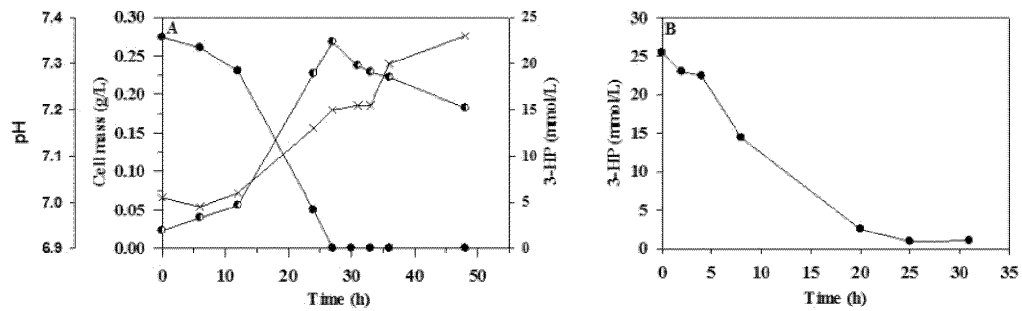
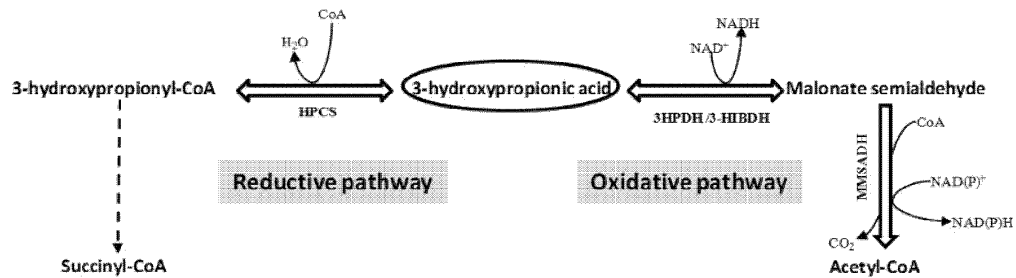


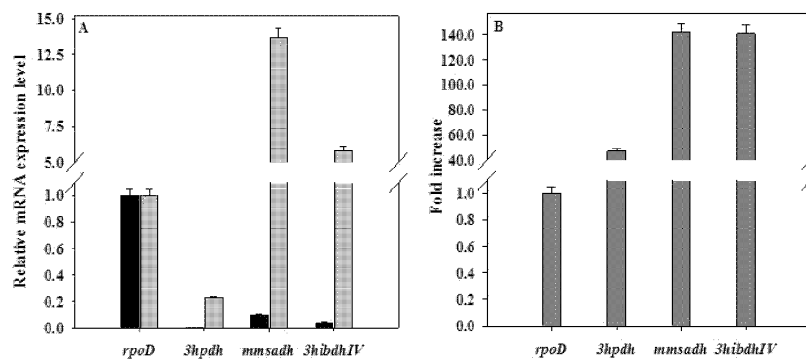
[도1]



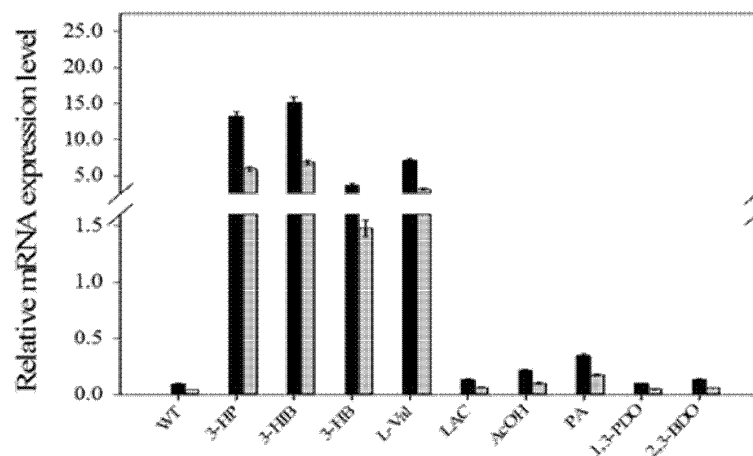
[도2]



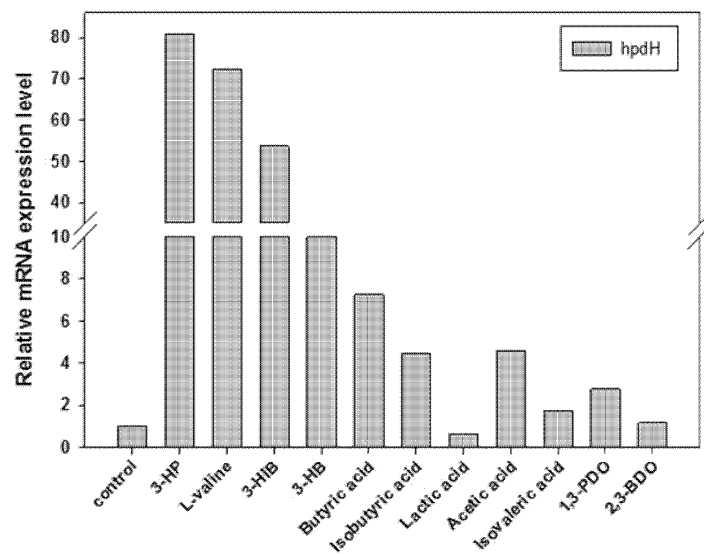
[도3]



