

Health,  
Safety, and the  
Environment  
1999



## From the President

Based on its corporate mission to "strive for the advancement of life science and technology and create new value to contribute to the health and happiness of people worldwide," Kyowa Hakko Kogyo Co., Ltd., carries out its business activities in a wide range of fields that include pharmaceuticals, chemicals, liquor, food, and biochemicals. In undertaking these business activities, Kyowa Hakko places top priority on preserving the environment, safety, and people's health (Responsible Care). As one of its Management Guidelines, Kyowa Hakko has formulated the Environment and Safety policy, "Work to protect the environment and maintain safety and also provide products with consideration of the environment and safety."

Since its establishment, Kyowa Hakko has carried out activities centered on the manufacture of fermented products that use such natural raw materials as molasses. In the course of these activities, Kyowa Hakko has been a front-runner in recycling process waste material into reusable resources and has contributed to the realization of a sound society that is in harmony with nature. This approach to preserving the environment is embodied in Kyowa Hakko's current "Zero Emission" thinking.

This report is intended to widely publicize Kyowa Hakko's health, safety, and environment-related activities that are carried out along with its regular business activities as well as to promote an understanding of Kyowa Hakko's thinking and approach to preserving health, safety, and the environment.

August 1, 1999



Dr. Tadashi Hirata, President

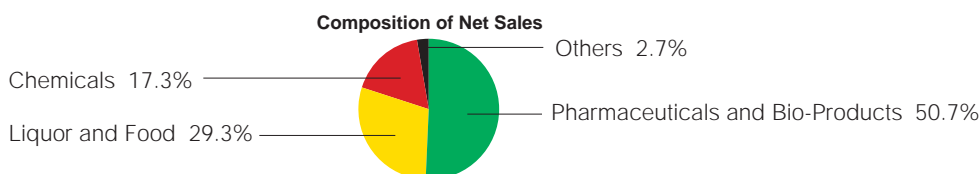
This report mainly covers activities carried out at Kyowa Hakko's eight domestic plants.

## Company Profile

**Net Sales:** ¥384,671 million  
(on a consolidated basis for the fiscal year ended March 31, 1999)

**Net Income:** ¥6,143 million

**Sales by Product Group:**



**Paid-in Capital:** ¥26,745 million

**Number of Employees:** 5,044

**Established:** July 1, 1949

**Domestic Offices:**

- Offices and branches: Tokyo, Osaka, Kyushu, Nagoya, Sapporo, Sendai, Hiroshima, Shikoku
- Plants: Tsuchiura, Fuji, Sakai, Hofu, Ube, Moji, (Kyowa Yuka) Yokkaichi, Chiba
- Research Laboratories: Tokyo Research Laboratories, Pharmaceutical Research Institute, Technical Research Laboratories, Toxicological Research Laboratories, Sakai Research Laboratories, Foods & Liquors Research Laboratories, Tsukuba Research Laboratories (Kyowa Yuka) Yokkaichi Research Laboratories
- Sales branches: 63 throughout Japan

**Overseas Offices:** 20 bases in 10 countries

- Plants: Biokyowa Inc. (U.S.A.), Fermentaciones Mexicanas, S.A. de C.V. (Fermex) (Mexico), Agroferm Hungarian-Japanese Fermentation Industry Ltd. (Agroferm) (Hungary)

# Declaration of the Basic Policies for Health, Safety, the Environment, and Product Safety

We declare that, in accordance with the “Basic Policies for Health, Safety, the Environment, and Product Safety,” we will carry out Responsible Care (RC\*) activities extensively to preserve health, safety, and the environment as well as step up quality assurance with our first consideration for safety of consumers in our daily business activities.

## \*RC definition

Responsible Care (RC) is a set of self-management principles according to which business operators engaged in the manufacture or handling of chemical substances make a commitment to follow stringent management guidelines. These guidelines are aimed at preserving the environment and ensuring safety at all stages of chemical substance life cycles, from development and manufacturing to distribution, use, final consumption, and disposal. RC also calls for the implementation of measures to make improvements in areas related to health, safety, and the environment based on the principle of individual responsibility.



## Basic Policies on Health, Safety, the Environment, and Product Safety

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Kyowa Hakko's policy formulated at its establishment is to “contribute to the health and well-being of people worldwide by creating new value with the pursuit of advancements of life science and technology.” Based on this policy, we will exert ourselves to realize an affluent society by conducting business activities with scientific consideration for health, safety, the environment, and product safety throughout the whole life cycle of our products, from research and development through production, marketing, use, and disposal, as well as by making efforts to ensure the quality and safety of our products, taking the safety of consumers as a matter of the greatest importance.

