juice, liquors and other flavoring agents to propose new flavors and meet the ever diversifying tastes of consumers. We also explore and evaluate new ingredients to create innovative flavors.

Development of product lineups for "smart drinking"

We develop low-alcohol, slightly alcoholic, and non-alcoholic beverages that can delight customers based on the concept of "smart drinking" by combining techniques for brewed alcohol beverages for beer and wine, techniques for preparing and blending ingredients such as fruit juice, liquors, and flavoring agents for ready-to-drink (RTD) alcohol beverages, and techniques for controlling the alcohol content and removing the alcohol component.

Research

Develop and deliver new value to customers with formulation design and risk assessment

The R&D Institute for Product Development was established when the R&D organization was restructured in September 2024. The institute focuses efforts on developing products that inspire customers in accordance with its policy: "We aim for new ways to touch customers' hearts rather than making decisions based simply on conventional ideas and technology."

It comprises three departments: the Beer Development Department, the RTD Development Department, and the new Risk Management Department. The Beer Development Department develops beer and beer-flavored beverages. The RTD Development Department develops RTDs (ready-to-drink beverages) and cocktail-flavored beverages. The Risk Management Department handles microbiology, analytical and sensory evaluation, and optimization of development schemes. This integrated structure ensures that each specialized technology is more directly connected to products and services than ever before.

The institute applies formulation design to create customer value with a technical approach that includes analysis, sensory evaluation, and microbial control technologies to assess risks associated with physical properties in each category. This has led to an increase in the efficiency and sophistication of the development process and the release of a large number of products with value that exceeds customer expectations.

The entire institute works as a united team to provide Japan-originated, world-first products that inspire and excite customers.

Asahi Breweries, Ltd.

R&D Institute for New Consumer Creation

Taking on the challenge of developing new products and technologies that excite and inspire customers

The R&D Institute for New Consumer Creation will cultivate new customers and markets by moving beyond Japan and our existing categories to explore a wide range of markets worldwide, and by developing new products and services with a mid-term perspective. We listen carefully to customer feedback in searching for insight that not even the customer may be aware of and use technology to give it form. We share inspiration with customers and strive to translate value into victory.

Co-creating early-stage ideas ("seeds")

First, we thoroughly discuss researchers' ideas and concepts and explore customer insights in depth through measures such as market inspection tours. We then translate our findings into plans that encompass two perspectives—technology and marketing. Completed plans are announced to the entire Marketing Headquarters at monthly "Seeds Proposal Meetings" and transformed into products for e-commerce and mass-production. We serve as both the source of early-stage ideas and the linchpin for formulating plans.

Product Innovation

We develop innovative products that excite and inspire customers, covering a wide range of drinks including beers, RTDs (ready-to-drink beverages), and non-alcoholic beverages. Our work encompasses all aspects of new product development, from delivering proposals for new value to designing flavor formulas and establishing mass producibility.

Process Innovation

We develop technology needed to deliver products with new value to all customers—whether they drink alcohol or not—for both existing and potential products and markets. We gather information on new materials and manufacturing processes and search for new early-stage ideas with out-of-the-box thinking. In addition, we take on the challenge of proposing great tastes customers have yet to experience with ingredients that contribute to flavor.

Research

Combining our technological expertise to create the *Mirai no Lemon Sour*

The Laboratory holds Seeds Proposal Meetings, during which development staff have the opportunity to propose their original ideas to management with the objective of commercializing promising ideas. This exciting new product development, which began in 2021 with the idea of putting real lemon slices in a wide-mouth can, posed many brain-wracking challenges before it became a reality.

Incorporating real lemon slices, which by their nature have individual differences, broke the conventional wisdom that products should be completely uniform, and a great deal of drive and energy was required to break through the many hurdles involved in development. The R&D Institute for New Consumer Creation, R&D Institute for Product Development, Research & Development Laboratories for Packaging Technology, and production and marketing divisions joined forces as a united team to work on a solution. Then in 2023, *Mirai no Lemon Sour* was born—the world's first RTD with lemon slices. After successfully test selling it on the corporate website, it was made available for general sale and released to customers in 2024.

Through repeated testing in cooperation with lemon slice suppliers, the R&D Institute for New Consumer Creation developed the lemon slice processing method and the flavor balance of the product. Consumers of the new beverage are greeted by the sight of lemon slices gently emerging from the foam when the can is opened, as well as an authentic fruit taste from using real lemons and a flavor that matures over time from production to opening. The team's hard work resulted in a product that is both surprising and exhilarating and truly worthy of the name *Mirai no Lemon Sour*.

Going forward, our team will continue taking on daily challenges to produce products that exceed customer expectations.

Asahi Breweries, Ltd.

Research & Development Laboratories for Packaging Technology

The external appearance is also an important part of the product

Most people may think that new product development is all about developing new content or new taste, but the external "look" of the product is also an important part of the product. We can improve both the functionality and design of the package by making use of various technologies, and even add value to the product concept through package design. We perform evaluation tests on the cans, bottles, paper boxes and other packaging materials used by Asahi Group (AG) companies to ensure safety and security to our customers and also pursue research to improve recyclability and reduce waste.

Development of new containers and packages

We develop cans, bottles, paper boxes and other packaging materials for use by our AG companies. Our mission is not only to developing user-friendly and aesthetically pleasant packages but also promoting light weight and environmentally conscious packages to reduce the burden on the environment.

Research on new technologies and trends

We conduct surveys and analysis of new technologies and trends related to packaging in Japan and overseas to support the development of new packages that are more attractive to customers. Based on the information collected and technologies identified, we develop packages with new added values responding to changes in society's needs.

Evaluation tests on new packages

We perform evaluation tests on packaging materials for new products developed by the AG companies to ensure safety and security to our customers. We also make improvements to packages of existing products. If any problems are found with our packages, we investigate the cause and take corrective measures to solve the problem.

Development of new equipment for serving draught beer

We are working to develop draught beer equipment that creates new value and is more attractive for both customers and restaurant/bar operators who use them. In other words, equipment useful for serving delicious beer to customers, easy to handle for restaurant/bar operators, and is friendly to the environment.

Research

Japan's first experience-based package innovation *"Super Dry Nama Jokki Can"*

"We wanted consumers to enjoy at home the fine foam and luxuriously large sips you would expect when drinking from a mug of freshly poured draft beer at a pub". We made it come true with an innovative package design, which helped invigorate our *Super Dry* brand. If you find creamy foam developing a nice head, you will see it as additional value. To produce fine foam and make this happen, we developed a material with a special surface structure. However, fine bubbles alone are not enough to constitute consumer value. We developed a design where the entire top of the can pulls off to create a wide opening to make it look more like a mug and allow for generous gulps. Double safety structure veils sharp edges anywhere near the opening so as to protect consumers from getting hurt. With mounting expectations even before the launch, *Super Dry Nama Jokki Can* was launched in April 2021 to achieve record-breaking sales that set new standards for beer sales. *Nama Jokki Can* will continue to evolve to exceed expectations.