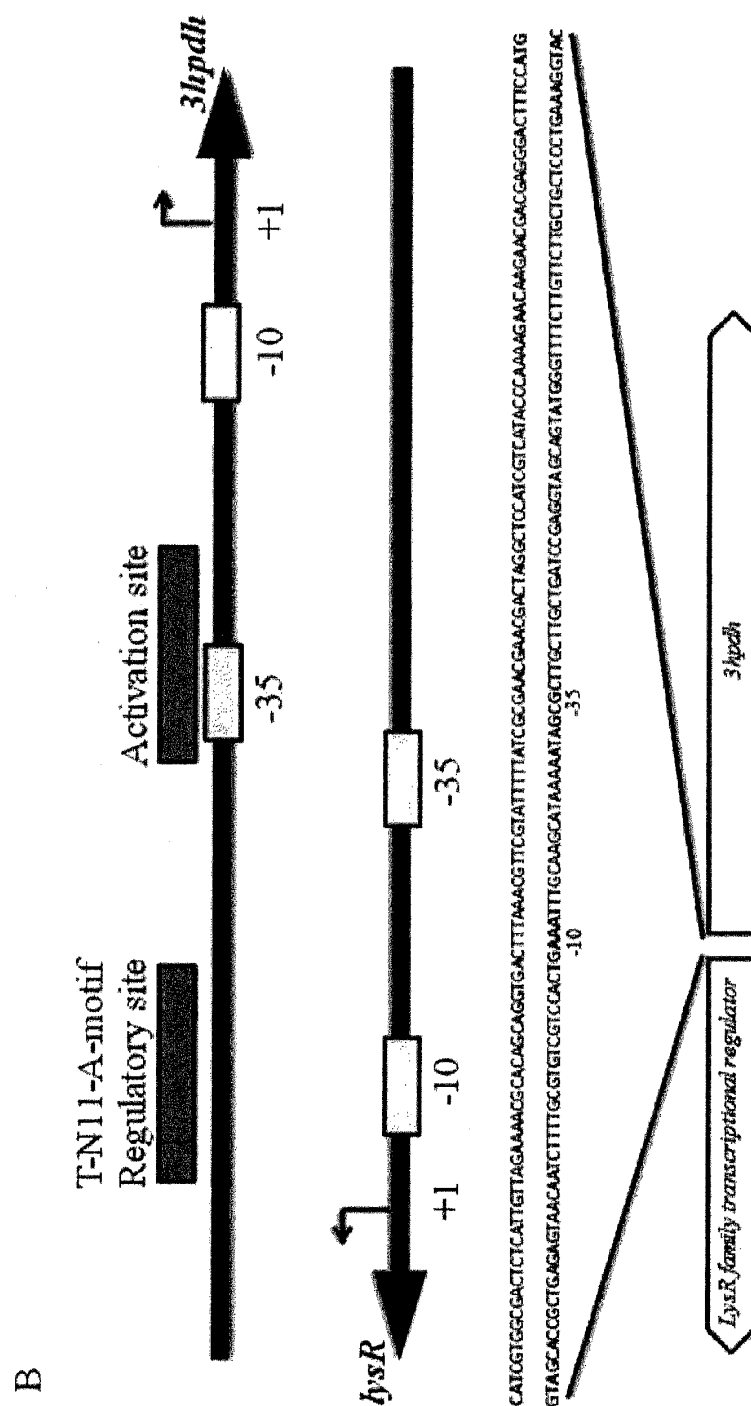
[도4]



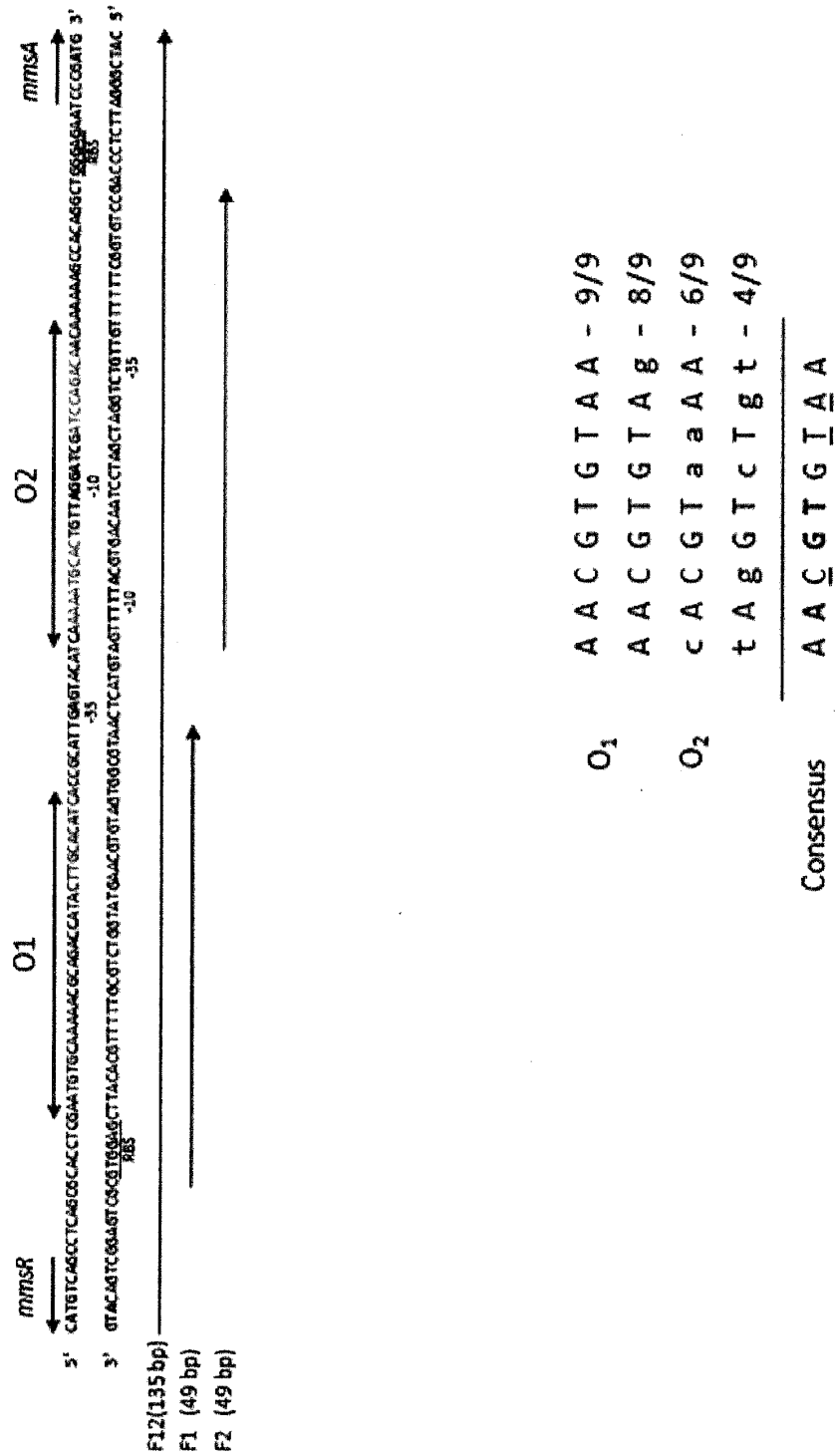
[E5]