## Guidelines for Action

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As our first rule, we should strictly control ourselves with profound respect for all living things and with humility toward science, prove ourselves worthy of public confidence, and contribute to the growth of a healthy and affluent society. Therefore, we should advance our business activities under the following principles, with the protection of human beings and the environment, as well as the safety of consumers, as our first consideration.

- 1) Along with the establishment of the basic policies and control systems for health, safety, the environment, and product safety as our highest principles in the management of Kyowa Hakko, we strive to enhance our employees' consciousness of health, safety, the environment, and product safety by making these principles generally known to them and to advance our activities under these principles from a global standpoint.
- 2) We observe international regulations, as well as domestic laws, rules, regulations, and agreements relevant to health, safety, the environment, and product safety, in cooperation with relevant foreign and domestic agencies and organizations and make efforts to raise our level of control over these principles by observing our self-imposed control standards and utilizing auditing systems.
- 3) Together with our efforts to ensure the safety of our business activities and to reduce negative impact on the environment, we strive to ensure the quality of health, safety, the environment, and product safety throughout the whole life cycle of our products by engaging in overseeing the purchase of raw materials; the production, transportation, and sale of products; and the use and disposal of products by our consumers.
- 4) We carry out assessments of health, safety, the environment, and product safety prior to the development of new technologies and products, the transfer of technologies, and the start of novel businesses. These assessments enable us to ensure our products meet the highest standards with respect to such technologies throughout the whole life cycle of such products commencing in the planning stage.
- 5) We contribute to health, safety, the environment, and product safety on a global scale by working actively toward the development of “earth-friendly” technologies and products as well as toward the development of energy-conservation and resource-conservation technologies.
- 6) We concentrate our efforts on research and development to keep abreast of scientific progress, and we strive to strictly assure the usefulness and safety of our products.

(Introduced on January 29, 1996)

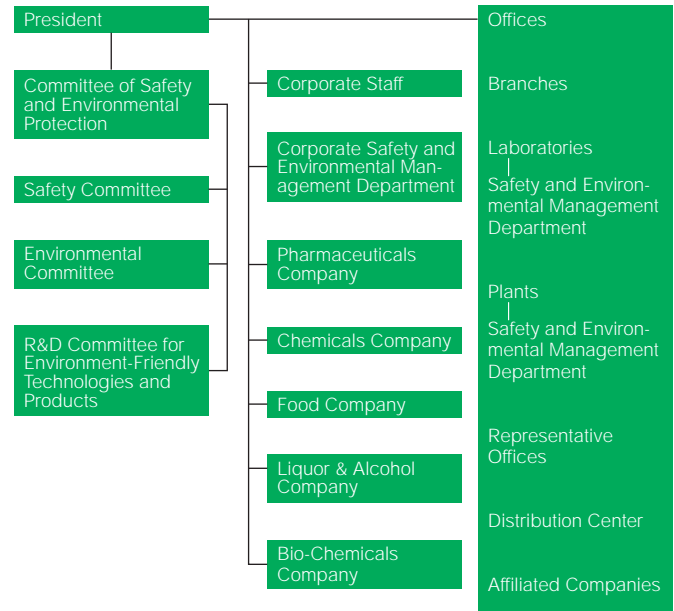
# Health, Safety, and Environmental Management Structure

Kyowa Hakko has established the Committee of Safety and Environmental Protection to formulate basic policies related to health, safety, and the environment.

Organizations operating under this structure include the Safety Committee and Environmental Committee—which ascertain the state of health, safety, and environmental management as well as issue improvement directives—and the R&D Committee for Environment-Friendly Technologies and Products, based at the R&D headquarters, which formulates development plans for technologies and products that protect the environment.

The Corporate Safety and Environmental Management Department at Kyowa Hakko's headquarters is the organization responsible for handling business affairs related to safety and the environment as well as for coordinating the Safety and Environmental Management departments at the various workplaces (plants and R&D facilities) of the Company.

