Advanced wastewater treatment system for high BOD wastewater

Enzyme activated method

CM System・CMS System

Catalysis + Microorganism + Support

CMS Systm: Japan Patent No. 595023

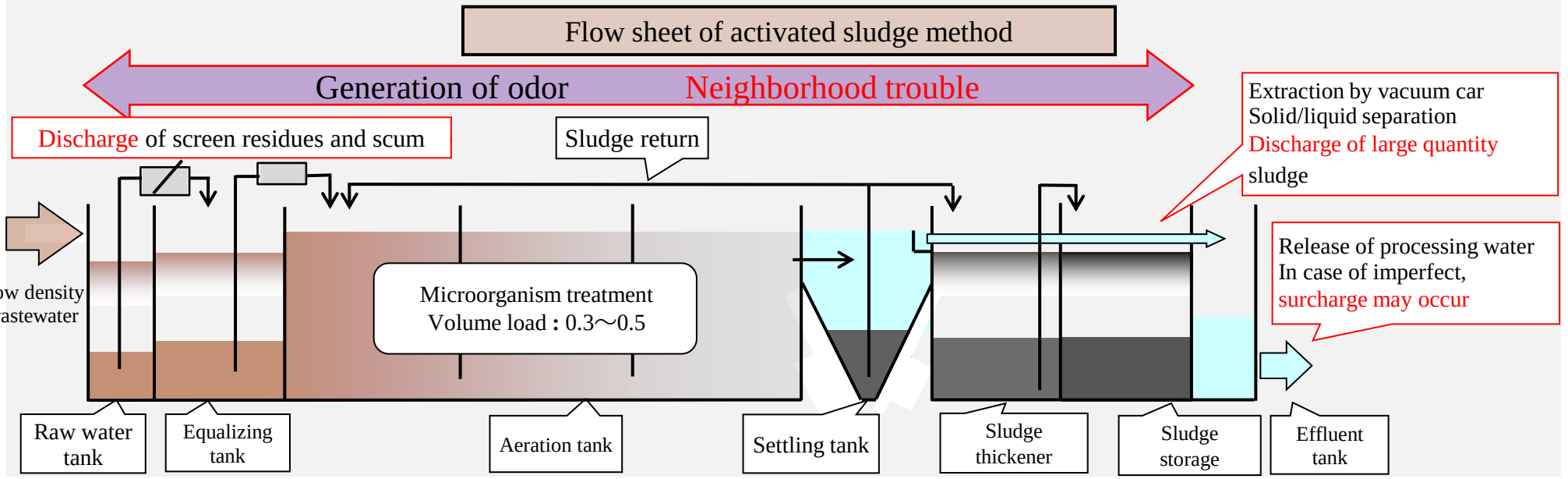
Technology description

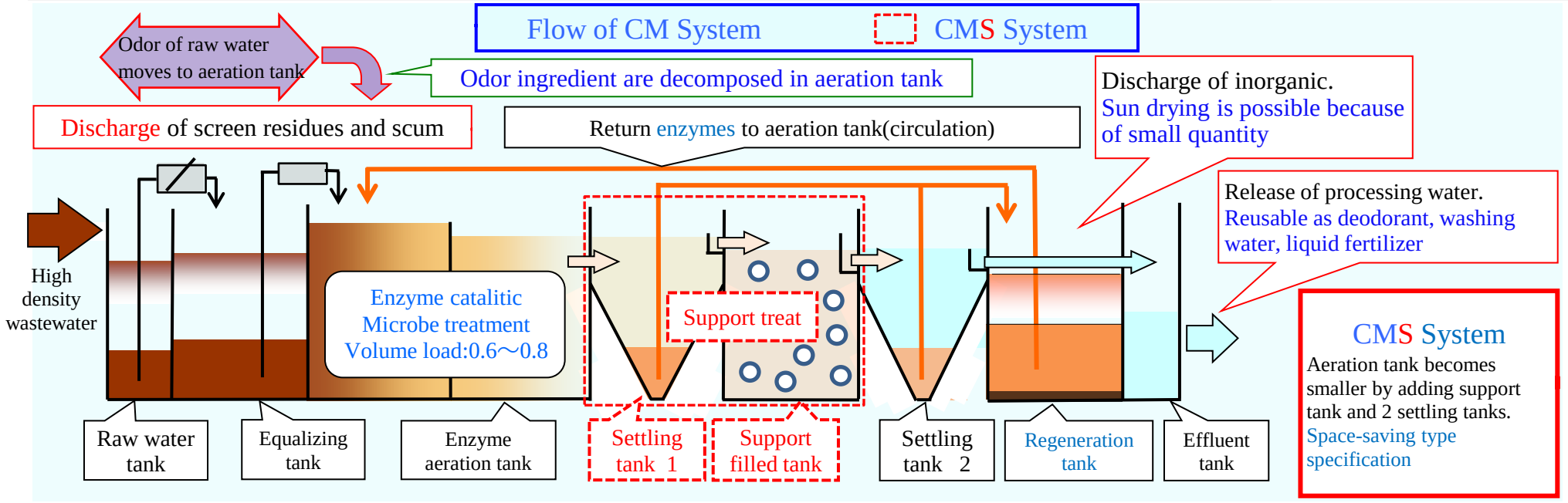
Overseas Sales Dep

Sales agency : Tomoe Engineering Co., Ltd.
Osaki Bright Core, 5-15 Kitashinagawa 5-chome,
Shinagawa-ku, Tokyo 141-0001, Japan
Tel：＋81 3 3442 5157　Fax：＋81 3 3442 5179
URL **http://www.tomo-e.co.jp**
E-mail **overseas@tomo-e.co.jp**

Manufacturer : Jfils Ltd.
5-12-30, Nakai Kokurakita-ku Kitakyushu-city,
Fukuoka Prefecture 803-0836, Japan
URL **http://www.jfils.jp**

Difference between conventional activated sludge method and enzyme activated method
1. Hardware side





Difference between conventional activated sludge method and enzyme activated method
2. Software side

Conventional activated sludge method

Low density organic wastewater
pH:5.8~8.7
BOD:1,000㎎/L
n-Hex:100㎎/L

Odor of raw water and sludge.
Odor generated from whole facilities.
Complaint from neighborhood

Raw water

Malodor

Microorganismprocessing.

As process is weak in environmental change, microbial control is inevitable.

Treated water

Organic sludge

Treated water is discharged into river or sewer.
In case of imperfect, surcharge may occur

About 80% of excess sludge is corpes of microbe.
Disposal cost of excess sludge increases

Enzyme activated method CM・CMS System

High density organic wastewater
pH：4.7～10.5
BOD：100.000㎎/L
n-Hex:700㎎/L

Smell of sludge is deodorization by chemical reaction.
Avoidances from neighborhood complaint

As microbe lives in raw water, no extra addition is necessary

Chemical treatment is strong In Environmental

Raw water

Odor

CM materials put in at first

Circulation

Catalytic change (chemical reaction)
Neutralization phenomenan
Autolysis of microbe corpes
Sludge volume reduction