Cumulative number of members enrolled in *THE DRAFTERS* service using *Full-fledged Foaming Rich Server* exceeds 27,000

Full-fledged Foaming Rich Server is dedicated for use in *THE DRAFTERS*, a new draught beer subscription service offered by Asahi Breweries. Aiming to ensure that everyone can easily enjoy delicious draught beer, Asahi Breweries fully leveraged the expertise accumulated in the development of professional-use draught beer equipment to create this home-use beer server, which provides users with an experience of high-density creamy foam and the great taste of sub-zero beer. As one of its features, this server is designed to be easy to use at home, while equipped with professional specs that deliver authentic draught beer. Since its launch in May 2021, the server has been used by more than 20,000 members in cumulative total and widely acclaimed. *Full-fledged Foaming Rich Server* will continue to evolve for our great taste promise.

Asahi Breweries, Ltd.

Quality Control Center

Assuring the highest quality

The Quality Control Center supports quality assurance processes by conducting component, microbial and food safety analysis of raw materials and finished products, to deliver products of the highest level of quality to customers. We also anticipate and respond to quality risks, as well as investigate and analyze products that customers experience issues with. We employ a wide array of advanced technologies for detection/identification of hazardous microorganisms, analysis of foreign substances, abnormal odor and taste, DNA analysis, analysis of mycotoxin, radiation measurement and more, to ensure the quality of the products of Asahi Breweries, Ltd.

Component analysis

Providing accurate and timely analysis data on a daily basis

We perform analysis to confirm the conformance to quality standards of raw materials and finished products, to conduct risk control, develop new analytical methods to support product development, research products distributed in the market, provide advice for improving inspection ability in manufacturing process, and coordinate confirmation of analytical accuracy at all breweries.

Microbial analysis

Stringent tests on quality risks performed on materials and products from within Japan and overseas

An accurate and robust microbial testing system has been built within Japan to implement speedy inspection of finished products before shipment and microbial inspection of imported wines, spirits, etc. to support the delivery of safe and secure products.

Food safety analysis

World's highest level of detection sensitivity for risk factors in food

We have systems in place to test various substances that pose potential risks to product quality. We are also working to achieve high sensitivity and efficiency of analysis by using the latest analytical instruments to enable detection of substances present in trace amounts.

Research

Development of high-precision microbial identification method combining MinION and rapid genome analysis

There are species of microorganisms that contaminate beer and multiply, giving it a cloudy appearance and off-aroma and -taste. To deliver safe products to customers, beer quality is checked at breweries by conducting daily microbial testing. The Quality Control Center uses analytical equipment such as MALDI-TOF mass spectrometry and DNA sequencers to determine whether there are microbes that would negatively impact the quality of beer. There are some types of lactic acid bacteria known to cause beer spoilage, but it was difficult to distinguish genetically closely related species with conventional analytical methods. The conventional methods targeted specific genes and proteins, so we focused on MinION, a nanopore sequencer capable of analyzing DNA at the single-molecule level, and developed a method targeting the entire genomic DNA of microbes. By combining this with proprietarily developed analytical tools in partnership with a university,We have successfully developed a method enabling high-precision microbial identification within one hour of DNA extraction. This method not only enables species-level identification of the Lactobacillus casei group, which are beer spoilage bacteria, but also identification of the Bacillus cereus group, which contains species that can cause food poisoning. The method was presented at academic conferences in Japan such as the Japanese Society of Food Microbiology and Japanese Society for Food Hygiene and Safety, as well as international academic conferences such as FEMS 2023 and IAFP 2024 as a pioneering technique that can be applied to both beer and food.

Asahi Soft Drinks Co., Ltd.

Products Development Department

Enhancing brand value through differentiation

We are working to enhance the brand value of our products, especially flagship brands, by developing robust technology that will differentiate us from competitors and enhance the value of individual products. As a pioneer of the Japanese soft drink business with a range of core brands including *MITSUYA CIDER* , first launched in 1884 as *Mitsuya Hirano-Sui* and long embraced by Japanese consumers, *WILKINSON* launched in 1890 which was the first beverage to use the term "tansan" (meaning carbonic acid) as a product name, "*WILKINSON TANSAN*", *CALPIS* , first launched in 1919, *Bireley's* distributed in Japan since 1951, *Juroku-Cha* launched in 1993 as the pioneer of the blended tea market, and *WONDA* launched in 1997 as the next generation of canned coffee, we are constantly pursuing innovation to develop delicious, lively, fun and healthy products and to further enhance our brand value.

Product development

We develop new products to accommodate customer needs. We are also constantly renewing and improving our legacy brands to keep with the changing needs. Moreover, we proactively address the research noting not only physical health but also mental health to help our customers have wellness life.

Creating new value

In order to create new value through our beverage business in the fields of health, environment, and co-creation with local communities, we develop products using new ingredients and engage with local communities through our products.

Supporting Asahi Group businesses worldwide

We promote exchanges of information and technology among Group companies and affiliated companies to serve growth of the Asahi Group's beverage business.

Research

R&D aimed at further enhancing the brand value of carbonated drinks

MITSUYA CIDER and *WILKINSON*, both with a history spanning over a century, are our two core brands in the carbonated drinks category which has a strong customer base around the world. We are strengthening R&D for these brands to invigorate the soft drink market.

In *MITSUYA CIDER*, we have been developing underlying technologies to enhance its "refreshingness" which is an essential value of the brand. Also, its lineup has been diversified with favor variations and difference in carbonation level to suit the different tastes and needs of all generations. On the other hand, *WILKINSON* enhanced its brand value of "intense and refreshing stimulation" as the top soda brand to capture changing consumer needs and create a new beverage scene.

To help identify potential added values, we are also focusing on a research of various effects that sparkling water may have on people's mind and body. To date, we have discovered that drinking sparkling water when in mentally demanding tasks, such as an office time, can help prevent drowsiness and maintain motivation.

We have also identified some other intriguing results that show promise for improving productivity, such as an immediate increase in typing speed after drinking sparkling water.

In addition, we have also discovered new benefits of carbonated drinks, including that drinking sparkling water in hot environment such as summer weather helps improve mood and that drinking sparkling water while playing e-sports—which has recently gained in popularity as a barrier-free sport—may help to maintain judgement capability and enhance enjoyment of the game. The potential benefits of sparkling water are outlined in the "Asahi Carbonated Drinks Lab" (https://www.asahigroup-holdings.com/rd/library/tansan/). We have high hopes for many benefits that sparkling water can provide for the body and mind in the future.

Asahi Soft Drinks Co., Ltd.

Products Research Laboratory

Using the five senses and the power of science to deliver tastes that surpass the expectations of people around the world

We support product development by evaluating the taste, user-friendliness of packaging, and design of products from a variety of perspectives.
To deliver our long-selling brands such as *CALPIS* and *Juroku-Cha* to consumers around the world, we are also working to develop products that cater to tastes and regulations in different countries by leveraging the beverage development technologies we have cultivated in Japan.

Delivering the Asahi brand experience to people around the world

We design our brands in accordance with the tastes and regulations of each country and adapt them for mass production to deliver the Asahi brand experience to consumers around the world.

Commitment to deliciousness

Using our proprietary system for sensory evaluation data management, we evaluate and investigate the taste, aroma, and color of prototypes and products from a sensory perspective, and utilize this information in new product development.