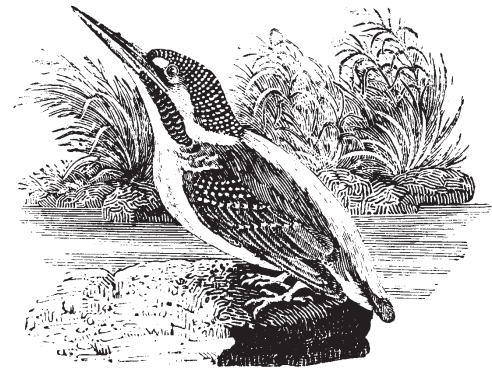
## Safety and Environmental Management Organization



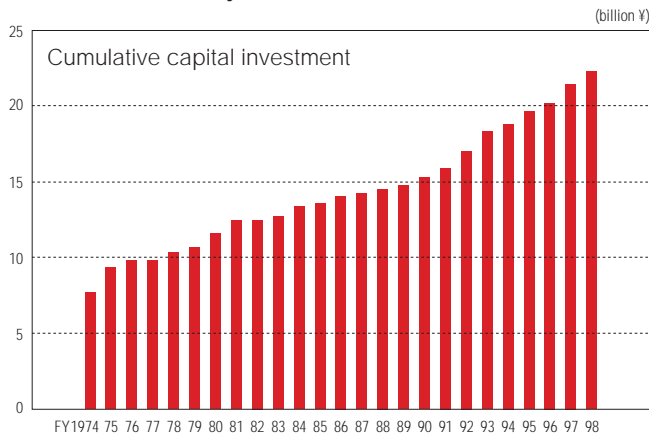
# Environment- and Safety-Related Investments

Kyowa Hakko's cumulative capital investment in environment- and safety-related facilities and the cumulative operating costs since fiscal 1974 are shown in the graphs below.

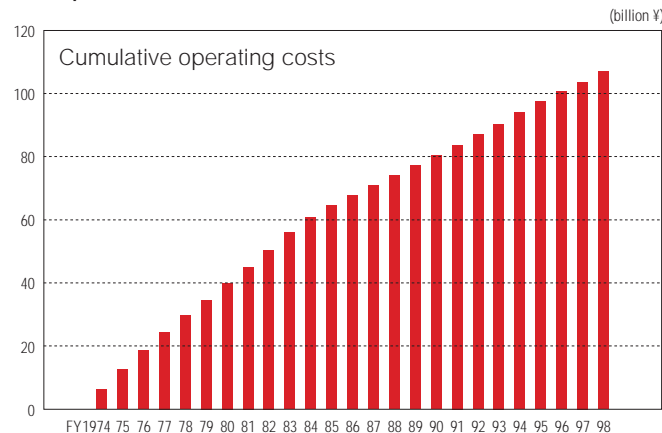
For the most recent 10-year period, Kyowa Hakko's operating costs for environmental facilities have averaged more than ¥3.0 billion annually. Most of these expenses have been for recycling process waste material, wastewater treatment, and the combustion of wastewater chemicals.



● Trends in Cumulative Capital Investment for Environment- and Safety-Related Facilities



● Trends in Cumulative Operating Costs for the Operation of Environmental Facilities



# An Outline of Environmental Protection Activities

To minimize the environmental impact of its business activities, Kyowa Hakko strictly adheres to environment-related laws and local regulations with government bodies and also formulates self-imposed management standards that—depending on the region—are even more stringent than the laws and regulations. In addition, Kyowa Hakko carries out environmental protection

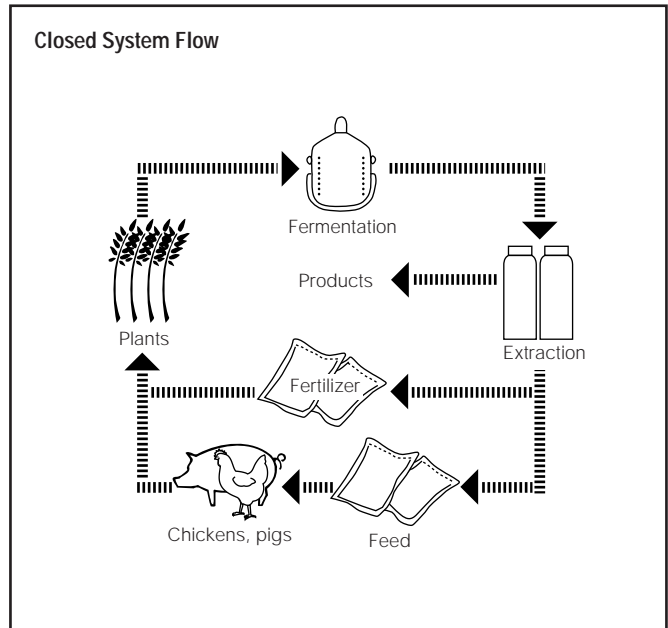
activities based on ISO 14001, the international standard for environmental management systems. In fiscal 1999, Kyowa Hakko's Hofu Plant received ISO 14001 certification, and all other plants are scheduled to obtain this certification in fiscal 2000.