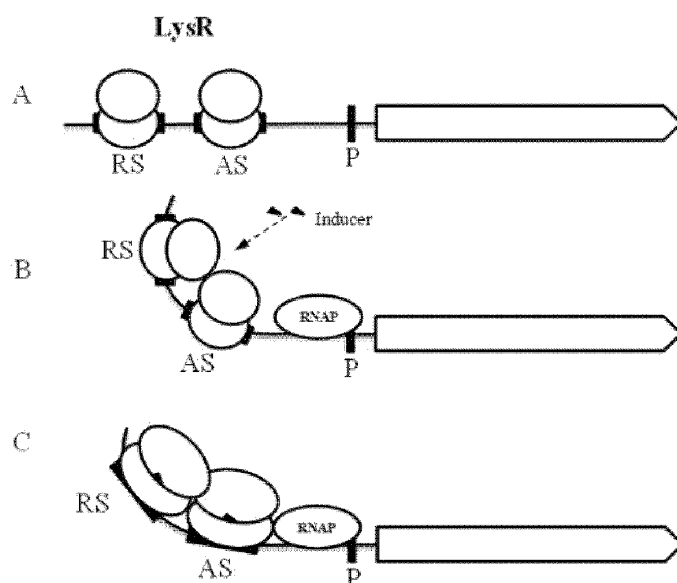
[도 6b]



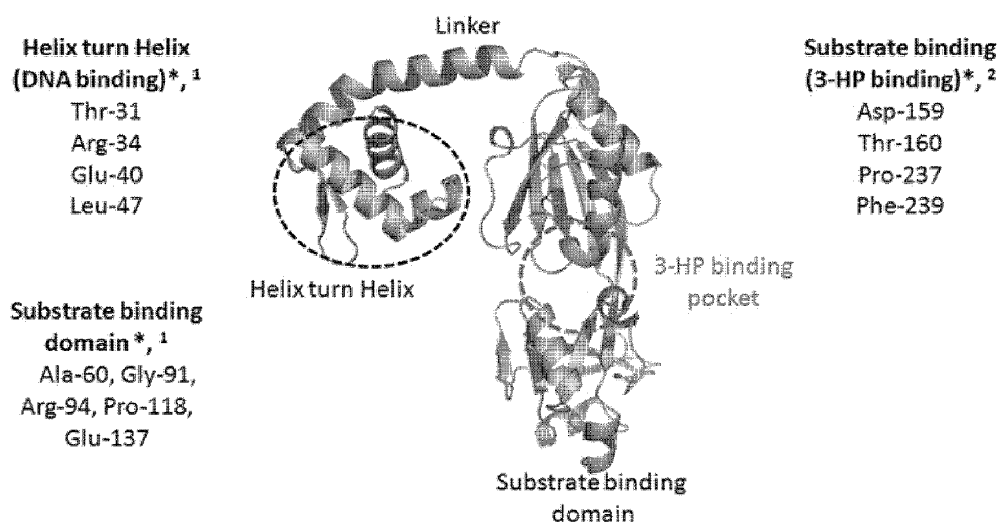
[도 7]



[도8]



[도9]

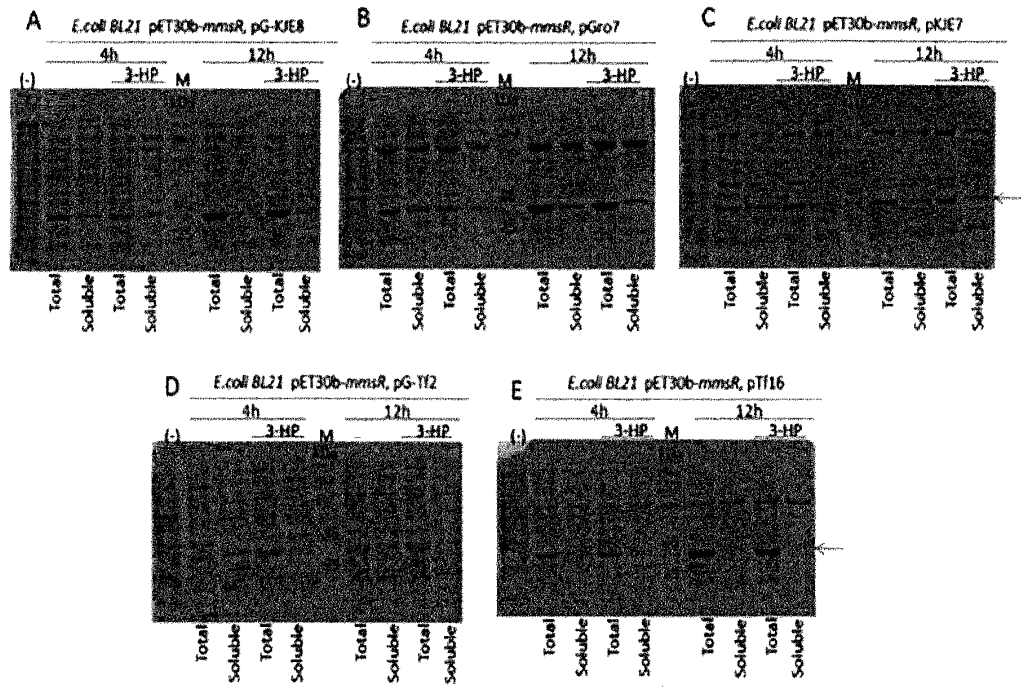


* Highly conserved residues with reference to C4-LysR in *P. denitrificans*.