Research

■ Business Development Group

We utilize the beverage development technologies cultivated in Japan to develop products for overseas markets, including adapting long-selling brands such as *CALPIS* and *Juroku-Cha* to each country's laws and regulations so that they can be mass-produced at local manufacturing plants.

We adapt existing brands in the Japanese market as well as develop new products in accordance with our product strategy in each country, primarily focusing on the U.S. and Taiwan, where we have affiliated companies.

We also provide technological support in collaboration with related divisions of Asahi Group Holdings.

In addition, we identify trends in raw materials and technologies from a global perspective, focusing particularly on Europe, the U.S., and Asia, to study technologies that can be applied to future product development, as well as to understand local market trends and preferences and offer products tailored to these regions.

■ Product Evaluation Group

We conduct scientific evaluation of the thrill and excitement that customers feel when they pick up our products.

We conduct statistical analysis of questionnaires to understand how our products are perceived from a sensory perspective, including whether consumers find them delicious, and why. In addition to direct survey methods such as questionnaires, we are also developing indirect analysis methods that will enable us to better understand the underlying psychology of our customers by utilizing biological indicators such as cerebral blood flow.

Furthermore, in order to determine why a product tastes good from a scientific perspective, we use physicochemical analysis methods such as gas chromatography to analyze everything from esters, aldehydes, and other aroma compounds to sugars, amino acids, and other trace elements to identify exactly what compounds are contained in the product in question.

Asahi Soft Drinks Co., Ltd.

Technology Research & Development Laboratory

Maintaining technological strength to continue creating safe, secure, and environmentally friendly products

The Technology Research & Development Laboratory continues to pursue research aiming to improve our manufacturing technology to ensure efficient production, product quality and safety, so that we can deliver safe and delicious products to as many customers as possible. We engage in production tests at laboratory scale, development of new plastic bottles and packaging technology, as well as development of technologies to ensure the safety and security of the product contents, such as microbial analysis and physical and chemical analysis.

Product safety and security, enhancing brand value

We are working to develop technologies for the control, rapid detection, and identification of microorganisms in beverage products. We are also developing trace component analysis technologies that will lead to advancement and systematization of product design technologies.

Development of packages

We are working to develop attractive product packages that offer improved usability, are more lightweight, and are made with materials that reduce environmental impact. We undertake a comprehensive process from design to mass production for PET bottles and cardboard cartons.

Technological development

We use our test plant to develop manufacturing technologies that add new value to our products. We are also developing upcycling technologies to reduce manufacturing residues and recycle resources.

Research

■ Development of packages friendly to both humans and the environment

With the rise of online shopping and disaster prevention awareness, an increasing number of consumers are purchasing whole cartons of large-volume PET bottled mineral water. We are also upgrading our cardboard packaging to more "human-friendly" designs, such as making opening the package more intuitive and incorporating strategically-placed slots in the cardboard for easy opening.

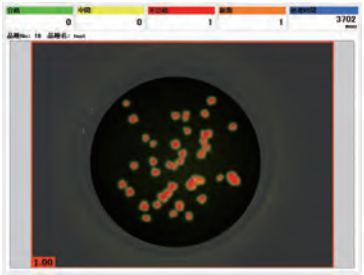
In addition, we have led the industry in developing "simple eco-label products"—environmentally-friendly products whose label wrappers can be removed easily—and "unlabeled products," which eliminate label wrappers entirely.

■ Developing technologies to maintain freshness and reduce manufacturing residues and manufacturing product samples for business discussions

We have upgraded our 1/10 scale test plant, with operation of the facility commencing in March 2023. This test plant is used to develop technologies to help maintain freshness and manufacturing residues. In collaboration with the Technology Research & Development Laboratory, we also install fermentation equipment and conduct technological development and verifications. The test plant is also used to produce plain samples for business discussions and serves as an important first step in bringing new products to a wider consumer base.

■ FLOX-AI, the soft drink industry's first AI-based rapid microbial testing system

Pre-shipment microbiological inspections for quality assurance typically require three to five days using conventional methods, and the final assessment is made through visual inspection—which is both time-consuming and labor-intensive. In order to address this hurdle, we have developed a technology that uses AI (deep learning image processing) to analyze fluorescent images of microorganisms and learn the differences in shape, color tone, and other characteristics and quantities between acceptable and unacceptable samples. This technology enables the inspection to be completed in around one day and to automatically detect the presence of microorganisms.



Asahi Group Foods, Ltd.

Food Ingredients Development Department

Development of food ingredients with unique values to support the wider market

We develop proprietary food ingredients and materials such as yeast materials, dairy ingredients and freeze-dried ingredients. To give some examples, yeast-related ingredients extracted and processed from yeast (e.g. yeast extract), professional-use creaming powder born from the expertise of the developer of the first infant formula in Japan, and powder premix drinks and powder foods developed with the ingredients and technologies mentioned earlier are some of the various food ingredients and materials that we have developed. We support product development in the wider market by tailoring each ingredient to the specific needs of our clients and by engaging in basic research.

Development of dairy ingredients, freeze-dried ingredients, and powdered foods

We are working to develop dairy ingredients for a range of commercial applications, such as addition of flavor to dairy products and improvement of texture and color. We are also developing food ingredients such as fruit, plum, and miso as well as easy-to-use processed freeze-dried products that can be used as ingredients in food or health supplements without sacrificing nutritional value or other properties. Other development areas include powdered beverages for cup-type vending machines and OEM products that utilize these ingredients and raw materials. We aim to constantly provide optimal products by focusing on and meeting the diverse needs of our customers.

Development of yeast extract seasoning and their applications

We develop, change the design, and support the sales of yeast extract seasonings and other products making use of the nutrients and umami components included in yeast. We also develop applications for such seasonings according to client needs. We are also stepping up efforts on interdisciplinary product development by combining our expertise in dairy ingredient and powdered food development as well.

Development of high value-added yeast-based ingredients

We are focusing our efforts on developing yeast-based ingredients with higher added value, for example by establishing screening and cultivation methods for novel yeasts, and by carrying out multifaceted research on yeast utilization such as methods for producing yeast extract and processing yeast cell walls. In addition, we work on joint developments with various organizations, both within the Asahi Group and beyond, to propose new values to the markets of the world.

Research

■ Development of yeast cultivation technology

In order to obtain yeast with new functions, we carry out screening among the vast yeast strain library held by Asahi Group and investigations to identify the optimum cultivation conditions for each strain. We have succeeded thus far in commercializing of yeast products, by screening for yeast strains containing large amounts of glutamic acid and establishing special culture techniques. We have also developed yeast products rich in glutathione and nucleic acid.

■ Expansion of applications for yeast-based materials and ingredients

There are various materials and ingredients made by processing yeast including yeast extract and yeast cell walls. We are also developing suitable applications to make the most of the features of each ingredient. Not to mention applications in food products, we propose wide-ranging applications for yeast-based materials to our clients, for instance, using yeast extract as a culture medium component, or using dried yeast and yeast cell walls in pet food and animal feed.

