

Since its foundation, Kumiai Group has grown by leveraging its strength in research and development to create new agricultural chemicals. In accordance with the corporate philosophy, “It is our aim to use creative science to contribute to a safe, secure, and prosperous society in harmony with our overriding theme of ‘Protecting and fostering life and nature,’” we are vigorously engaged in the creation of new technologies and compounds for agricultural chemicals and fine chemicals. We will provide high-value-added products and technologies that meet market needs and customer requirements by utilizing our integrated R&D system that covers every phase from the exploration of new compounds to process chemistry.

R&D Technology

Synthesis of New Compounds and Discovery Techniques

New compounds are the starting point for developing agricultural chemicals. These are synthesized using the know-how Kumiai has accumulated over many years. Using the results of physicochemical studies and information obtained from AI, we will create innovative new agricultural chemicals through exploration and optimization studies.

Biological Evaluation

We create highly effective, safe, and easy-to-use agricultural chemical products by applying high biological evaluation capabilities based on our accumulated data and know-how.

Using not only greenhouses at our research institutes, and our own testing sites including paddy fields and croplands but also other testing institutions in Japan and overseas, we conduct trials in different environments for evaluating new compounds and new formulations.

Formulation Technology

We create products that have high performance, are safe, and reasonably priced based on formulation technologies that make it possible for us to design safe agricultural chemical formulations while effectively extracting the performance of the active ingredients. We have established our unique formulations such as MAMETSUBU® and proprietary technologies such as the slow-release of active ingredients.

Assessment Studies on Safety and Environmental Impact, Elucidation of Mode of Action

Assessment of human and animal safety and environmental impact plays a crucial role in developing new agricultural chemicals that will be safe and secure far into the future. We

also scientifically elucidate the function and safety of new agricultural chemicals by clarifying their mode of action and metabolic mechanisms in living organisms.

Process Chemistry and Custom Synthesis Technology

Kumiai has advanced process chemistry technology enabling us to swiftly perform research into development of manufacturing processes for new compounds. In addition to development of manufacturing technologies at manufacturing scale according to the development phase and process chemistry, we also study the design of equipment and disposal treatments for achieving safe and low-cost manufacturing.

Number of proprietary active ingredients

20

(excluding microbial pesticides)

Probability of success in new agricultural chemical development

1/7,500

Investment in R&D (plan)

22.0 billion yen

(Total for FY2024–2026)

Research and Development

ShIP in Full-scale Operation Accelerates R&D

Director, Managing Executive Officer,
Head of Research & Development Division

OKAWA Tetsuo



Achieving Successful Chemical Discovery with a Probability of 1 in 7,500

In the development of agricultural chemicals, it is essential to ensure safety as well as effectiveness in protecting crops. Agricultural chemicals must have no adverse impact on humans or on the environment, including animals, plants, and soil, other than the pests and weeds they target. Therefore, at present, development of agricultural chemicals is subject to numerous risk assessments based on more than 70 study results, and it takes an enormous amount of time and money to satisfy all of them.

In these circumstances, the probability of successfully developing a new agricultural chemical from newly synthesized compounds for evaluation is said to be typically 1 in 160,000. However, we have succeeded in developing new agricultural chemicals at an extremely high probability of 1 in 7,500.

I believe there are five factors that enable Kumiai to achieve such a high probability of successful development: establishment of an efficient R&D system, market forecasts closely linked to the field, accumulated development know-how, vigorous investment in R&D, and excellent human capital.

In October 2023, the Chemistry Research Institute Shimizu Innovation Park (ShIP), which integrates three Chemical

Research Centers that previously had been scattered at separate locations in Shizuoka Prefecture, began operation in Shimizu-ku, Shizuoka City, where Kumiai was founded. As a result, a system is in place for further fusion of different fields and cooperation between organizations.

Setting a Theme Is Important in R&D

Setting a theme, the first step in R&D, is critically important. In order to set a theme, it is essential to identify the agricultural chemical market in each region, conduct surveys, and collect information, and at the same time, forecast with a time horizon of five to 10 years ahead and formulate hypotheses. To do so, Kumiai researchers visit agricultural fields in Japan and overseas to communicate with farmers and researchers, forecasting the market, and setting R&D themes.

Moreover, having established our own database more than 40 years ago, we have continually updated it while accumulating R&D know-how. This allows us to instantly access past data and link it to current research.

Kumiai has been vigorously investing in R&D since its foundation. The development of a new chemical is very costly, but Kumiai has consistently invested in R&D even when the Company was in difficult circumstances. The fact that we have produced many long-selling products is proof of the effectiveness of this approach.

ShIP to Support Agriculture 10 to 20 Years from Now

Kumiai's target for new chemical development is at least one new chemical every three years. To achieve this target, in view of the current situation where development takes longer and is more costly than ever before, we must steadily conduct R&D of agricultural chemicals that can contribute to agriculture in the world 10 to 20 years from now.

The two research institutes that will be our growth engines for agricultural chemical development are ShIP and the Life Science Research Institute. The nickname “ShIP” reflects the hope that by bringing together researchers from different fields in Shimizu, where Kumiai was founded, and strengthening collaboration, ShIP will be the hub for creating synergies and new innovations. The concept of ShIP consists of the following five points: (1) an environment for imagination and free thinking, (2) an environment for tireless improvement of technological capabilities and challenge, (3) shared innovation, (4) a safe, secure, and comfortable working environment, and (5) enhancement of the brand image. Equipped with spaces designed to promote interaction among researchers, cutting-edge experimental equipment and energy-saving equipment in the laboratories, and solar panels to supply part of the facility's electricity, ShIP is designed not only to improve the efficiency of experiments but also for sustainability and environmental friendliness.

Researchers with Flexible Thinking Engaged in Development

Above all, I believe that what enhances our R&D capabilities is the excellence of our employees involved in research and their willingness to continually take on new challenges.

At Kumiai, researchers specialized in chemical synthesis, biological evaluation, mode of action research, safety

evaluation, and other fields are gathered. A culture is cultivated that is conducive to free and vigorous discussion among researchers across organizational boundaries on a regular basis and where they work with a sharp focus on their themes.

The culture of proactively taking on challenges and making the most of experience even in the event of failure is also passed down through the generations. Trial and error leads to the accumulation of data and a change in thinking can lead to new successes.

Recently, chemical discovery utilizing AI has been progressing, but without the conceptual ability of our researchers, successful development would not be possible. When a competitor' non-selective herbicide, which was said to be all-purpose, was overwhelming dominant in the global market, a researcher of Kumiai had the idea that weed control in which herbicide is applied on the soil, rather than directly on the weeds that have emerged, which was the norm at that time, would attract increasing demand. Kumiai's core product, the field crop herbicide AXEEV® was born from this idea. At the start of R&D, a fresh concept to create value, starting from scratch, and the ability to think outside the box are required.

Contributing to a Sustainable Society

The circumstances in which agriculture is pursued are continually changing. Given this reality, Kumiai with a history of 75 years from its foundation is at a major turning point as the prospect of becoming a 100-year-old company comes into focus. In order to survive in this era of rapid change, we must further refine our R&D capabilities, which is one of Kumiai's strengths. We will continue to play an essential role in food production and embrace the challenge of contributing to the realization of a sustainable society. It is my earnest desire that our creative science will make the cherished dreams of people worldwide, which have yet to be fulfilled, a reality.