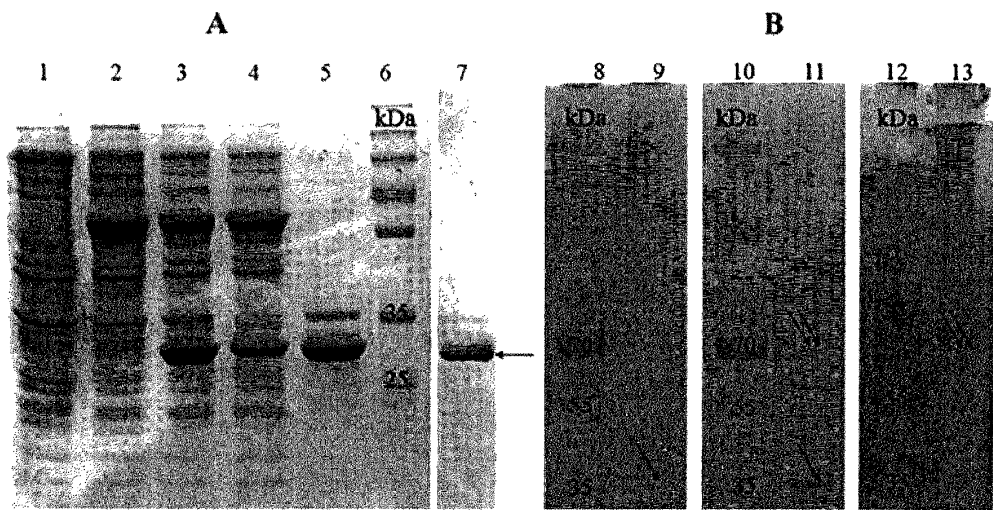
¹ Proposed based on Multiple Sequence Alignment of LysR from 62 different genus; and

² based on molecular modeling, docking and MSA.

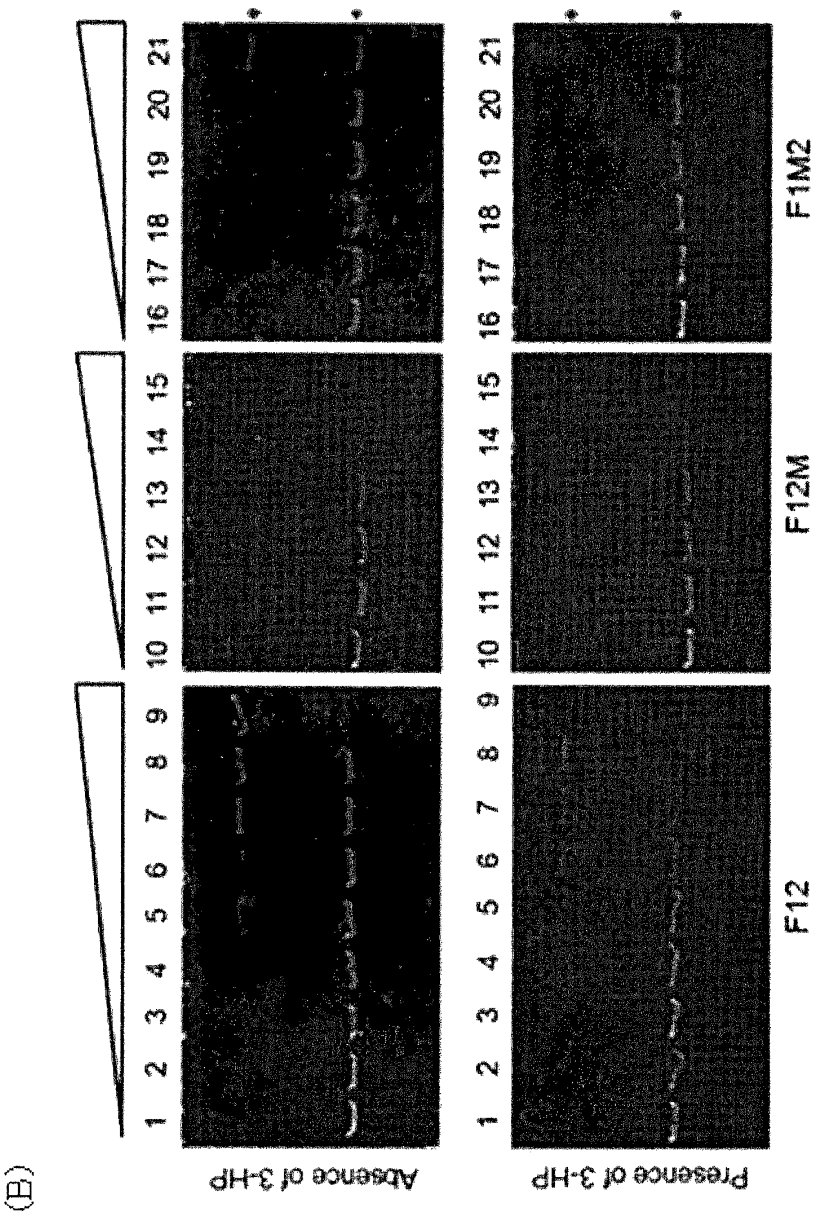
[도 10]



[도 11]



[도 12b]

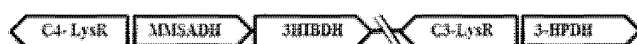


[도 12c]

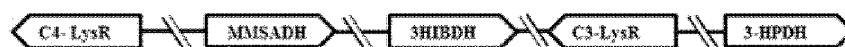
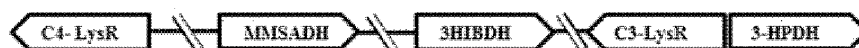
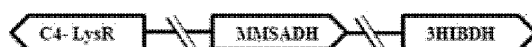
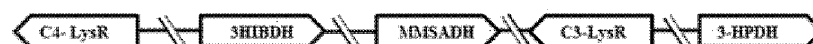
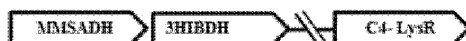
(C)

K₀(nM)	F12	F12M	F1M2	F1M2M
- 3-HP	10.7	18.6	79.8	N/A
+ 3-HP	5.4	19.8	316	N/A

[E13a]

Group 1: *Pseudomonas***Group 2:** *Acinetobacter, Cupriavidus***Group 3:** *Collimonas***Group 4:** *Alcanivorax, Burkholderia***Group 5:** *Corynebacterium, Segniliparus***Group 6:** *Methylocystis, Tatlockia, Curvibacter***Group 7:** *Sphingobium, Polynucleobacter, Bradyrhizobium, Xanthobacter, Catenulispora, Agrobacterium, Methylobacterium, Novosphingobium, Sphingomonas, Thalassospira***Group 8:** *Alicyclophilus, Alteromonas, Kitasatospora, Paracoccus, Simiduia, Sphingopyxis***Group 9:** *Sinorhizobium, Beijerinckia, Aeromonas, Castellaniella, Amycolatopsis*

