○ Overview

Technology intended for verification /environmental technology developer	Miike colloid separater / Miike Co., Ltd.
Demonstration institution (Conducted by)	Hiroshima Prefecture (Hiroshima Prefectural Health and Environment Center, Hiroshima Environment & Health Association)
Period of the experiment for verification	October 6, 2004 ~ February 11, 2005
Purpose of this technology	Comprehensive treatment of wastewater discharged from food factories

1. Outline of the technology intended for verification

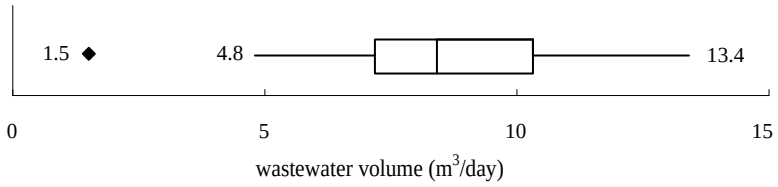
Wastewater from food factory
↓ Dropped, mixed/agitated
Underground pit
↓
Vibrating filter ⇨ Separation of solids
↓
Mixing & adjusting tank
↓
pH adjustment/addition of coagulant
↓
Pressurized floatation ⇨ Separation of fats/suspended solids
↓
Discharged

【Principle】
Wastewater is dropped into the underground pit to accelerate mixing/agitation and prevent clogging of the equipment. The solids are then separated by a vibrating filter, coagulant is added, and the dissolved-air floatation method is used to collect the suspended solids including the emulsified fats, thus improving the removal ratio.

[Features]
- Comprehensive treatment of wastewater discharged from food factories
- Pretreatment by a grease trap is no longer necessary.

2. Outline of the verification experiment

○ Outline of the location for performing the verification experiment

Project type	Food factory (prepared foods, etc.)
Project scale	Total floor area：About 330m^2 Quantity of products box lunch: 30,000 pack/month, prepared foods:150,000 pack/month
Address	92-2, Daimon, Daimoncho, Fukuyama-shi, Hiroshima (premises of Sun foods Co., Ltd.)
Wastewater volume during the verification test period	

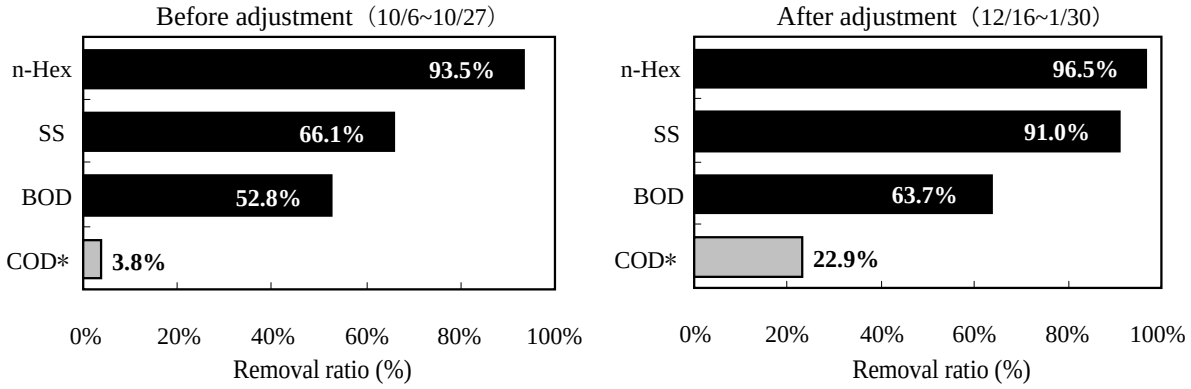
○ Specification and performance of the equipment used for verification