## 1. REDUCING INDUSTRIAL WASTE (Approach to recycling)

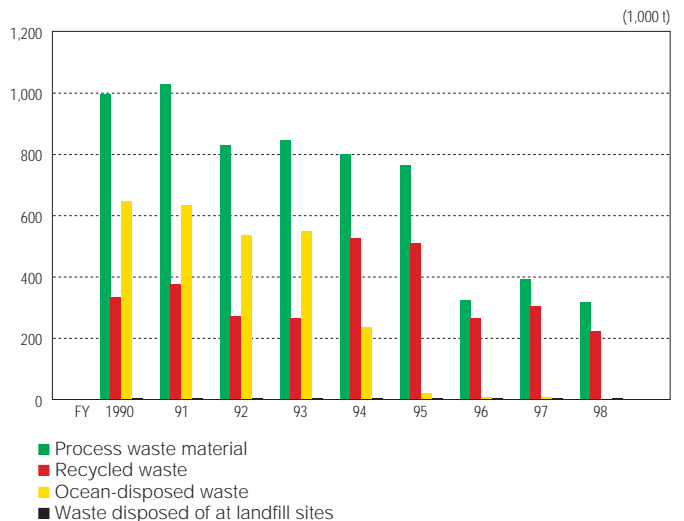
For many years, Kyowa Hakko has pursued the better use of process waste material. Technologies developed by Kyowa Hakko in the recycling of process waste material have become basic technologies in the fermentation industry. In 1977, Kyowa Hakko received the first Director General of the Environment Agency Award for implementing closed systems for process waste material and contributing to an improvement in water quality in bodies of water near its Hofu Plant.

Kyowa Hakko is also recycling *shochu* waste for use as a feed material and makes this technology available to other manufacturers of *shochu*.

From 1994 to 1997, Kyowa Hakko reduced the amount of waste it disposed of in the ocean—which had accounted for the largest proportion of its total industrial waste—and has reduced process waste material 70% of the 1990 level (as shown in the graph to the right) by improving various production processes, including exchange for cleaner raw materials and reusing this waste as a resource. (Total industrial waste is defined as the sum of ocean-disposed waste and the waste disposed of at landfill sites.) Due to these efforts, in summer 1997 Kyowa Hakko completely eliminated the ocean disposal of waste. To reduce the volume of industrial waste to zero, Kyowa Hakko is meeting various challenges as it works to recycle this waste into usable resources.



● Yearly Changes in the Volume of Industrial Waste



Evaporator of *Shochu* Waste at the Moji Plant

## 2. PREVENTING WATER CONTAMINATION

In 1998, chemical oxygen demand (COD) had been reduced approximately 60% from the 1990 level. To remove nitrogen and phosphorous contained in wastewater as well as improve COD, Kyowa Hakko has taken various steps to clean wastewater. These efforts include the establishment of wastewater treatment technologies.



Wastewater treatment facilities at the Hofu Plant

## 3. AIR-POLLUTION CONTROL

SO<sub>x</sub>, NO<sub>x</sub>, and smoke and soot emissions by Kyowa Hakko have been reduced to below levels set by laws and standards of regulations.

### Volume of SO<sub>x</sub> Emissions

As a countermeasure for reducing sulfur oxide (SO<sub>x</sub>) emissions, a cause of acid rain, Kyowa Hakko uses crude oil with low sulfur content and installs equipment to remove sulfur from exhaust gas.

### Volume of NO<sub>x</sub> Emissions

To reduce nitrogen oxide (NO<sub>x</sub>), Kyowa Hakko is checking boiler equipment.

When renovating boilers in the Chemicals Division (planned for 2000), denitration equipment will be installed with the aim of further reducing NO<sub>x</sub> emissions.

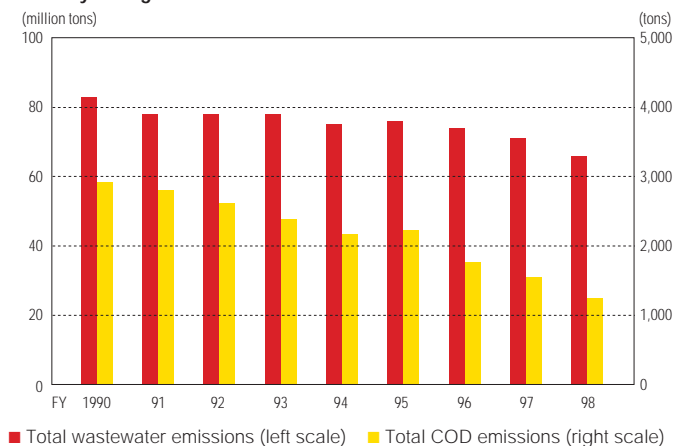
### Volume of Smoke and Soot Emissions

Kyowa Hakko is making concerted efforts to cut smoke and soot emissions, as well as installing ash collectors.

