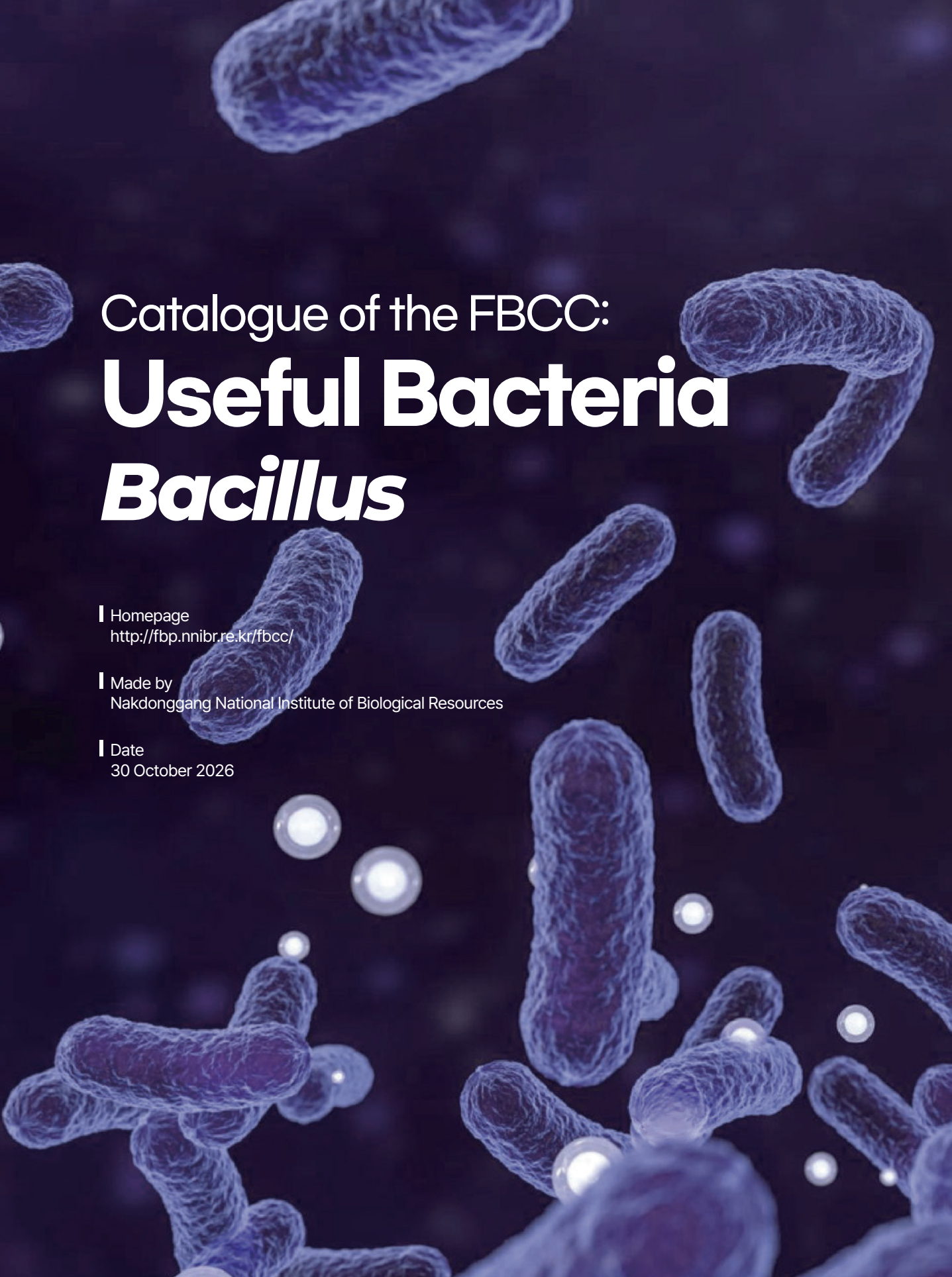


Catalogue of the FBCC:
Useful Bacteria
Bacillus

Homepage
http://fbp.nnibr.re.kr/fbcc/

Made by
Nakdonggang National Institute of Biological Resources

Date
30 October 2026

담수생물자원은행

FBRC

Freshwater Bioresources Culture Collection

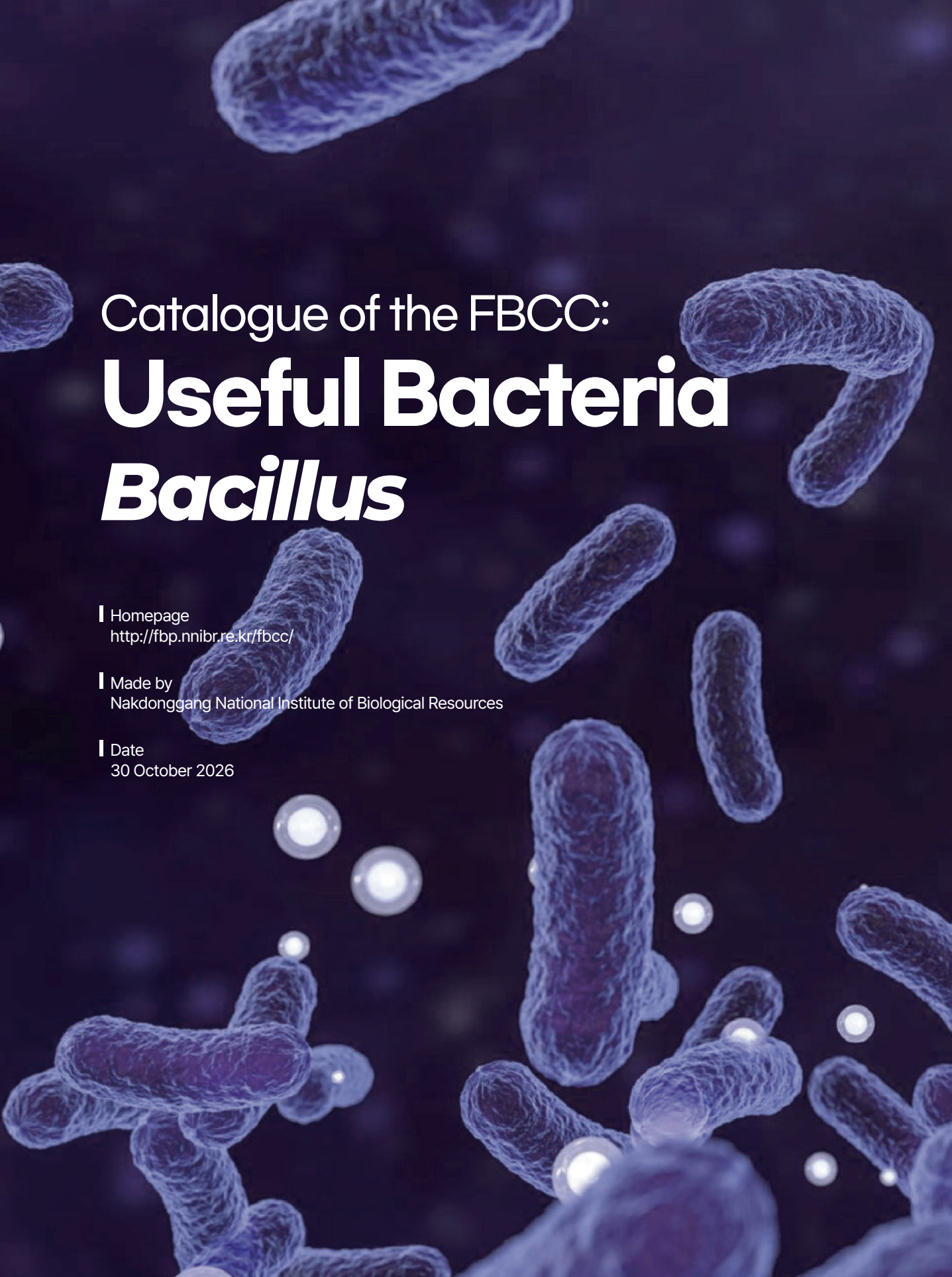


발 행 일 2026년 10월 30일
발 행 처 국립낙동강생물자원관
경상북도 상주시 도남2길 137
저 자 정유진, 국립낙동강생물자원관 책임연구원
이창수, 국립낙동강생물자원관 책임연구원
문혜연, 국립낙동강생물자원관 전임연구원
이재학, 국립낙동강생물자원관 연구원
남윤종, 국립낙동강생물자원관 연구원
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출 판 사 예솔기획
부산 동래구 충렬대로459번길 85 1층

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비매품

본 결과물은 기후에너지환경부의 재원으로 한국환경산업기술원의 다부처 국가생명연구자원 선진화 사업의 지원을 받아 수행되었습니다.(RS-2021-KE001786)