■ Technology development for expanding the applications of dairy ingredients for business use

We are also working to develop dairy ingredients that not only deliver distinctive dairy flavor, but are stable under a range of environments, including high temperatures, high salt content, and acidic conditions. We are striving to develop dairy ingredients and technologies that are suitable for a wide range of applications in terms of both flavor and function.

■ Development of ingredients and processing technologies for adding new flavor

As alternative protein sources such as plant-based meat are increasingly attracting attention worldwide, we are considering the use of yeast extracts as a seasoning to add meaty flavor. In addition, we are also developing new techniques to add flavor more effectively, such as those to process ingredients to add a smoke flavor.

Asahi Group Foods, Ltd.

Product Development Department I

For Achieving "deliciousness with added value"

We develop new products in a wide variety of categories, from tablet candies, candies, baked confectionery, chocolates, jelly products. We not only make prototypes in our laboratories but also conduct test production at a larger scale using actual-size factory equipment to identify and solve problems encountered during the transition from laboratory scale to commercial scale. Our goal is, above all, customer satisfaction. We are working, both independently and as a team, to realize additional value for the customer, quality improvement from an early stage of development, and an environment that encourages new challenges and proposals.

Product development

To achieve a flavor, texture, appearance, and functionality that will satisfy a wide range of generations, we are constantly searching for new ingredients of high quality and innovative added value while considering the cost effectiveness as well.

Achieving deliciousness

We try to maintain our sharp senses of taste and smell by regularly conducting sensory evaluation tests. Objective evaluation is also employed by quantifying food texture in numerical terms. We also have our staff try tasting products and foodstuff that are attracting attention to enrich the food experience of our R&D staff to develop delicious products.

Offering additional value

We strive to create products that are not only delicious but also offer added value and additional benefits, for instance, by developing baked confectionery made with lactic acid bacteria—a proprietary functional ingredient of the Asahi Group—and candy containing functional ingredients.

Research

■ *MINTIA*

In developing the *MINTIA* product line, we aimed to enhance the brand's essential value proposition of refreshment by focusing on all aspects of the product, including its taste and texture as a tablet confectionery, and to stimulate ongoing demand by delivering a product experience that contributes to health and wellbeing through refreshment.

We are also working to develop and launch environmentally-friendly products, including releasing the first *MINTIA* product to employ a thinner plastic container in 2023.

■ *Cream Genmai Bran*

Cream Genmai Bran is a nutrient-adjusted food in the form of a delicious cream sandwich cookie that makes it easy to consume natural ingredients such as fiber-rich wheat bran and healthy brown rice. We carefully selected the ingredients and production techniques with the aim of creating a great-tasting, light snack that features a variety of textures—from crispy to moist—and added benefits.

■ *Ippon Manzoku* Bar PROTEIN

Ippon Manzoku Bar PROTEIN is a convenient, great-tasting nutrition bar that provides a protein boost.

To deliver products of the highest quality that fully satisfy our customers, we start from the selection of raw materials and conduct exhaustive research, such as studying the combination of different types and properties of proteins, to fulfill the product concept, including not only the high quality standards demanded by customers but also the perfect texture and taste.

Asahi Group Foods, Ltd.

Product Development Department II

Development of freeze-dried food products that offer freshly made taste and inspiration

Since the development of Japan's first freeze-dried miso soup with the ingredients and miso freeze-dried together into a block, we have continued to recreate a variety of foods and meals under the Amano Foods brand, such as miso soup, rice porridge, dishes to top a bowl of rice, curry, and pasta, nyumen noodles, and side dishes,using the freeze-drying technology. Our aim is to offer savory meals ready to eat just by adding hot water by further advancing existing technologies and identifying the optimum freeze-drying conditions for individual products. We also work on developing food products.

Development of freeze-dried food products

We make prototypes of food products, including miso soup, other types of soup, and various dishes, using our small-scale testing facility until we can realize the flavor, appearance, texture, and rehydration capacity we wanted to achieve to ensure customers can experience the deliciousness of freshly made food in an instant. We identify the most delicious composition that will delight customers from countless combinations of ingredients and seasonings by repeating test production and evaluation until we are satisfied.

Competitive technology development and fundamental research

We strive to increase production efficiency by reviewing product processing methods and to enhance our competitive edge in the market by pursuing great taste. In addition, we study eco-friendly product design technologies through efforts such as exploring technologies that keep quality from degrading to reduce food waste and considering new ways to minimize plastic use.

Research

An evolution in freeze-dried food technology - developing a ready-to-eat stewed hamburger

Under the Amano Foods brand, in addition to offering miso soup, we strive daily to improve freeze-drying technology to offer customers not only great taste but also the added value of entertainment from the surprise and fun of rehydrating food, with products such as ready-made toppings for Katsudon (pork cutlets served on rice) and Ebi Tentojidon (shrimp tempura served on rice), both of which feature large deep-fried toppings.

In 2024, we released Freeze-dried Premium Stewed Hamburger Patty—something previously considered too difficult to produce. It is an astonishing product that allows consumers to enjoy a thick, authentic hamburger patty with demi-glace sauce by simply adding hot water. Throughout the product launch process, we explored the relevant technologies in depth and performed numerous trials and tests. Our efforts led to the establishment of three new patent-pending technologies: 1. a manufacturing method in which the hamburger patty is exposed from the seasoning liquid surface after freeze-drying, 2. a preprocessing method that gives the hamburger patty a tender texture after rehydration, and 3. a freeze-drying method that can rehydrate difficult-to-rehydrate, highly viscous, highly concentrated seasoning.

Today we spend each day taking on challenging work such as developing new products with the technologies we established and striving to evolve those technologies even further.

Going forward, we will continue to pursue both innovative manufacturing that inspires customers and the high quality demanded by our customers.

Asahi Group Foods, Ltd.

Product Development Department III

Developing products that meet daily health needs

We develop healthcare products in a wide range of formats including tablet and capsule supplements, powdered beverages, jellies, drinks, and skincare products. Products are designed to be easy to take or apply and safe over the long term so customers can continue using them. Although a variety of problems occur in development, we strive to develop products that contribute to the health of customers by leveraging technology to solve each problem.

Product development

We consider which dosage form and manufacturing method to use in line with the selling points of the product and create prototypes in the lab with a granulator, tablet press, or other equipment. Then we check whether the nutrients can be preserved within the best-by date in the prototype. We also examine manufacturing conditions and other factors at the plant and translate the results to actual production.

Function, flavor, and form

There are many problems that could occur with flavor when adding nutritional ingredients. Therefore, we use technology and techniques to mask the flavor in line with the product format. Tablets are designed to be easy to swallow as well. When developing products, we strive to balance function with how easy they are to take, thereby ensuring that products are easy to continue taking daily even when containing a high concentration of nutrients.

Offering additional value

We strive to create products that offer the added value and additional benefits you can expect from Asahi. For instance, we develop Foods with Functional Claims containing Asahi Group's proprietary functional ingredients such as lactic acid bacteria and milk-derived peptide.