Enzyme environment
Multiplied microbe
Reduction of microbe management

Treated water

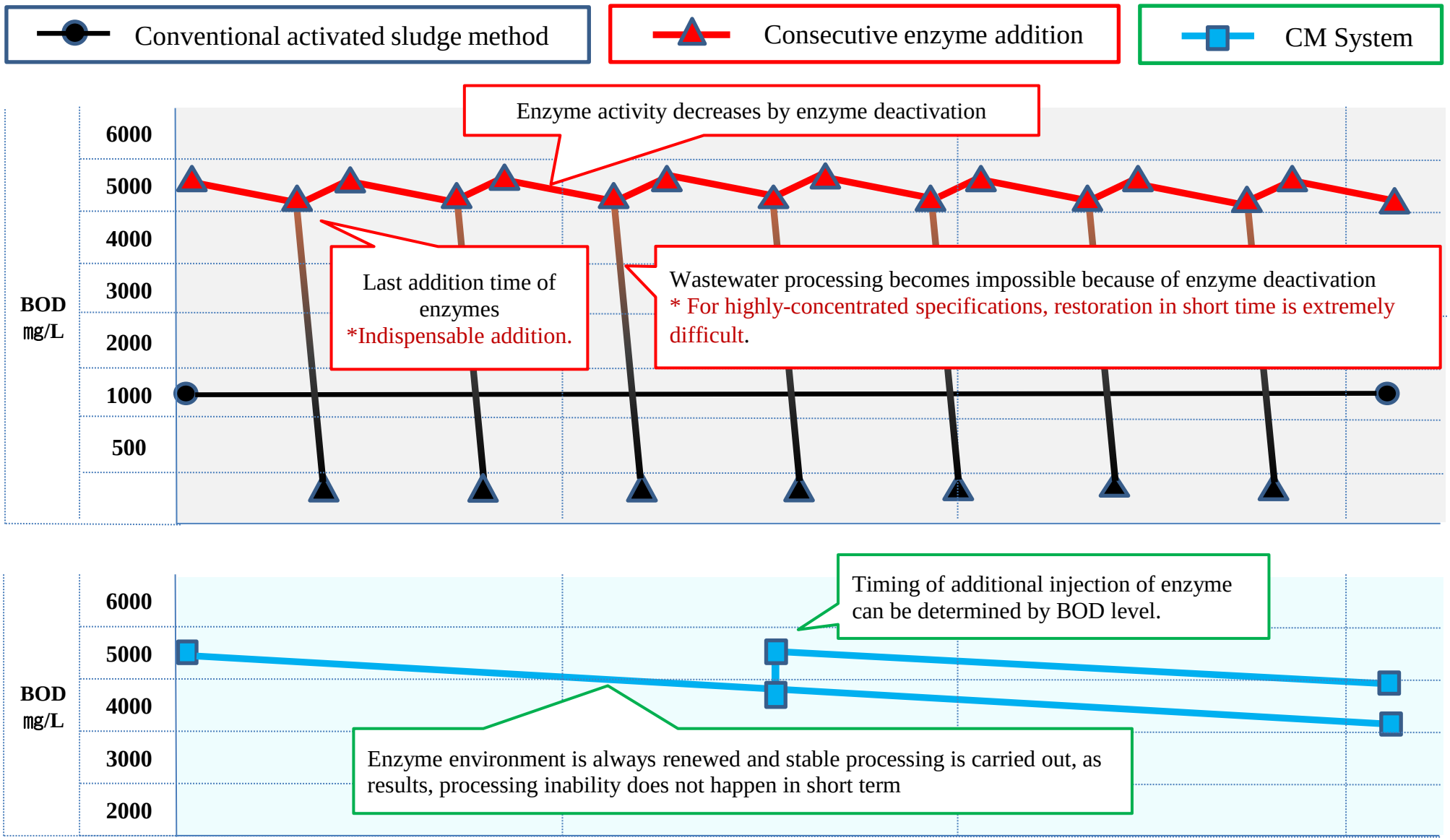
Circulation system realizes long-term stabilization

Inorganic sludge

Treated water is discharged into river or sewer.
Processing water containing enzyme is used for deodorant, washing water, liquid fertilizer

Discharge density is more than MLSS 15,000.
Discharge of excess sludge is around 10~30% of conventional process.

Difference between consecutive enzyme addition method and CM System.



Difference between latest activated sludge method and enzyme activated method

3. Initial and running cost

Raw water: Organic wastewater			Latest activated sluge method	CM・CMS System	
Processing capacity	BOD ㎎/L		Max.4,000～7,000	100,000 (there is no upper limit theoretically)	
	pH		5.8～8.7	4.7～10.5 (in case short time 4~11)	
	n-Hex ㎎/L		100	Even 700 becomes less than 1 (actual performance)	
Disposal expense of excess sludge			assume 100%	Less than 10～30%	
Initial	Middle density	**No-pretreatment** BOD：7,000 pH：7 n-Hex:100	assume 100%	110～120%	Reference level
Running			assume 100%	Amlount of excess sluge：10～30% Total：70～80%	Reference level
Initial	High density	**No-pretreatment** BOD：9,000 pH：4.7 n-Hex:500	Unfeasible	90～100% of activated method	Reference level
Running				Amount of excess sludge：10～30% Total：30～50%	Reference level

Practical example : Comparison of annual running cost. Object: Food-processing factory drainage