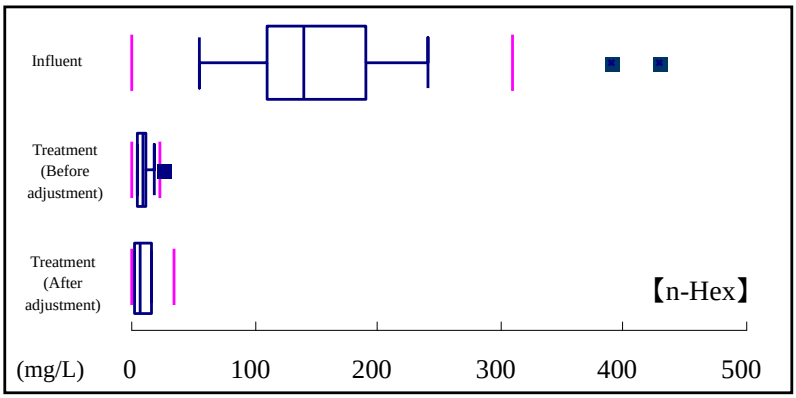
Category	Item	Specifications and water treatment capacity
Outline of the facility	Model	MICO-1500SE
	Size and weight	W 3500 mm × D 5000 mm × H 2300 mm 2800 kg
Design conditions	Object	BOD, SS, n-Hex
	Daily wastewater volume	maximum15m^3 / day
	Influent quantity (maximum volume)	n-Hex：550mg/L SS：6900mg/L BOD：7900mg/L
	Treated wastewater quality	n-Hex：30 mg/L SS：100mg/L BOD：600mg/L（Daily average） pH：5.8~8.6 COD：300mg/L（Daily average）

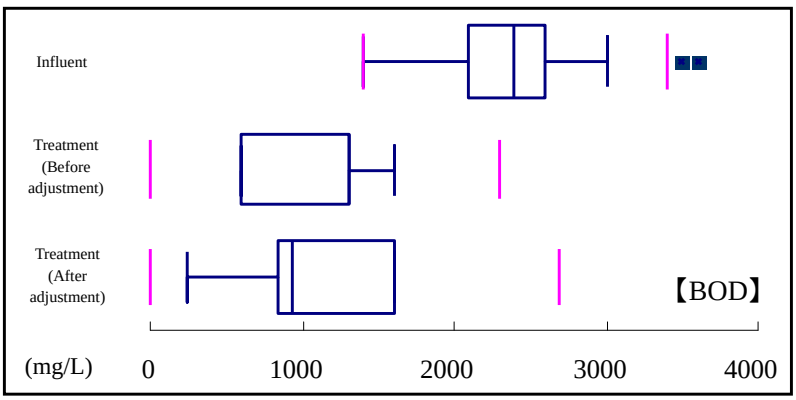
3. Results of the verification experiment