[E13b]

Group 10: *Verminephrobacter*, *Janthinobacterium*, *Idiomarina*, *Glaciecola*, *Gordonia***Group 11:** *Achromobacter*, *Acidovorax*, *Alcaligenes*, *Halomonas*, *Azospirillum*, *Chromobacterium*, *Comamonas***Group 12:** *Oceanimonas*, *Rastolnia*, *Pseudoalteromonas*, *Ferrimonas*, *Delftia*, *Pseudogulbenkiania*, *Anaeromyxobacter*, *Bordetella***Group 13:** *Phenylobacterium*, *Psychrobacter*, *Shewanella*, *Vibrio*, *Xanthomonas*, *Stenotrophomonas*, *Caulobacter*, *Hahella*, *Kutzneria*, *Rhodomicrobium***Group 14:** *Pseudoxanthomonas*, *Azotobacter***Group 15:** *Parvibaculum*, *Hirschia***Group 16:** *Photobacterium*

[도 14a]

(1)	1	20	30	40	50	60	77
Achromobacter_arsenitoxydans	(1)	M	S	C	A	---	SRS
Achromobacter_piechaudii	(1)	M	S	C	A	---	SRS
Achromobacter_xylosoxidans	(1)	M	S	C	A	---	SRS
Acidovorax_avenae	(1)	N	N	GT	AA	---	EST
Acidovorax_citrinellus	(1)	N	N	GT	AA	---	EST
Acidovorax_delfieldii	(1)	N	N	GT	AA	---	EST
Acidovorax_ebreus	(1)	N	N	GT	AA	---	EST
Acidovorax_radialis	(1)	N	N	GT	AA	---	EST
Acidovorax_sp.	(1)	N	N	GT	AA	---	EST
Acinetobacter	(1)	N	N	GT	AA	---	EST
Acinetobacter_beijerinckii	(1)	MK	HE	AKI	N	---	EST
Acinetobacter_bohemicus	(1)	MK	HE	AKI	N	---	EST
Acinetobacter_cacoaceticus	(1)	MK	HE	AKI	N	---	EST
Acinetobacter_gemini	(1)	MK	HE	AKI	N	---	EST
Acinetobacter_gyllenbergii	(1)	MK	HE	AKI	N	---	EST
Acinetobacter_johnsonii	(1)	MK	HE	AKI	N	---	EST
Acinetobacter_juni	(1)	MK	HE	AKI	N	---	EST
Acinetobacter_nosocomialis	(1)	MK	HE	AKI	N	---	EST
Acinetobacter_rudis	(1)	MS	HE	AKI	N	---	EST
Acinetobacter_tandouii	(1)	MK	HE	AKI	N	---	EST
Advenella_kashimirensis	(1)	N	N	GT	AA	---	EST
Alcaligenes_faecalis	(1)	N	N	GT	AA	---	EST
Allicyclophus_dentificans	(1)	N	N	GT	AA	---	EST
Azospirillum_ipoferum	(1)	MADF	N	---	---	---	---
Azotobacter_chroococcum	(1)	N	N	GT	AA	---	EST
Azotobacter_vinelandii	(1)	N	N	GT	AA	---	EST
Beijerinckia_indica	(1)	MSDF	N	---	---	---	---
Beijerinckia_mobilis	(1)	MSDF	N	---	---	---	---
Bordetella_avium	(1)	M	TS	C	AA	---	EST
Bordetella_bronchiseptica	(1)	M	TS	C	AA	---	EST
Bordetella_hinzii	(1)	M	TS	C	AA	---	EST
Bordetella_pertussis	(1)	M	TS	C	AA	---	EST
Bosea_sp.	(1)	MERF	D	---	---	---	---
Bradyrhizobium_ellipticum	(1)	MLDQGGT	DE	V	AA	---	EST
Burkholderia_ambifaria	(1)	MRHPEPVS	N	---	---	---	---
Burkholderia_ferrariae	(1)	MQKNITTSKLET	N	---	---	---	---
Burkholderia_lata	(1)	MRHAITEPVSGN	N	---	---	---	---

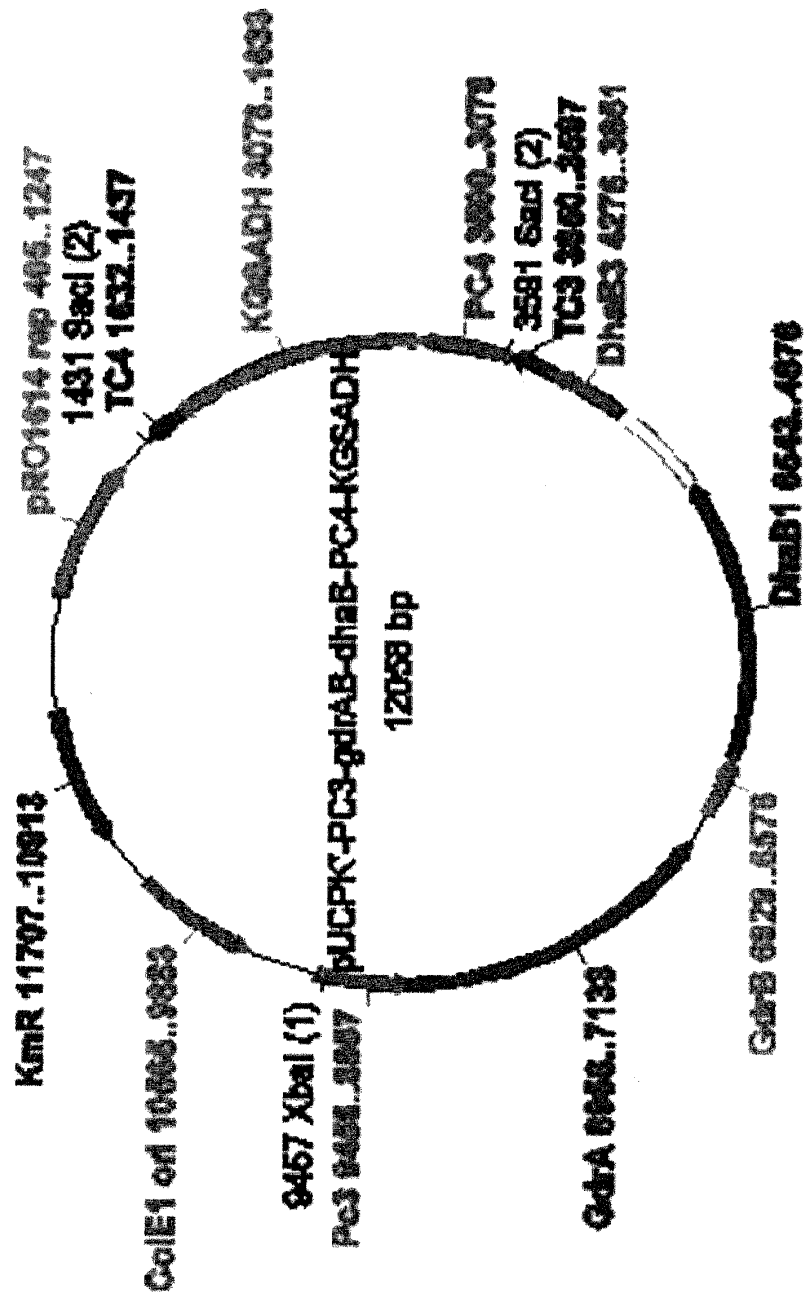
[도 14b]