Unit: thousand yen

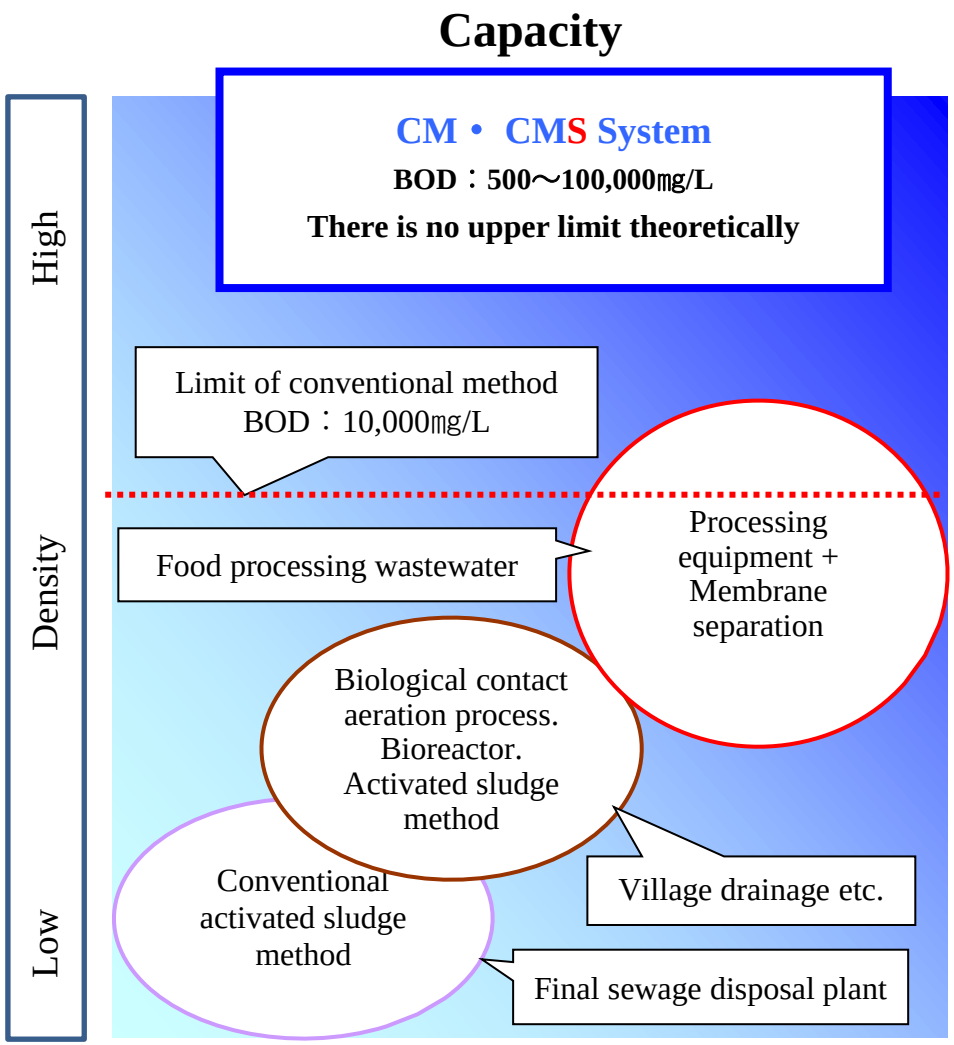
Specification： Flow rate:50ton/day, BOD=4,500, COD=3,000, n-Hex-700, pH=4.7