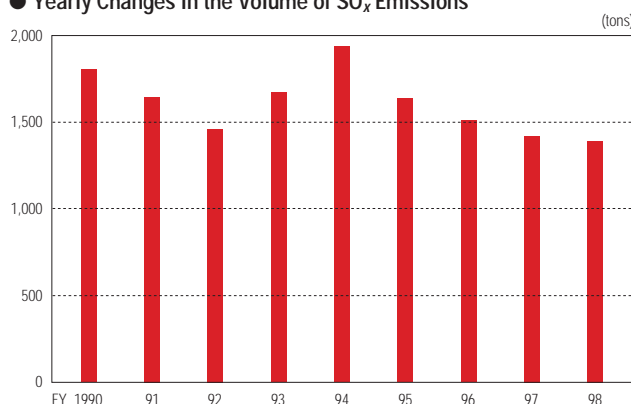
### Dioxin Emissions

Kyowa Hakko has checked the amounts of dioxin emissions in exhaust gas from all its incinerators that are subject to emission restrictions, and these incinerators complied with the emission standards that will be in effect from 2002.

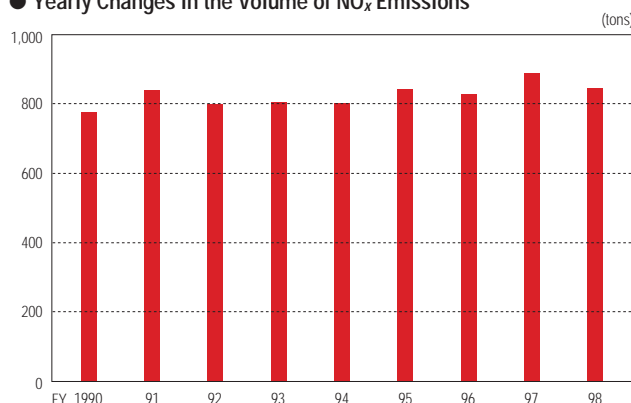
### Yearly Changes in the Total Volume of Wastewater and COD Emissions



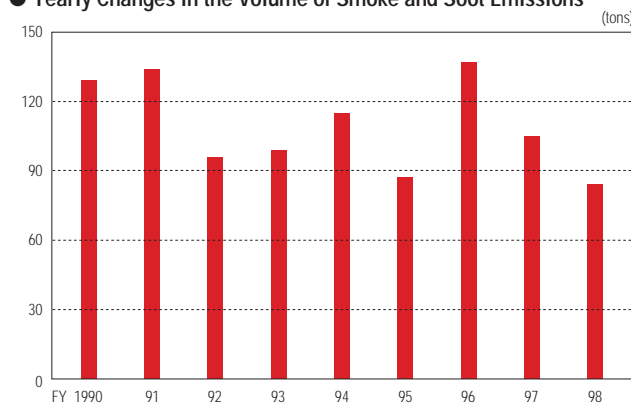
### Yearly Changes in the Volume of SO<sub>x</sub> Emissions



### Yearly Changes in the Volume of NO<sub>x</sub> Emissions



### Yearly Changes in the Volume of Smoke and Soot Emissions



### Use of Substances That Damage the Ozone Layer

Kyowa Hakko's use of CFCs is limited to coolants for air conditioners and freezing equipment. Therefore, the level of CFC usage by Kyowa Hakko does not have an adverse effect on the ozone layer. In the future, Kyowa Hakko will install environment-friendly cooling units when renovating facilities.