Research

■ *Dear-Natura*

Dear-Natura is a multi-brand concept covering the entire health category that keeps customers and their families healthy. In product development, we select ingredients, optimize manufacturing when scaling up production, and confirm that quality will be maintained within the best-by date. Products are designed to be easy to swallow so customers can continue taking them, to help them improve quality of life and stay healthy every day. We also focus efforts on eco-friendly, sustainable activities such as reducing the use of plastics in bottled and pouch products, and actively engage in initiatives that pursue a sustainable future.

■ *Kotsukotsu Care*

Kotsukotsu Care is a mail-order supplement containing live *Bacillus subtilis* C-3102. *Bacillus subtilis* C-3102 is a proprietary bacterial strain with probiotic health benefits that was discovered through research conducted by *CALPIS*. As many customers who purchase mail-order food products take these supplements over a long time frame, we optimized the size and the number of tablets required per day in order to make it as easy as possible to continue taking this supplement on an ongoing basis.

■ *Slim up Slim*

Slim up Slim is a series of protein powder beverages that help customers keep in shape with a positive attitude by offering an effortless way to get nutrients and beauty ingredients. Realizing the importance of both keeping calories and sugar low and making it taste great so customers will enjoy drinking it, we focus efforts on developing the flavor through measures such as masking nutrients. We examine formulas in the lab and manufacturing conditions at the plant to ensure it dissolves easily so customers can take it daily.

Asahi Group Foods, Ltd.

Product Development Department IV

Ensuring food safety for infants and the elderly

Building on the technologies heritage of Wakodo brand, which made the first infant formula in Japan, we develop infant formulas, baby foods, toddler foods and food products designed for the elderly. Making prototypes and providing follow-up for commercial production are not our only tasks. We also focus our efforts on thoroughly ensuring food safety and quality through careful selection of ingredients and collecting the latest information from academic conferences and councils. We engage in product development with an attitude as if to make something for our family members so that even infants and elderly people can consume our products with confidence and peace of mind.

Development of formulas for infants and young children

We seek ways to differentiate our products by examining various ingredients and content levels that will contribute to infant growth, while keeping in compliance with the specifications and standards for infant formula as specified by Japan's Ministerial Ordinance on Milk and Milk products Concerning Compositional Standards, etc. We also actively collect information from literature and academic conferences to design our formula based on the latest nutritional science and to ensure that babies will be able to take in sufficient nutrition from the infant formula alone.

Development of baby foods

Ingredients are selected and chunk size and firmness are adjusted by month of age according to the immature masticatory and digestive functions of infants. We have set our own standards on the content of nutritional components which is more rigorous than other standards to ensure that we can provide safer and securer products. While adhering to such rigorous standards, we try to achieve good taste by bringing out the best of the natural flavors of the ingredients and using good broth.

Development of care-related foods

We develop products designed to enhance the intake of such nutrients as protein, dietary fiber, and energy, which tend to be deficient in the elderly and people whose ability to eat has diminished. We offer authentic meals that would take a lot of work to cook by oneself, with reduced salt content and fine-tuned firmness and viscosity to enable these people to eat with confidence and peace of mind so that they can enjoy the experience of having a hearty meal.

Research

■ Development of "*Goo Goo Kitchen with Plenty of Ingredients*" aimed at revitalizing the baby food market

In developing "*Goo Goo Kitchen with Plenty of Ingredients*," we selected a wide variety of ingredients, including protein ingredients which are difficult to provide with homemade baby meals. Additionally, in response to the needs of users, we were committed to increasing the volume of ingredients and completed a filling and satisfying food product. Further, this product is designed to enable easy nutrition intake by increasing the content of iron and calcium which tend to be deficient during the weaning period.

■ Improvement of infant formula "*Wakodo Lebens Haihai*"

The best nutrition source for babies is breast milk. "*Wakodo Lebens Haihai*" has been repeatedly improved to approach breast milk and with consideration for infants' digestion and absorption abilities so that babies will be able to take in just the right amount of nutrition without excess or deficiency. Beta-lactoglobulin is an indigestible protein included in bovine milk but not in human breast milk. This protein contained in *Haihai* has been pre-digested to reduce the digestion burden for babies.

■ Development of satisfying nursing-care food

We believe that boosting the motivation to eat is an important factor for preventing malnutrition in the elderly. Based on this idea, we developed nursing-care food focusing on not only the deliciousness but also on more satisfaction than conventional care food. While giving consideration to soft texture and ease of consumption appropriate as universal design food, we succeeded in preparing food products that are delicious, satisfying and visually appealing at the same time by including larger cuts, selecting colorful vegetables and bringing out the deep taste of respective ingredients by adjusting the proportion of extracts and broth used.

Asahi Group Foods, Ltd.

Technology Research & Development Department I

Developing technologies and ingredients to support customers' health

Our department conducts research and development of technologies and ingredients that support product development. By leveraging advanced technologies of component analysis and functional evaluation, we contribute to help our customers maintain and improve their health. In particular, we are supporting the development of Foods with Function Claims, which are attracting a high level of attention in the health market. We also contribute to the functional ingredients business by launching new commercial production of the Asahi Group's proprietary ingredients, improving the efficiency of the production flow, and developing new cost-effective manufacturing methods.

Development of evaluation technology and analytical technology in relation to functional components

We carry out functional and safety evaluation of ingredients using mainly human-derived cultured cells. When human efficacy testing is required, we conduct clinical trials based on the latest evaluation methods. We also develop the quantitative and qualitative methods of the Asahi Group's proprietary ingredients using advanced technology.

Development support for Foods with Function Claims

Foods with Function Claims requires scientific evidence to be submitted to the Consumer Affairs Agency. We provide comprehensive support for the development of Foods with Function Claims, including the selection of functional ingredients that meet customers' needs, overall evaluation of efficacy and safety, and compilation and submission of premarket notifications. We also provide academic support for marketing departments.

Development of manufacturing technologies for the Asahi Group's proprietary ingredients

We develop manufacturing technologies to start industrial production or to reduce manufacturing costs of our proprietary ingredients including milk-derived peptides (e.g. Lactotripeptide) and lactic acid bacteria (e.g. *L. acidophilus* L-92 and *L. gasseri* CP2305). We also conduct a wide range of operations, including quality evaluation of raw materials for overseas BtoB sales, transportation suitability testing, and academic support for local distributors.

Research

■ Achievement of the first health claim related to menstruation

Lactobacillus gasseri CP2305, one of the Asahi Group's proprietary lactic acid bacteria, has been shown in clinical trials to provide functional benefits related to menstruation in healthy women with regular menstrual cycles.

On the basis of this scientific evidence, we prepared a notification with information supporting the health benefit claim and submitted it to the Consumer Affairs Agency—the first feminine care product in the industry to make a health claim related to menstruation.

Its launch is attracting media attention as an initiative with the high social value of supporting women's social participation.

■ Evaluation of the emotional benefits of *MINTIA*

We strive to maximize the value of our products by assessing the emotional effects of ingesting our products. For example, we are conducting scientific studies to determine the emotional changes when ingesting *MINTIA* tablets, depending on the intensity of the coolness or the size of the tablets. Our research findings demonstrated that ingesting *MINTIA* tablets contributes to a shift toward positive emotions (presented at the 71st Annual Meeting of the Japanese Society for Food Science and Technology in 2024). Going forward, we will focus on the unique refreshing feeling that *MINTIA* delivers, in order to help developed products that will continue to be selected by our customers.