Burkholderia_ubonensis (1)	---	MRHHPEPVSGN	N	D	---	Q	A	G	---	R	R	E	E	---	SR	---
Chelatococcus sp. (1)	---	---	MRE	D	---	A	A	V	---	T	T	E	D	---	KAK	---
Comamonas_arenae (1)	---	---	---	N	---	V	V	VE	---	R	R	F	E	Q	Q	---
Comamonas_fungivorans (1)	---	---	---	N	---	V	V	VE	---	R	R	F	E	Q	Q	---
Comamonas_aquatica (1)	---	---	---	H	---	MA	MA	VG	---	R	R	F	E	Q	Q	---
Comamonas_bada (1)	---	---	---	N	---	---	---	GT	AA	---	---	---	---	---	---	---
Comamonas_composti (1)	---	---	---	H	---	A	A	AA	---	R	R	F	E	Q	Q	---
Comamonas_granulii (1)	---	---	---	N	---	G	G	AG	VG	---	---	---	---	---	---	---
Comamonas_testosteroni (1)	---	---	---	H	---	---	---	GS	AA	---	---	---	---	---	---	---
Curvibacter_gracilis (1)	---	---	---	NN	---	---	---	GT	VN	---	---	---	---	---	---	---
Curvibacter_binceolatus (1)	---	---	---	NN	---	---	---	GT	VN	---	---	---	---	---	---	---
Dexia_gummosa (1)	---	---	---	---	---	---	---	G	AV	---	---	---	---	---	---	---
Halomonas_elongata (1)	---	---	---	OD	---	---	---	Q	AD	---	---	---	---	---	---	---
Halomonas_habocynthiae (1)	---	---	---	OD	---	---	---	E	D	---	---	---	---	---	---	---
Halomonas sp. (1)	---	---	---	OD	---	---	---	Q	D	---	---	---	---	---	---	---
Herbaspirillum_huttianse (1)	---	---	---	M	---	---	---	Q	VD	---	---	---	---	---	---	---
Herbaspirillum_lustianum (1)	---	---	---	M	---	---	---	Q	VD	---	---	---	---	---	---	---
Herbaspirillum_seropedicae (1)	---	---	---	M	---	---	---	Q	VD	---	---	---	---	---	---	---
Herbaspirillum_sp. (1)	---	---	---	M	---	---	---	Q	VD	---	---	---	---	---	---	---
Janthinobacterium_lividum (1)	---	---	---	M	---	---	---	AG	VD	---	---	---	---	---	---	---
Janthinobacterium_sp. (1)	---	---	---	M	---	---	---	AG	VD	---	---	---	---	---	---	---
Kiloniella_lamarinae (1)	---	---	---	M	---	---	---	G	II	---	---	---	---	---	---	---
Magnetospirillum_gryphowaldense (1)	---	---	---	ND	---	---	---	GR	MD	---	---	---	---	---	---	---
Marinobacterium_stanieri (1)	---	---	---	M	---	---	---	AN	D	---	---	---	---	---	---	---
Microvibrio_sp. (1)	---	---	---	MSA	---	---	---	AG	PA	---	---	---	---	---	---	---
Microvibrio_aerodentificans (1)	---	---	---	---	---	---	---	ET	VQ	---	---	---	---	---	---	---
Muria_flava (1)	---	---	---	---	---	---	---	Q	AG	---	---	---	---	---	---	---
Nivospirillum_rakense (1)	---	---	---	MAE	---	---	---	G	IL	---	---	---	---	---	---	---
Ongeta_urethralis (1)	---	---	---	---	---	---	---	S	D	---	---	---	---	---	---	---
Ottowia_thioxydans (1)	---	---	---	---	---	---	---	G	AA	---	---	---	---	---	---	---
Pandoraea_apista (1)	---	---	---	---	---	---	---	Q	AA	---	---	---	---	---	---	---
Pandoraea_sp. (1)	---	---	---	---	---	---	---	Q	AA	---	---	---	---	---	---	---
Pannonibacter_phragmitetus (1)	---	---	---	---	---	---	---	AG	LG	---	---	---	---	---	---	---
Peridichaea_piscinae (1)	---	---	---	---	---	---	---	A	D	---	---	---	---	---	---	---
Polynucleobacter_necessarius (1)	---	---	---	---	---	---	---	D	EG	SA	---	---	---	---	---	---
Pseudogulbenkiania_ferrooxidans (1)	---	---	---	---	---	---	---	---	IV	---	---	---	---	---	---	---
Pseudomonas_aeruginosa (1)	---	---	---	---	---	---	---	HTA	S	---	---	---	---	---	---	---
Pseudomonas_alkyphenolia (1)	---	---	---	---	---	---	---	RT	AA	---	---	---	---	---	---	---
Pseudomonas_amygdali (1)	---	---	---	---	---	---	---	R	AS	---	---	---	---	---	---	---
Pseudomonas_...	---	---	---	---	---	---	---	R	S	---	---	---	---	---	---	---