## 4. PREVENTING GLOBAL WARMING (Kyowa Hakko's approach to energy consumption)

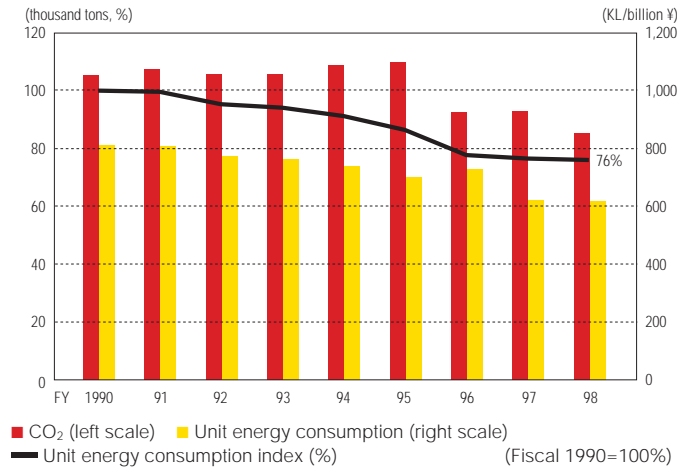
Kyowa Hakko is steadily proceeding to achieve a 20% reduction in unit energy consumption by 2010 compared with 1990 levels.

In addition, Kyowa Yuka, a subsidiary that manufactures chemical products, is vigorously implementing energy-conservation measures, which include introducing cogeneration facilities. Kyowa Yuka plans to take a forward-looking approach to cutting its energy consumption under the increasing volume of the production.

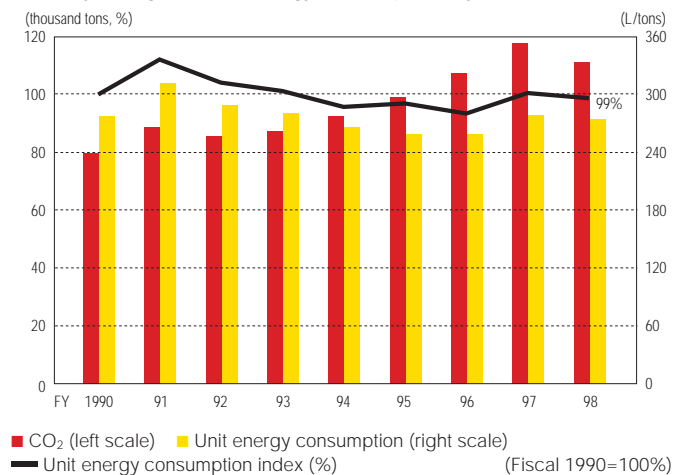


Cogeneration facilities at Kyowa Yuka's Chiba Plant

### ● Yearly Changes in Unit Energy Consumption (Kyowa Hakko)\*



### ● Yearly Changes in Unit Energy Consumption (Kyowa Yuka)\*



\* Energy consumption per unit of production is expressed on a crude-oil-conversion basis. It is not possible to make a uniform comparison of the amount of basic energy units used by Kyowa Hakko, which engages in the small-volume production of pharmaceuticals and other products, and Kyowa Yuka, which is involved in the production of petrochemical products. Therefore, the amounts of unit energy consumption by Kyowa Hakko and Kyowa Yuka are listed separately.