リフレッシュをチカラに。
MINTIA
【ミンティア】

■ Pursuing AmealPeptide manufacturing technology

In addition to long-standing sales in Japan, overseas BtoB sales of AmealPeptide, an Asahi Group's proprietary milk protein hydrolysate containing lactotripeptide, continue to increase year by year. To meet this growing global demand, we are working to develop manufacturing methods that increase production yields while maintaining the current quality. Through this technological development, we aim to contribute to further development of the functional ingredients business by not only improving yields but also lowering production costs and reducing environmental impact.

AmealPeptide®

Asahi Group Foods, Ltd.

Technology Research & Development Department II

Technological development and analysis supporting product safety

Technology Research & Development Department II conducts food safety analysis to ensure and assure the safety and reliability of raw materials and finished products. We support the baby food business by analyzing various risk factors, including through the measurement of residual agricultural chemicals, heavy metal minerals in food and the identification of foreign substances, and developing new analytical technologies.

Analyses for ensuring product safety

We ensure product safety by conducting analysis of residual agricultural chemicals in baby food products, microanalysis of heavy metal minerals and analysis of foreign substances or unusual odors detected in products and manufacturing processes.
We contribute to product safety and peace of mind by leveraging our inhouse strengths to respond swiftly and precisely to issues that would be difficult to address through external analysis.

Improvement of analysis technologies and their accuracy

We are constantly striving to introduce new analytical methods and refine our technologies. As our main product line of processed foods consists of a complex matrix, which requires highly sophisticated technologies to analyze hazardous factors and perform other types of analyses, we are working to improve our technologies and their precision through creativity and innovation.

Technological exchange with related departments

We hold exchange meetings on analytical technologies with the quality assurance departments of our company plants. We share information on foreign substance analysis and microbial testing, and work to improve our analytical technologies from the bottom up to raise the standard across our quality assurance departments. As one example, we are studying rapid microbial testing methods to save effort and time for testing at manufacturing plants.

Asahi Group Foods, Ltd.

Package Development Office

Development of future-oriented, safe packaging

The Package Development Office carries out a wide range of testing and assessments to ensure that the designs of containers and packages suit new products and retain quality. We design optimal containers and packages with the aim of creating new value, such as safety and usability when filling, shipping, and storing, in line with product features and the distribution environment. Recently, we have been designing environmentally friendly containers and packages to contribute to creating sustainable communities.

Developing and evaluating new product packaging

Containers and packages serve a variety of roles. For example, packages designed for long-term storage and durability against external force in shipping ensure that food remains safe and retains high quality, and containers designed to be easy to open and remove contents are easier for customers to use. We work daily to design appealing containers and packages and establish testing and evaluation methods so that food ends up in customers' hands in the best condition possible.

Improving existing products

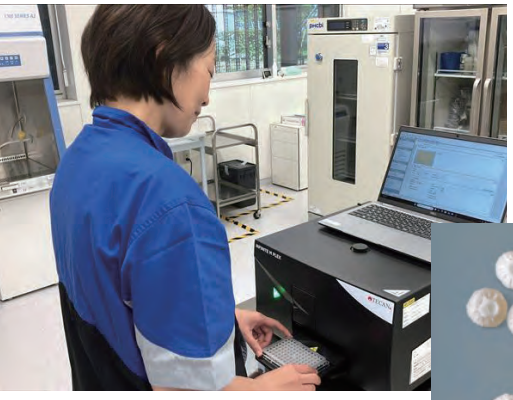
We work to solve problems discovered by customers and workers on the manufacturing floor, such as bags that tear or are difficult to open, or trouble at the plant. We strive to prevent recurrence, enhance quality, and improve customer satisfaction through a comprehensive process that includes investigating the root cause, formulating solutions, and proposing improvements.

Environmentally friendly initiatives

As an initiative to contribute to achieving SDGs, we have formulated a master plan and are developing containers and packages in collaboration with other departments to reduce use of single-use plastic in 2030 by a cumulative 25% sales intensity compared to 2019. We strive to develop sustainable containers and packages by balancing functionality, safety, and cost.

Asahi Biocycle Co., Ltd.

Research & Development Department



Bacillus subtilis C-3102 ▼

Contributing to the livestock industry through microbial research

We research and develop nature-based products to help farmers produce safe and high-quality meat and eggs. Numerous microorganisms reside in the digestive tract of humans and other animals. Inside our body, they form a microbiota whose balance has a large influence on our health. Asahi Biocycle Co., Ltd. engages in research to apply our microbial expertise accumulated over many years to supporting the healthy growth of livestock.
In addition, we manufacture and sell the agricultural materials derived from beer yeast cell walls and contribute to a stable agricultural production and turf management. We also provide technical supports to growers and sales channels.

Applying our technology to enable livestock production with minimal use of antibiotics

As demands for safe and reliable animal products increase around the world, the livestock industry needs to respond to calls for eliminating the use of antibiotics as growth promoters. Our research is making a great contribution to the healthy growth of livestock without depending on antibiotics and the efficient use of feed, which is receiving remarkable attention from livestock stakeholders worldwide.

Probiotic feed additive *CALSPORIN*

CALSPORIN is a probiotic containing *Bacillus subtilis* C-3102 for livestock animals including cattle, equine, swine, poultry, and quails. An appropriate daily intake will promote the increase of bifidobacteria and lactic acid bacteria in mammals and lactic acid bacteria in poultry, leading them to dominate the intestinal microbiota. Optimizing the intestinal microflora can be expected to promote livestock growth and improve the feed conversion ratio, leading to increased productivity.

FINELACT feed blended with lactic acid bacteria

FINELACT is a feed blended with lactic acid bacteria, which supports health of swine and poultry through the power of lactic acid bacteria and bifidobacteria. The week following birth is the most critical period for rearing healthy chicks. During this period it is of utmost importance that chicks develop healthy intestinal flora. Administering *FINELACT* (for chicks) to newborn chicks supports colonization of healthy intestinal flora with lactic acid bacteria as the dominant species.

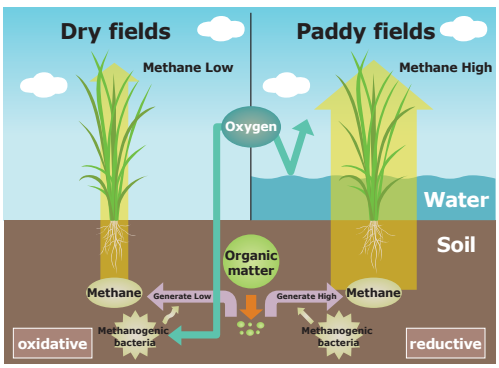
Research

Contributing to lowering greenhouse gas emissions and solving food challenges

The common method of cultivating rice using paddy fields is known to be a human-induced source of the greenhouse gas methane, posing a major societal challenge. In contrast, upland rice cultivation, in which rice is grown in dry fields (paddies are not flooded with water), can reduce methane production. However, the yields are not stable when rainfall is insufficient.