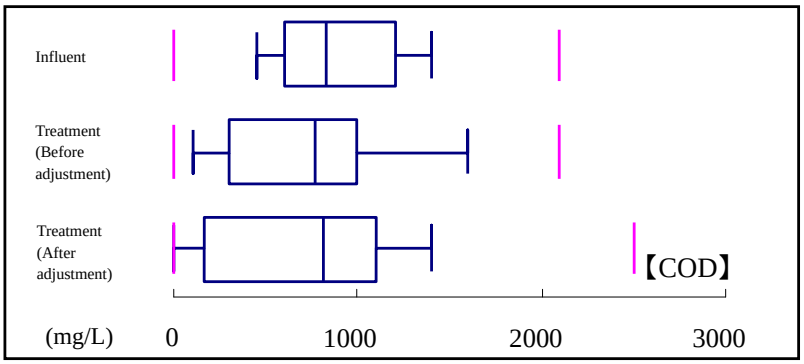
○ Water quality verification experiment

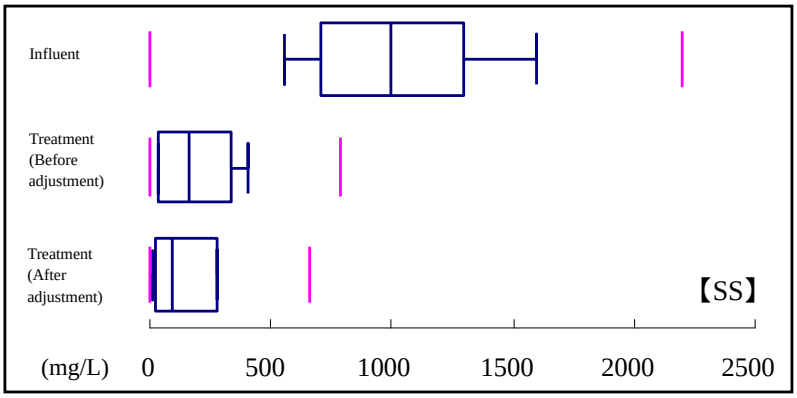
Item	Unit	Results of the verification experiment（Daily average）（lower adjacent value – upper adjacent value, central value）		
		Influent	Treated wastewater (Before adjustment)	Treated wastewater（After adjustment）
n-Hex	mg/L	55~240 , 140	4.4~18 , 8.6	1.4~15 , 6.5
SS	mg/L	550~1600 , 1000	38~410, 160	16~280 , 98
BOD	mg/L	1400~3000 , 2400	590~1600 , 1300	240~1600 , 930
pH*	－	3.8~5.7 , 4.7	5.1~6.5 , 5.6	5.9~6.8 , 6.5
COD*	mg/L	450~1400 , 830	110~1600 , 770	6.0~1400 , 810

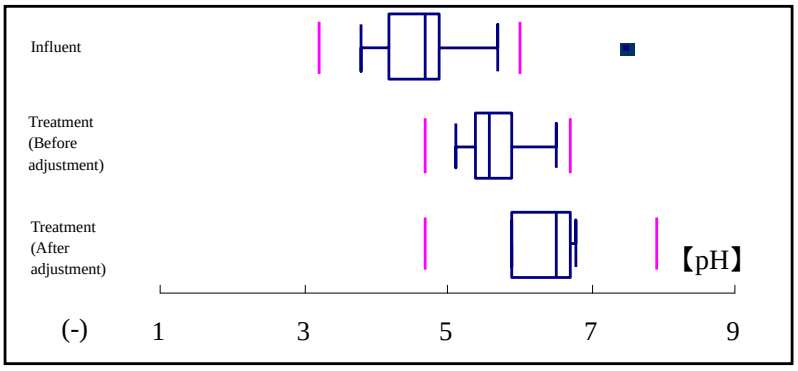












Note1: The removal ratio was calculated as follows: (summation of pollution load in influent on each measurement date – summation of pollution load in treated wastewater on each measurement date) / summation of pollution load in influent on each measurement date

Note2: The treatment system is not designed to remove or improve the asterisked items.

Note3: Number of influent data = 16, number of treated wastewater (before adjustment) data = 8, and number of treated wastewater (after adjustment) data = 8

Note4: The adjustment details are as follows:

・The sludge was collected, and the adjustment mechanism was inspected for maintenance.

・The equipment settings were adjusted.

○ Environmental impact item

Item	Verification result
Amount of sludge	3.4 kg/day (dry), 69.8 kg / day (Water content 95.1%)
Amount of wastes	Screenings 1.0 kg / day
Noise	Observation during the verification test period: The noise level was about that in a train or subway car. Measurement result(October 24, 2004): 70 dB
Odor	Observation during the verification test period: A slight smell was emitted, and occasionally an obvious smell was discharged. Measurement result(October 24, 2004):Odor index under10

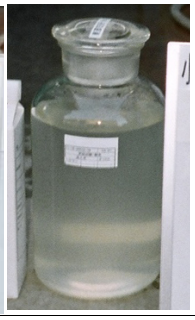
○ Used resources index

Item	Verification result
Amount of electric energy used	25.2 kWh/day
Amount of chemical used for waste water treatment	Sodium hydroxide (product name “caustic soda” (25%)) 6.6 L/day Polyaluminum chloride (product name “PAC” (10%)) 9.2 L/day Acrylamide series high-polymer coagulant (product name “Sanpoly 305”) 1.6 g/day

○ Operation and maintenance performance item

Maintenance item	Maintenance time per operation and maintenance frequency	Number of people and skill required for maintenance
Daily management and maintenance	Average 70 minutes(every day) [40~125 minutes]	No special knowledge or skill is required. Only one person is required to perform daily inspection and remove the sludge. However, the cleaning should be performed by two persons for safety reasons.