이 책에 실린 내용은 국립낙동강생물자원관의 동의 없이 무단으로 전재 및 복제를 할 수 없습니다.



Catalogue of the FBCC:
Useful Bacteria
Bacillus

Homepage
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Made by
Nakdonggang National Institute of Biological Resources

Date
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발간사

GREETING

담수 생태계에 서식하는 미생물자원은 생물다양성의 근간을 이룰 뿐 아니라, 항생물질·효소·생물농약 등 다양한 산업 소재로 전환될 수 있는 잠재력을 지닌 핵심 생물자원입니다. 그중 바실러스(*Bacillus*) 속 세균은 내생포자 형성을 통한 높은 환경 저항성과 다양한 생리활성 물질 생산능으로, 농업·식품·환경 분야를 아우르는 미래 바이오산업의 중요한 소재로 주목받고 있습니다.

국립낙동강생물자원관 담수생물자원은행(FBCC)은 국내 유일의 담수생물 전문 보존기관으로서, 담수 미생물자원의 발굴과 수집·보존·분양 체계를 지속적으로 고도화해 왔습니다. 특히 *Bacillus* 속 균주는 생물자원의 산업적 활용 가능성이 높은 소재군으로, 이에 대한 체계적인 정보 구축과 제공은 연구자와 산업계의 자원 접근성을 높이는 데 매우 중요한 의미를 갖고 있습니다.