The Asahi Group's beer yeast materials stimulate plants to increase their activity, allowing them to grow healthily even in unfavorable environments. Some farms in Abashiri City, Hokkaido, which had not grown rice since the early Showa period as the low temperatures of the region made it unsuitable for rice cultivation, have successfully cultivated upland rice by utilizing our beer yeast materials . Following this pilot study, we are working to expand this technology across Japan in the anticipation that this will contribute to a reduction in methane emissions.

We also believe that this cultivation method will make it possible to cultivate rice in regions with little water, such as Africa, thus helping to solve global food shortages.



beer yeast materials ▶

Asahi Quality & Innovations, Ltd.

Core Technology Laboratories

Realizing a well-being society with the power of microorganisms and science

We are engaged in research and development at a wide range of stages from fundamental research to prototype development and production technology development, centering on the area of microorganisms including lactic acid bacteria, yeast, and intestinal microflora*, where the Asahi Group's core technologies lie. We are committed to developing and commercializing ingredients and services that are sure to be effective by leveraging cutting-edge science to contribute to promoting our customers' health and happiness and in turn realizing a well-being society.

*Aggregates of various intestinal bacteria

Creating new values through fermentation

Aiming at creating food products and drinks with unprecedented value, we are engaged in search for and breeding of yeast, lactic acid bacteria, and other beneficial microorganisms and development of fermentation technologies utilizing them.

Pursuing the value of flavor

To propose new food values, we pursue research and development on the contributions of food components to the overall flavor of a food product as well as the various effects that delicious foods and drinks have on us.

R&D of functional ingredients

Targeting a wide range of food-derived substances such as yeast and lactic acid bacteria, we explore new functional ingredients, research their functional mechanisms and effectiveness on humans, and propose the commercial utilization of these ingredients.

Commercialization of ingredients using beneficial microorganisms

To realize the commercial production of ingredients using beneficial microorganisms, we work on implementing high value-added ingredients, including through development of new processes for mass production and research on starters.

Research

World-first finding that a specific species of intestinal bacteria contributes to improved performance in endurance sports

The human intestinal tract is populated with a wide variety of intestinal bacteria, known as gut microbiota, totaling some 40 trillion organisms, and it has become clear in recent years that this microbiota has a significant impact on health and disease. The Asahi Group has long studied the positive health effects of gut microbiota and the foods that help gut microbiota. As part of this research, we demonstrated—in a world first—that *Bacteroides uniformis (B. uniformis)*, a species of human intestinal bacteria, contributes to exercise function and that ingesting the cyclic oligosaccharide α-cyclodextrin, which serves as a source of nutrition for this bacteria, can improve performance during endurance sports*.

We first studied the gut microbiota of 48 long-distance runners belonging to the track and field club (long-distance team) of Aoyama Gakuin University, our joint research partner. Our initial study found that their gut microbiota was rich in *B. uniformis* and that the runners with higher numbers of this bacteria had faster 3,000 m times than those with lower numbers. Next, ten ordinary male subjects were given supplements of α-cyclodextrin, a source of nutrients for *B. uniformis*, for eight weeks. The study found that not only did the number of *B. uniformis* bacteria in their gut microbiota increased, their 10 kilometer cycling time on an exercise bike improved by approximately 10%, and that their post-exercise fatigue was also lower. The mechanism behind this efficacy is believed to involve the acetic and propionic acids produced by *B. uniformis* in the intestinal system, and we hope these findings will have applications in the field of sports and athletic function in the future.

*_SCIENCE ADVANCES_ · 25 Jan 2023 · Vol 9, Issue 4 · DOI: 10.1126/sciadv.add2120

Asahi Quality & Innovations, Ltd.

Sustainable Technology Laboratories

R&D aimed at ensuring the sustainability of the environment and resources

To contribute to the sustainable future of the Asahi Group, we promote sustainability R&D. We work on four initiatives: development of technologies to reduce greenhouse gas emissions from plants and other impacts on the environment and create environmental value; sustainable securing of major ingredients such as barley and utilization of by-products; development of new applications of yeast resources; and research to promote responsible drinking.

Mitigation of environmental impact from business activities

We are developing technology capable of providing new value to realize a beverage business that produces less greenhouse gas emissions, uses environmentally friendly containers and drink serving equipment, and does not use disposable containers.

Securing of resources and development of upcycling technologies

Climate change is expected to affect major ingredients for Asahi. We develop technologies that achieve stable procurement of these ingredients and upcycling by-products generated in the manufacturing process.

Development of new applications of yeast resources and their commercial production

With the aim of contributing to a sustainable society through our business, we are engaged in research and development to expand new applications and utilization of yeast resources held by the Group and create new businesses.

Research on alcohol and health

To actively promote "responsible drinking," which is one of the Asahi Group's material issues, we work on research projects to prevent alcohol-related issues in collaboration with outside research institutes, etc.

Research

Recovery and effective use of CO_2 emitted from plants

The Asahi Group has set out "contribute to a sustainable society through our business" as one of the guiding principles of the Asahi Group Philosophy. The Group is working on developing various technologies to achieve the Asahi Carbon Zero, the Asahi Group's mid- to long-term goal of reducing greenhouse gas emissions from the Group to zero by 2040. In order to achieve the goal, we are working on technology to separate and recover CO_2 from gases emitted on a daily basis from boilers and other facilities at manufacturing plants. We installed testing equipment at the Asahi Group Research and Development Center in 2020, and are conducting demonstration tests. However, our challenge is not simply how to recover CO_2, but also how to utilize it. As one solution to this problem, we are conducting quality evaluations and developing a refining process in order to utilize the recovered CO_2 in the Group's beverages and other products. In another approach that goes a step further, we are also researching carbon recycling technology, which would enable recovered CO_2 to be used as a raw material to produce other substances. As one example, we are studying methods of producing methane from CO_2 through methanation technology. The resulting methane could be used as an energy source, and making effective use of this methane as fuel for boilers and fuel cells would contribute to the reduction of greenhouse gas emissions from plants.

The entire Asahi Group is working to actively utilize renewable energy at production bases across the world and promote energy conservation through such measures as revising manufacturing processes and improving logistics effciency.

Asahi Quality & Innovations, Ltd.

Analytical Science Laboratories

Creating the future with "ANALYSIS"

We are committed to developing cutting-edge analytical technologies with three core pillars: analytical science, life science, and computational science. Through a cross-disciplinary approach that goes beyond conventional boundaries, we contribute to the rapid and continuous research outcomes that will benefit customers and communities.

Unlocking new value and ensuring food safety through advanced analytical technologies

We create new value that enhances the competitiveness of the Asahi Group by leveraging data grounded in scientific evidence from cutting-edge analytical technologies. In addition, we are developing a food safety risk management system that enables swift responses to unforeseen contingencies.

Next-gen R&D accelerated with AI and DX

We leverage digital science technologies such as machine learning, statistical analysis, and simulations in research and development. By advancing digital transformation (DX) aligned with our R&D strategy, we aim to deliver outcomes that embody both efficiency and innovation.