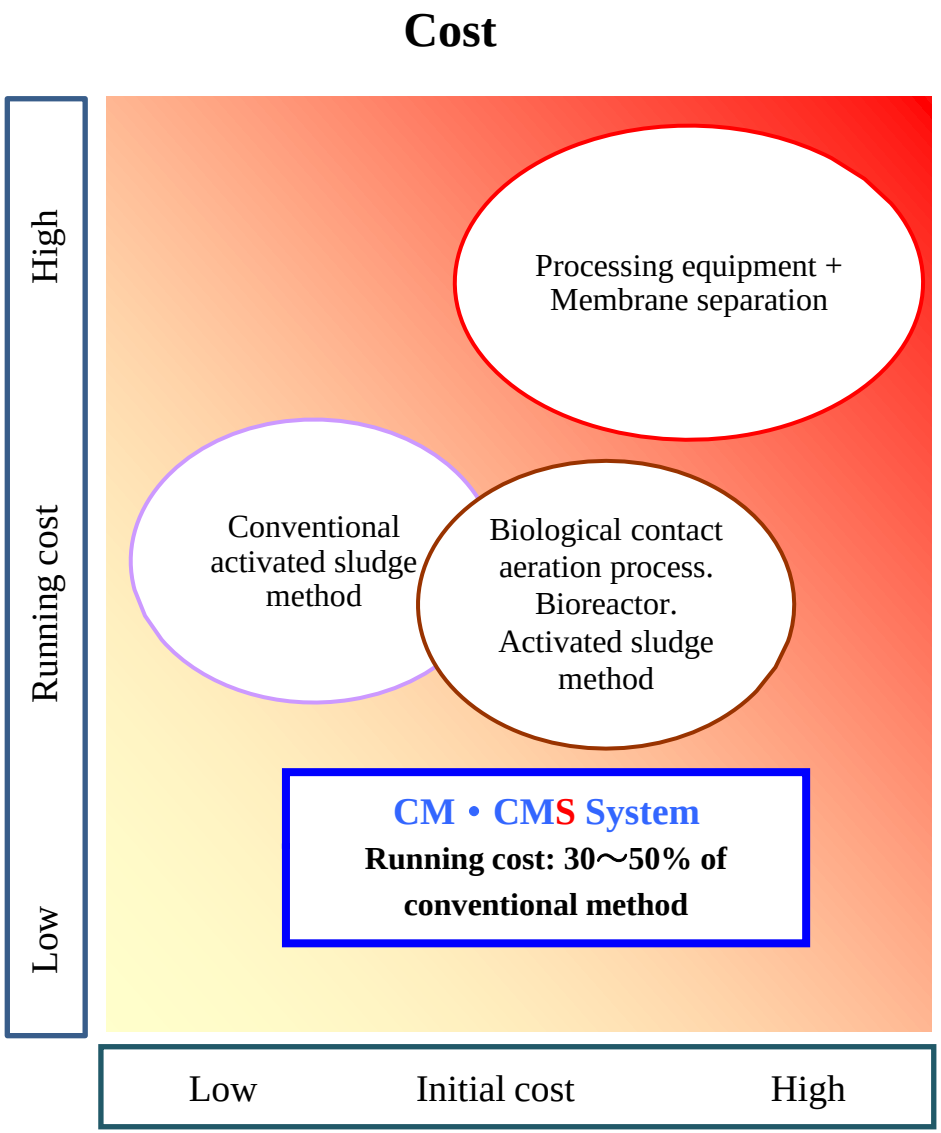
	Chemical expense		Sludge disposal cost		Necessary cost		Administration cost		Total	Machine update cost (future)
Acivated method	1,800	＋	3,750	＋	500	＋	1,000	＝	7,050	15,000 (Dehydrater etc)
CMS System	0	＋	1,200	＋	0	＋	1,700	＝	2,900	0

Residue, scum and excess sludge

Amount of annual reduction = 4,150 thousand Yen

Positioning





Marketing

Industries having problems

Confectionery production

Meat processing

Fishery products processing

Others. Hog raising business. Shochu brewing

Cooling drinks

Dairy products production

Starches processing (Soy sauce, Tofu)

Problem content

1、 Because density is high, handle as industrial waste disposal

Problem ： Expensive industrial waste processing cost. Anxious whether appropriate disposal is done or not

2、 Whether existing processing equipment attain effluent standard or not

Problem ： Cost rise due to surcharge. Uneasiness for surprise inspection

3、 Chemical expense. Machine purchase costs

Problem ： Excess sludge disposal costs. Flocculant costs. Renewal cost such as apparatuses

4、 Malodor

Problem ： Anxious about odor pollution to neighborhood

Recently, issue of malodor becomes remarkable

Facilities summary

New construction ：Treatment of factory effluent

CM System： Smaller than conventional sludge method （10-15% decrease） * Stable operation in volume load 0.6-0.8

CMS System ： More smaller in case of support treatment (20~30% decrease) * Support becomes bio organism bed

Concrete • aboveground, semi-basement, underground Steel and Stainless steel • aboveground

New constraction：Reprocessing of excess sludge

Effective for volume-reduction of large amount of excess sludge

CM • CMS ：Disposal of microbe's corpse existing in excess sludge before dehydration *Volume reduction rate : 50~80%

Reinforced concrete aboveground facility

Reinforced concrete semi-basement faility

Existing diversion. Steel structure

Existing diversion : Perfect zymogenesis	Remodel of existing facilities into complete zymogenesis is possible, in case shutdown is possible during necessary period.
Existing diversion : Zymogenesis by enlargement of regeneration tank	Zymogenesis is possible by addition of regeneration tank, in case short time shutdown is possible.
Existing diversion : Semi-zymogenesis changing to by-pass process	Chang to semi-zymogenesis is possible by addition of small CM system, in case shutdown is not permitted.