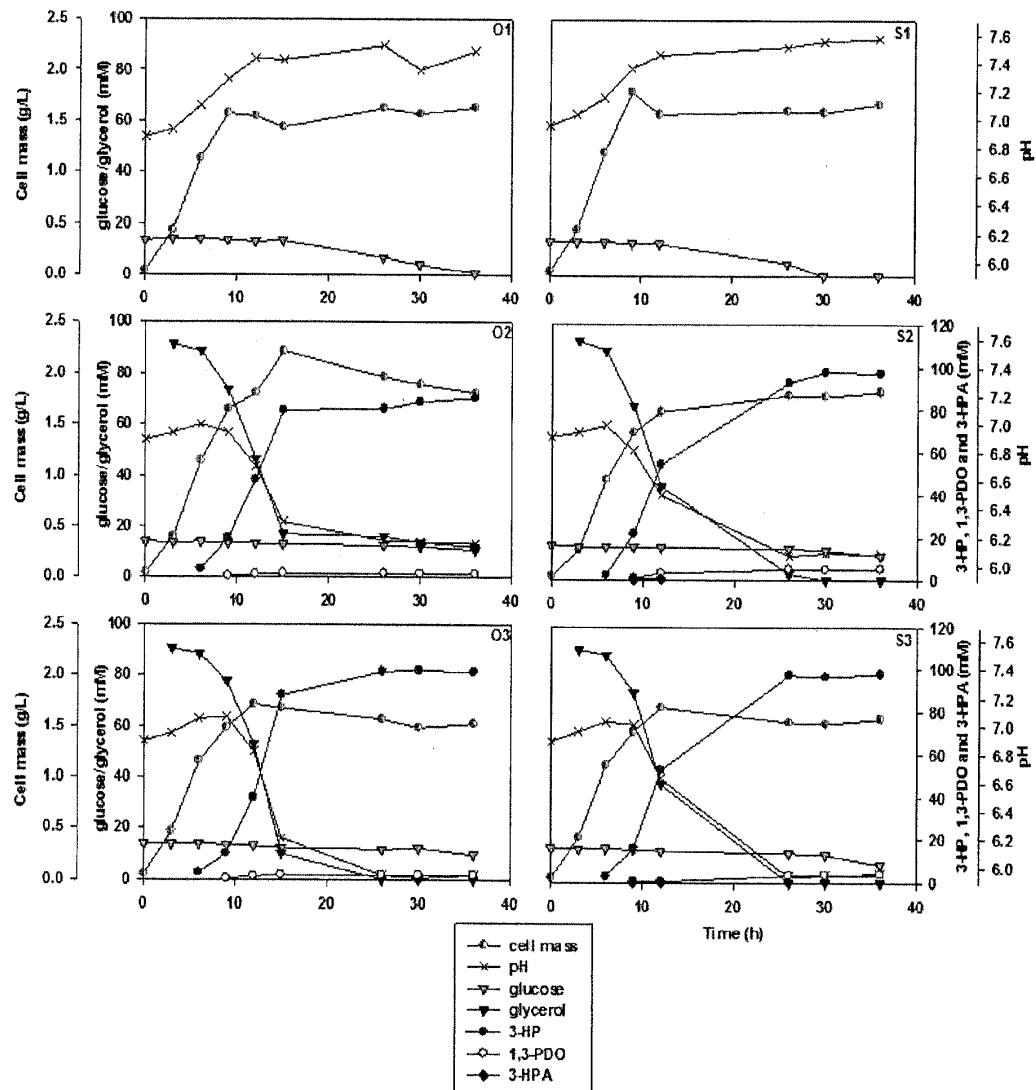
	1	10	20	30	40	50	60	70	81
Achromobacter_sp. (1)	---	M	---	OR SA	---	R	ETE L	EDQR	EVH
Acidovorax_avenae (1)	---	N	---	AA	---	O	ESI A	GRH	PAV A
Acidovorax_citulli (1)	---	N	---	AA	---	O	ESI A	GRH	PAV A
Acidovorax_defieldii (1)	---	N	---	AA	---	O	ESI A	GRV	PQV A
Acidovorax_ebreus (1)	---	N	---	AA	---	O	ESI A	GRH	PAV A
Acinetobacter_baumannii (1)	---	MK	---	AG IN	---	O	EL I	LEMA	PRV
Acinetobacter_guillouiae (1)	---	MK	---	AG IN	---	O	EL I	LEMA	PRV
Acinetobacter_glycinebergii (1)	---	MK	---	AG IN	---	O	EL I	LEMA	PRV
Acinetobacter_johnsonii (1)	---	MK	---	AG IN	---	O	EL I	LEMA	PRV
Acinetobacter_junii (1)	---	MK	---	AG IN	---	O	EL I	LEMA	PRV
Acinetobacter_soli (1)	---	MK	---	AG IN	---	O	EL I	LEMA	PRV
Advenella_kashimirensis (1)	---	MK	---	AG IN	---	O	EL I	LEMA	PRV
Aflpia_brigiae (1)	---	MP	---	HR SA	---	RH	EAD	RRRS	AAH
Aflpia_broomae (1)	---	MTDQ	---	SA	---	A	DA	SS	EDR E
Agrobacterium_tumefaciens (1)	---	MTDQ	---	SA	---	A	DA	SS	EDR E
Alcaligenes_faecalis (1)	---	N	---	OR SV	---	S	RA	CE	EGOR
Alkylcyclobutyl_denitrificans (1)	---	N	---	OR SV	---	S	RA	CE	EGOR
Azohizobium_caulinodans (1)	---	AVTGA	---	SA	---	O	EOE	SS	EQON
Azospirillum_lipoferum (1)	---	MADFN	---	SA	---	O	EOE	SS	EQON
Azospirillum_sp. (1)	---	MADFN	---	SA	---	O	EOE	SS	EQON
Bordetella_hazali (1)	---	M	---	OR SA	---	R	EAE	EDQR	FVH
Bordetella_petrii (1)	---	M	---	OR SA	---	R	EAE	EDQR	FVH
Bordetella_trematum (1)	---	M	---	OR SA	---	R	EAE	EDQR	FVH
Bosea_sp. (1)	---	MERFM	---	SA	---	I	EFA	ANGER	AK
Bradyrhizobium_yuanningense (1)	---	MLDG	---	SA	---	DR	EKH	EDQR	FVH
Brucella_abortus (1)	---	RRMRPF	---	SA	---	DR	EKH	EDQR	FVH
Brucella_inopinata (1)	---	QAKNA	---	SA	---	I	ET	H	EEEF
Brucella_melitensis (1)	---	QAKNA	---	SA	---	I	ET	H	EEEF
Brucella_neotomae (1)	---	RRMRPF	---	SA	---	DR	EKH	EDQR	FVH
Brucella_ovis (1)	---	QAKNA	---	SA	---	I	ET	H	EEEF
Brucella_pinnipedialis (1)	---	MPAQAKNA	---	SA	---	I	ET	H	EEEF
Brucella_sp. (1)	---	QAKNA	---	SA	---	I	ET	H	EEEF
Brucella_suis (1)	---	QAKNA	---	SA	---	I	ET	H	EEEF
Burkholderia_ferreliae (1)	---	TNAM	---	OR SA	---	RE	ET	V	ALGQR
Burkholderia_glaucis (1)	---	MRQF	---	OR SA	---	RE	ET	V	ALGQR
Burkholderia_nodosa (1)	---	TNAM	---	OR SA	---	RE	ET	V	ALGQR
Collimonas_avenae (1)	---	TNAM	---	OR SA	---	RE	ET	V	ALGQR
Collimonas_fungivorans (1)	---	TNAM	---	OR SA	---	RE	ET	V	ALGQR