Research

Developing and deploying techniques using MinION sequencers for the identification of beer spoilage bacteria in overseas breweries

In recent years, we are increasingly committed to assuring the quality of its products whether manufactured both in and outside of Japan. We have been engaged in technical collaboration with European beer brewers since 2018 and have supported the local engineers to enhance techniques to detect and identify beer spoilage bacteria.

As our latest project, we are developing a technique to analyze beer spoilage bacteria at the genetic level for more accurate identification of the bacterial species. We introduced a low-cost, palm-sized genetic sequencer named MinION that can be easily operated by on-site engineers. We have succeeded in significantly reducing the overall processing time by simplifying the process for extracting DNA from the bacteria, and additionally improving the process so that multiple samples can be analyzed at a time. Furthermore, we established a technique that can be applied to identify not only beer spoilage bacteria but a broad variety of bacterial species that may be present in the manufacturing environment posing potential risk to beer quality.

We conducted a verification test using this technique in a brewery in Rome. After the technique was optimized to the local circumstances, even inexperienced staff without any knowledge of molecular biology techniques can operate the technique by participating a short training program. Thanks to their efforts, we were able to obtain reliable results. The technique has been successfully implemented in the brewery. We are planning to further deploy the technique to other overseas breweries in the future.

Asahi Quality & Innovations, Ltd.

Brewing Science Laboratories

Expanding the possibilities of brewing technology to create new and innovative value in alcohol and non-alcohol beverages

Focusing primarily on alcohol and non-alcohol beverages, we aim to create flavors that surpass customer expectations and foster enjoyable lifestyles and culture through brewing. Our researchers, who specialize in diverse fields such as microorganisms, fermentation, flavor components, manufacturing processes, and customer insights, collaborate to explore new approaches that go beyond traditional brewing frameworks and deliver innovative value to our customers.

Analysis and formulation of flavor components

We analyze the components that contribute to aroma and taste, which are key constituents in both alcohol beverages and non-alcohol beverages, using chromatography as a core technology. The ingredients we identify are utilized in the development of prototypes through preparation and blending, and sensory evaluations are conducted by a panel of experts. We also conduct research to quickly verify whether a product concept has novel value for consumers.

Development of fermentation technologies

We conduct broad-ranging research on beer yeast as well as other yeast species. Through yeast breeding and genetic analysis, we are working to elucidate the scientific principles of microbial fermentation, as well as operating a 200L-scale pilot plant to achieve more stable fermentation and developing production processes that employ new brewing technologies.

Development of technologies that utilize microorganisms and enzymes

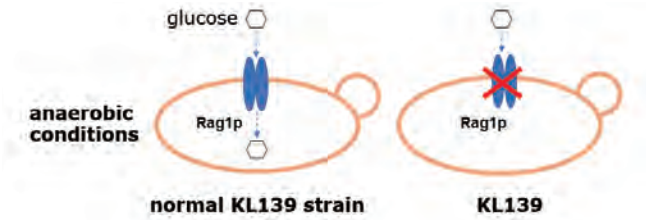
We conduct analysis and evaluation of substances contained in microorganisms themselves as well as their ability to metabolize substances via enzymes, studying a wide range of microbes with applications in food products, including yeasts and lactic acid bacteria. We aim to leverage these attributes to generate new value such as improved flavor, health benefits, and convenience. We are also working to develop manufacturing processes that utilize the functions of microorganisms and enzymes to their full potential.

Research

Producing non-alcohol beer with yeast that does not generate alcohol

In beer brewing, the role of yeast is to produce alcohol and aroma compounds as well as remove unpleasant odors from the wort through fermentation. By studying some 3,200 yeast strains, including those owned by the Asahi Group, we discovered a strain that does not produce alcohol while still eliminating all unpleasant wort-derived odors—*Kluyveromyces lactis* 139 (KL139).

Typical yeasts used in non-alcohol beer production do not utilize maltose, the main sugar in wort, but do utilize monosaccharides such as glucose and fructose to produce ethanol. As wort contains a certain level of monosaccharides, non-alcohol beers made with these yeasts contain trace amounts of alcohol, typically in the 0.4 to 0.8% range. In contrast, the KL139 yeast strain does not generate even this trace amount of alcohol, and is therefore capable of producing non-alcohol beer that has excellent aroma and flavor and an alcohol concentration of 0.0%.



The KL139 strain was the only yeast among the 11 *Kluyveromyces lactis* strains screened that did not produce trace amounts of alcohol. Using genomic analysis, we discovered a mutation in the *RAG1* gene of strain KL139 (encoding the Rag1p transporter, which is responsible for sugar uptake under anaerobic conditions), thus identifying the reason that the KL139 strain does not generate alcohol.

We are currently conducting further research to achieve the world's first implementation of a non-alcohol beer production method using a yeast strain that does not generate alcohol.

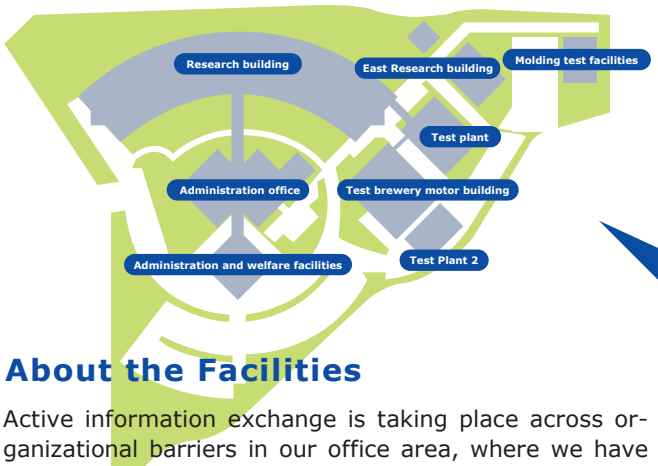
Our facilities

Asahi Group Research and Development Center (Moriya)

1-1-21 Midori, Moriya, Ibaraki
302-0106, Japan

Asahi Group Research and Development Center (Moriya) has a Group-wide operating model to create technology synergy and new value through R&D activities crossing organizational borders.

Area Map



About the Facilities

Active information exchange is taking place across organizational barriers in our office area, where we have introduced a free address system in our office area to allow workers to freely choose their seat and move around according to their mood or work. In addition, we offer Wi-Fi and a comprehensive search system covering a wide range of information from the world so that researchers can access necessary information anywhere and anytime. Combined with welfare facilities including the cafeteria and the refresh room, we provide a work environment to stimulate flexible thinking.
We are also committed to environmental conservation and have been certified for ISO 14001:2015 (environmental management systems).

Research building

Administration office

Administration and welfare facilities

Office

Laboratory

Library

Sengawa Laboratories

2-2 Wakaba-Cho, Chofu,
Tokyo 182-0003, Japan

Ebisu Laboratories

2-4-1 Ebisu-Minami. Shibuya,
Tokyo 150-0022, Japan

Kachidoki Laboratories

14F Inui-building-Kachidoki,
1-13-1 Kachidoki, Chuo, Tokyo
104-0054, Japan

◀ Website ◀ Pamphlet

Issue and Edit Asahi Quality & Innovations, Ltd. Department of Corporate Strategy
Production cooperation Bunkakobo, inc.

BNK-2512