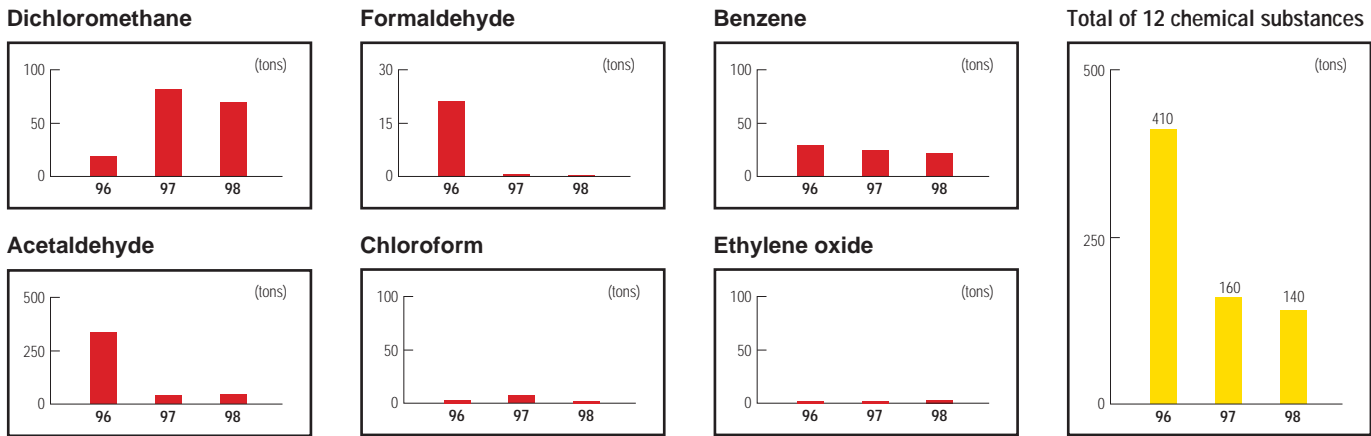


## 5. PRTR (Pollutant Release and Transfer Register)

PRTR is a system for surveying and registering the amounts of chemical products in the environment during all phases of the product life cycle—from development to manufacture, storage, usage, and disposal. In accordance with the guidelines set by the Japan Chemical Industry Association (JCIA), Kyowa Hakko is voluntarily implementing PRTR and reporting to the JCIA and the Japan Responsible Care Council (JRCC). Kyowa Hakko handles and releases six of the 12 air pollutants of which JCIA is placing a priority on reducing usage. Emissions of

these substances by Kyowa Hakko are shown in the graphs below. Kyowa Hakko has already significantly exceeded JCIA targets (achieving a 30% reduction from 1995 levels by fiscal 1999), and emissions of these substances are at low levels.

To reduce the volume of emissions of chemical products released into the environment, Kyowa Hakko is implementing measures to reduce emissions at their source as well as improve various processes and upgrade its wastewater treatment systems. As further measures, Kyowa Hakko is also installing organic solvent absorber equipment and combustion furnaces for wastewater and is working to strengthen its everyday monitoring of facilities.



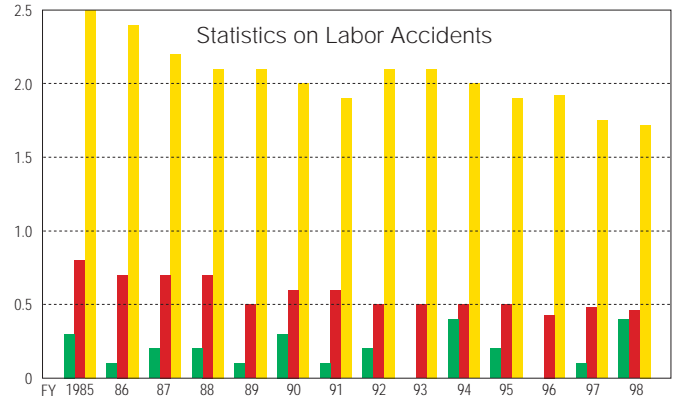
## Preservation of Safety and Health

Kyowa Hakko implements thorough safety policies and works to maintain health and safety using the safety technologies it has developed over many years that enable harmony between such top-down activities as safety assessments when starting new businesses and improving facilities and its safety monitoring evaluation system as well as such small-group activities as its zero accident activities, facilities improvement system, and danger detection activities.

As can be seen in the graph to the right, Kyowa Hakko has one of the best safety records in the industry, including the lowest accident rate in the chemicals industry. The Kyowa Hakko Group will work to further raise the level of its safety monitoring.

The table on page 7 shows awards received externally for safety and health-related activities over the most recent nine-year period.

● Yearly Changes in the Accident Rate



■ Kyowa Hakko ■ Japan Chemical Industry Association ■ All industry  
The accident rate is the number of deaths and injuries from disasters and accidents per one million labor hours.



## Principal Recently Received Safety and Health-Related Awards\*

Year	Name of Award	Plant receiving Award
1991	Japan Chemical Industry Association Safety Award	Fuji Plant
1991	Ministry of Labor, Labor Standards Bureau Award, 12 Million Hours Accident-Free Record	Yokkaichi Plant
1992	Minister of Labor Award (Hygiene)	Ube Plant
1992	Japan Chemical Industry Association Safety Award	Yokkaichi Plant
1993	Fire Defence Agency Commissioner's Award (Excellent facility in the handling of hazardous materials)	Hofu Plant
1993	Fire Defence Agency Commissioner's Award (Excellent facility in the handling of hazardous materials)	Yokkaichi Plant
1994	Ministry of Labor, Labor Standards Bureau Award, 15 Million Hours Accident-Free Record	Fuji Plant
1994	Minister of Labor Award (Hygiene)	Sakai Plant
1995	Minister of International Trade & Industry Award as an Excellent Manufacturing Facility for High-Pressure Gas	Ube Plant
1998	Minister of International Trade & Industry Award as an Excellent Manufacturing Facility for High-Pressure Gas	Yokkaichi Plant
1998	Minister of Labor Award (Safety)	Ube Plant
1998	Japan Chemical Industry Association Safety Award	Yokkaichi Plant
1999	Ministry of Labor, Labor Standards Bureau Award, 9.3 Million Hours Accident-Free Record	Ube Plant
1999	Fire Defence Agency Commissioner's Award (Excellent business facility for hazardous materials)	Ube Plant

\*Awards received externally for safety- and health-related activities over the most-recent nine-year period

## Safety Monitoring of Chemical Substances

### Disclosure of Safety Information

Kyowa Hakko prepares Material Safety Data Sheets (MSDS's) for chemical products and provides these to users.