○ Qualitative remark

Item	Remark
Remark on water quality	  Influent (Picture Left) ・Visibility: 2 degrees ・Light brown to grayish black color ・Somewhat strong smell of kitchen waste Treated wastewater【 After adjustment 】 (Picture Light) ・Visibility: about 25 degrees ・Light yellow green to colorless ・Slight smell of kitchen waste
Operations required for initiation	Since the existing operating system was used, no verification was performed for these two items.
Operations required for shutdown	
Reliability of the equipment intended for verification	The system operated stably for the latter part of the verification test period.
How to solve the problems	Refer to the operation manual to solve most errors. However, specialized knowledge is required to fix equipment failures and to adjust the operating conditions.
Evaluation of the instruction manual of operation and maintenance	The specific operation and inspection methods are described, along with photographs, and users can easily check the optimal settings for respective installation locations. However, since the manual contains much information, it is necessary to distinguish the information necessary for users from the specialized information.
Others	—

(Reference information)

The information shown on this page is provided by the applicant for verification at its responsibility for publication of the technical data and not the subject of the verification experiment. The Ministry of the Environment and the organization conducting the verification experiment are not responsible for the information on this page.

○ Product date

Items		Column to be filled in by the environmental technology developer			
Name / type		Miike colloid separater / MICO－1500SE			
Manufacturer (distributor)		Miike Co., Ltd			
Contact address	TEL/FAX	TEL(084)963−5500 / FAX(084)963−5508			
	E-mail	gijyutu@miike.co.jp			
Size and weight		W 3,500mm × D 5,000 mm × H 2,300 mm 2,800kg Body : W 2,500 mm × D 1,100 mm × H 2,300 mm 1800kg Pressurized floatation tank: W 2,500 mm × D 1,300 mm × H 1,600 mm 800kg Mixing & adjusting tank : W 4,000 mm × D 1,000 mm × H 1,000 mm 200kg			
Necessity for pre-treatment and post-treatment		None			
Supplementary facility		Structure for collecting and removing the screenings and sludge			
Life of the equipment		8 years for accessories such as pumps			
Time for initiation		10 days			
Approximate cost (yen)		Expense item	Unit price	Quantity	Total
		Initial cost			15,000,000 yen
		Cost of equipment (including auxiliary equipment)	11,500,000yen	1 set	11,500,000 yen
		Installation/adjustment cost	1,500,000 yen	1 set	1,500,000 yen
		Civil engineering and electrical work	2,000,000 yen	1 set	2,000,000 yen
		Running cost (monthly)			97,663 yen
		Sludge disposal cost	13,000 yen /t	2,100kg	27,000 yen
		Waste disposal cost	12,000 yen /t	30kg	630 yen
		Power rate	23 yen /kWh	771kWh	17,733 yen
		Tap water consumption	-----	-----	-----
		Cost for wastewater treatment chemicals	50,000 yen	1 set	50,000 yen
		Cost for other expendables (sacks for collecting sludge)	10 yen	200 sack	2,000 yen
		Operation and maintenance cost	-----	35 h	-----
		Cost per 1 m^3 of treated wastewater (assuming that 300 m^3 of wastewater is treated a month)			326 yen

※Calculation of running cost

・The unit cost for disposal of sludge is quoted from the Report on Project for Constructing Wide-area System for Circulating Resources (Organic Sludge, etc.) (Hiroshima Local Government, March 2004).

・The unit cost for disposal of wastes is quoted from the Fukuyama City Newsletter (April 2004).

・Operation and maintenance must be performed by users of this system based on the manufacturer's operation and maintenance manual.

○ Other information from the manufacturer

Features

- The system removes the fats, fine suspended solids and colloidal substances contained in the wastewater discharged from food manufacturers.
- The equipment is easy to operate because operation is controlled automatically.
- Inspection and maintenance can be performed easily thanks to the structure for collecting and removing the screenings and sludge.
- Based on the verification test results, the manufacturer is constantly improving the stability and ease of using the technology and establishing new technologies for dealing with various volumes of wastewater.