Principle of by-pass method : 10% of raw water is treated by enzyme processes of bypass, therefore load of facilities is reduced by 10%.
Processing water goes back up to existing aeration tank.
Consecutive insertion of water containing enzymes stabilizes operation and reduce excess sludge.

Sales framework, Maintenance & Administration structure

Sales framework

Base of domestic sale :Fukuoka-Pref., Saga-Pref. and Tokyo Base of overseas sale : Fukuoka-Pref. and Tokyo

Sale area:Japan and foreign countries

Sales results until 2016:Tochigi ~ Okonawa, Pref. 21 facilities. Proof experiment: 3 (in Oversea), 4 (in Japan)

Sales plan in 2017: 2 facilities (in Japan), 1 facility (in Vietnam), more than 5 test plants (Domestic and abroad)

Future sale plan to abroad: Vietnam, India, Indonesia and othrers. Developed countries

Maintenance system

When problem is not settled locally, we dispatch our employees from head office and deal with.

When maintenance takes time, we ask for cooperation of client or subcontractor

When local correspondence is possible, we ask for handling of client or subcontractor themslves

Please give us notice over telephone

In case of oversea : Our local subcontractor will cope. We are ready to deal through telephone and E-mail

Administration system

Client, subcontractors of client, our subcontractors, local management companies handle.

After trial run, we carry out management training to concerned parties

Past results

Introduction body	Area	Kind of drainage	Flow rate (㎥/D)	BOD(㎎/L)	Influent pH	Discharge	
G Food	Kansai	Food processing	150	1,300	5.2	River	New construction
O Stock raising	Kyushu	Hog raising	25	8,500	6.2	River	Existing diversion
H Food	Kansai	Food processing	400	1,600	5	River	New construction
U Stock raising	Kyushu	Hog raising	12.5	9,000	8.9	River	New construction
S Food	Chubu	Food processing	30	1,100	6	River	Existing diversion
S Food	Chubu	Food processing	60	1,300	5.2	River	Existing diversion
H Processing	Kantou	Lavation	900	1,800	11～4.5	River	Existing diversion
F Association	Kyushu	Starch production	240	1,300	5.2	River	New construction
S Food	Kyushu	Food processing	60	4,500	3.5～5.3	Sewage	New steel made
K Recycling	Kyushu	Food processing	1.2	3,000	4.0	Sewage	Existing diversion
K Food	Kyushu	Food processing	20	800	4.0	River	Existing diversion
C Drink	Kyushu	Drinking water	5	1,000	4.0	On-site	New construction
Several others							

Sampling at residues
sureen Cloudy

Sampling at No.1 aeration tank
Deposition : Enzyme materials
and flock

Sampling at support
filled tank (S System)
Floating matter: support

Sampling at final settler
Approx. transparent

Verification survey by demonstration experiment Example:High density wastewater from sweet potato shochu brewing factory

Test-plant of Jfils

Experimental equipment：CM120L

Test-plant of client

Shochu brewing in Miyazaki Pref.

Experiment period: 35 days

※2

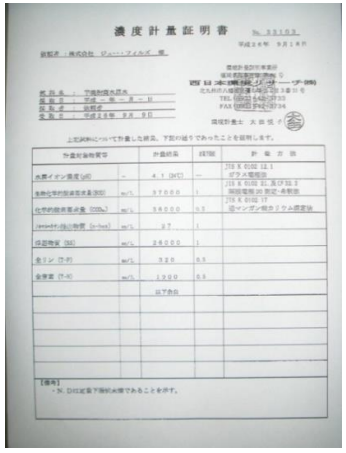
Before processing

※3

After processing

Analytical values by client

※1



Analytical values by Jfils

Three hours progress

Objective	High-concentrated waste fluid processing・No-discharge process
Experimental equipment	CM120L (BOD：1,000㎎/L・hour＝120L/day)
Analysis by Jfils	Raw water BOD：38,000㎎/L pH:4.1 ※1
Before processing	Raw water BOD：63,000㎎/L pH:4.0 ※2
After processing	Treated water BOD：7.3㎎/L pH:7.6 ※3
Throughput	Raw water (3L/Day) is diluted with processing water (30L/Day) No discharge experiments
Test period	35 days experiment by client Jfils carried out only setting and removal of facilities
Comment of president	Wonderful result was beyond my expectation. I'd like to enhance this technology to many companies having problems on high density wastewater treatment