Kyowa Hakko engages in the production of phthalic acid ester plasticizers. Based on the results of safety testing and the surveys of related information as well as the state of product usage, Kyowa Hakko understands that these plasticizers have no adverse impact on humans and ecosystems due to endocrine disruptors. Kyowa Hakko will continue working to maintain the safety of our products.

### Distribution Safety

Kyowa Hakko has established a 24-hour-a-day emergency contact system for maintaining distribution safety. We have also implemented the yellow card system (a chemicals safety information card in logistics) promoted by JCIA and are providing education to parties involved in the transportation of chemical products.

## R&D and the Evaluation of New Businesses

To preserve the environment and maintain safety while carrying out its business activities, Kyowa Hakko has formulated and implemented the SEA (Safety and Environmental Assessment) system for safety and environmental assessments when commencing new business activities and upgrading large production facilities.

### Bio-Assessments

Taking national policies into consideration, Kyowa Hakko is establishing even stricter monitoring standards for DNA recombinant technologies and is progressing with the development of safer production processes.

### Chemical Assessments

Kyowa Hakko is building an advanced assessment system that can evaluate uncontrolled reactions before they occur. For new chemical products, based on data for such categories as biodegradability and toxicity, Kyowa Hakko determines the appropriate treatment methods for waste materials and works to protect the environment.

### Product Safety

Kyowa Hakko has established a Companywide Product Quality Assurance System, using such research functions as its Toxicological Research Laboratories, and is strictly evaluating product safety.

# The Development of Technologies and Products That Preserve the Environment

Kyowa Hakko has set up an office for the R&D Committee for Environment-Friendly Technologies and Products within its R&D

Division and is working to develop technologies and products that contribute to the preservation of the environment.

## Principal Achievements

- 1970—Environment-friendly water-soluble polymer developed and commercialized
- 1974—Sales commenced for organic fertilizer produced from recycled fermentation wastewater
- 1993—Thermal plastic polyurethane landfill sheet for waste material landfill sites developed and commercialized
- 1993—Cleaner and lubricating oil materials as substitutes for CFCs and trichloroethanes, which are substances that damage the environment, developed and commercialized
- 1996—Phytase feed additives developed and commercialized as products to prevent environmental pollution caused by the livestock industry
- 1997—As a new manufacturing method for hydroxyproline, a type of amino acid, a technology that uses no collagen and causes little environmental pollution is commercialized.
- 1997 to 1998—Packaging for pharmaceuticals and foods simplified and made more compact
- 1998—Through joint research, *shochu* distillate is successfully converted into a feed and commercialized.
- 1999—The Japan Scientific Feeds Association presents Kyowa Hakko with the Technology Award in recognition of the Company's efforts, through its business activities in amino acids and enzymes for feed additives, to promote the development and wide usage of feeds that reduce the environmental burden.
- 1999—Kyowa Hakko converts to a simplified method for recycling PET bottles for *shochu* products.



An advertisement on a new environment-friendly technology



Landfill sheets (application example of thermal plastic polyurethane)



A simplified method for recycling PET bottles

## Carrying Out Overseas Business Activities

Kyowa Hakko is also adopting environmental protection technologies at its overseas production facilities for amino acids, including L-Lysine, that are based on its own closed system that it has completed in Japan. Kyowa Hakko aims to maintain safety and preserve the environment in the same manner as at its domestic production facilities.

In respect of its RC activities, Kyowa Hakko has established chemical substances monitoring standards in strict conformity to the ethical standards of the United Nations Environmental Plan and upholds these standards in its transaction activities.



**BIOKYOWA in the United States**



**FERMEX in Mexico**



**AGROFERM in Hungary**

## Communication with the Local Community

To the present, Kyowa Hakko has reported environment- and safety-related information to JCIA and JRCC. From the current fiscal year, however, Kyowa Hakko is publishing a *Health, Safety, and the Environment Report* annually and making efforts to

publicize various information, including environmental accounting. By aggressively participating in local activities and events, Kyowa Hakko is promoting a deeper understanding of its business activities.



**Bird sanctuary at the Ube Plant**



**Science summer school for children at the Ube Plant**

For further information, please contact:

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