Polynucleobacter_necessarius (1)
Pseudogubekiana_sp. (1)
Pseudomonas_aeruginosa (1)
Pseudomonas_agricola (1)
Pseudomonas_alkyphenolia (1)
Pseudomonas_balticum (1)
Pseudomonas_brascaeaeum (1)
Pseudomonas_chloritidimutans (1)
Pseudomonas_chlororaphis (1)
Pseudomonas_corrugata (1)
Pseudomonas_cremicolorata (1)
Pseudomonas_denicrificans (1)
Pseudomonas_extremotauris (1)
Pseudomonas_fluorescens (1)
Pseudomonas_frederikbergensis (1)
Pseudomonas_fuscovaginata (1)
Pseudomonas_japonica (1)
Pseudomonas_knackmussa (1)
Pseudomonas_luteola (1)
Pseudomonas_mediterranea (1)
Pseudomonas_nitroreducens (1)
Pseudomonas_parfayana (1)
Pseudomonas_pileocolloida (1)
Pseudomonas_protegens (1)
Pseudomonas_pseudophila (1)
Pseudomonas_puella (1)
Pseudomonas_thiosphaerae (1)
Pseudomonas_sp. (1)
Pseudomonas_stutteni (1)
Pseudomonas_tolosa (1)
Pseudomonas_umsongensis (1)
Pseudomonas_verona (1)
Pseudomonas_viridovirens (1)
Pseudomonas_xanthomaxina (1)
Pseudomonas_sp. (1)
Rhizobium_alani (1)
Rhizobium_eta (1)
Rhizobium_frederici (1)
Rhizobium_gardneri (1)
Rhizobium_leguminosarum (1)
Rhizobium_phaseoli (1)
Rhizobium_sulbae (1)
Simplicispira_pseudophila (1)
Sinorhizobium_americanum (1)
Sinorhizobium_medicae (1)
Sneathiella_glossodoneidis (1)
Spiribacter_sp. (1)
Streptomyces (1)
Tetrella_mobilis (1)
Varovoxax_paradoxus (1)
Varovoxax_sp. (1)
Xanthobacter_sp. (1)
Consensus (1)

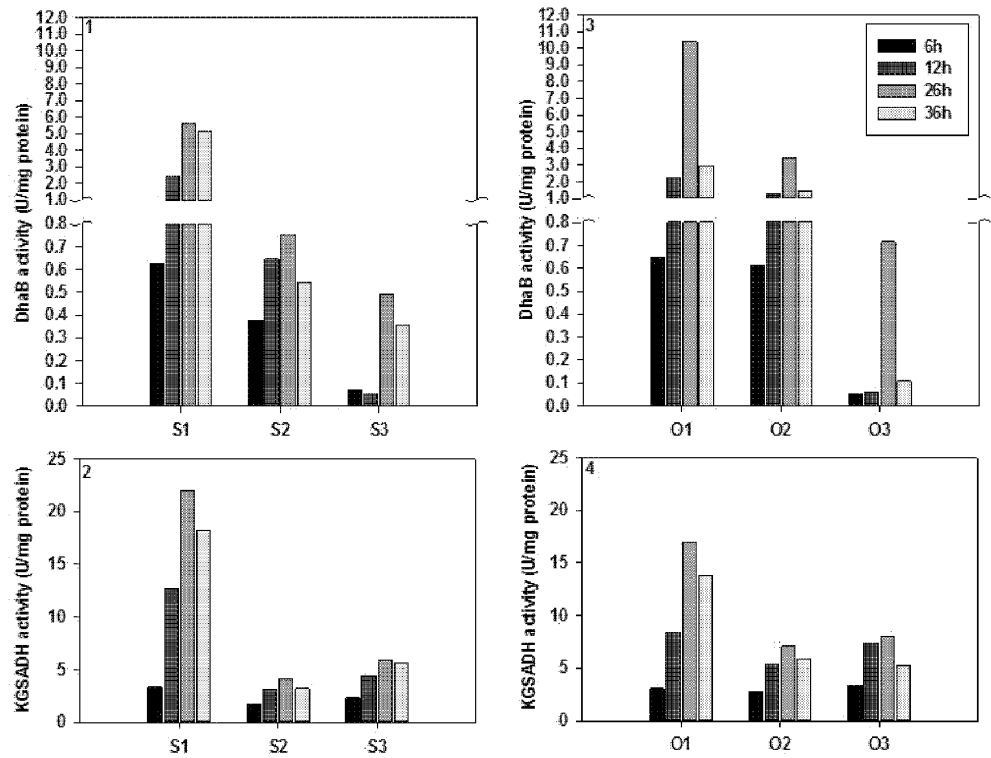
[도 16]



[도 17]



[도18]



[도19]