이번에 발간하는 『Catalogue of the FBCC: Useful Bacteria – *Bacillus*』는 우리 기관이 수집·보존해 온 *Bacillus*의 분류학적 정보와 유전자 염기서열, 항균·식물생장촉진·효소활성 등 유용성 평가 결과를 집대성한 자료집입니다.
본 자료집이 연구자와 산업 현장에서 목적에 맞는 담수 유래 균주를 보다 쉽게 탐색하고 활용할 수 있도록 돕고,
국내 담수 미생물자원의 산업적 활용 확대에 기여하기를 기대합니다.

앞으로도 국립낙동강생물자원관은 보유하고 있는 자원에 대한 과학적 근거에 기반하여 미래 생물산업 발전과 국가 생물주권 강화에 기여해 나가겠습니다. 본 자료집의 발간을 위해 힘써주신 모든 연구진과 관계자 여러분께 깊이 감사드립니다.

2026년 10월

국립낙동강생물자원관장 용석원

머리말

FOREWORD

기후변화, 환경오염, 항생제 내성과 같은 당면 과제를 해결하기 위해 지속가능한 생물자원의 발굴과 활용이 요구되는 오늘날, 미생물자원의 중요성은 그 어느 때보다 커지고 있습니다. 그중 바실러스(*Bacillus*) 속 세균은 항균물질을 포함한 다양한 이차대사산물과 세포외 효소를 생산하고 식물 근권에서 생육을 돕는 등 여러 기능이 보고되어, 농업·환경·식품·산업 분야에서 폭넓게 연구되고 있는 대표적인 유용 미생물입니다.

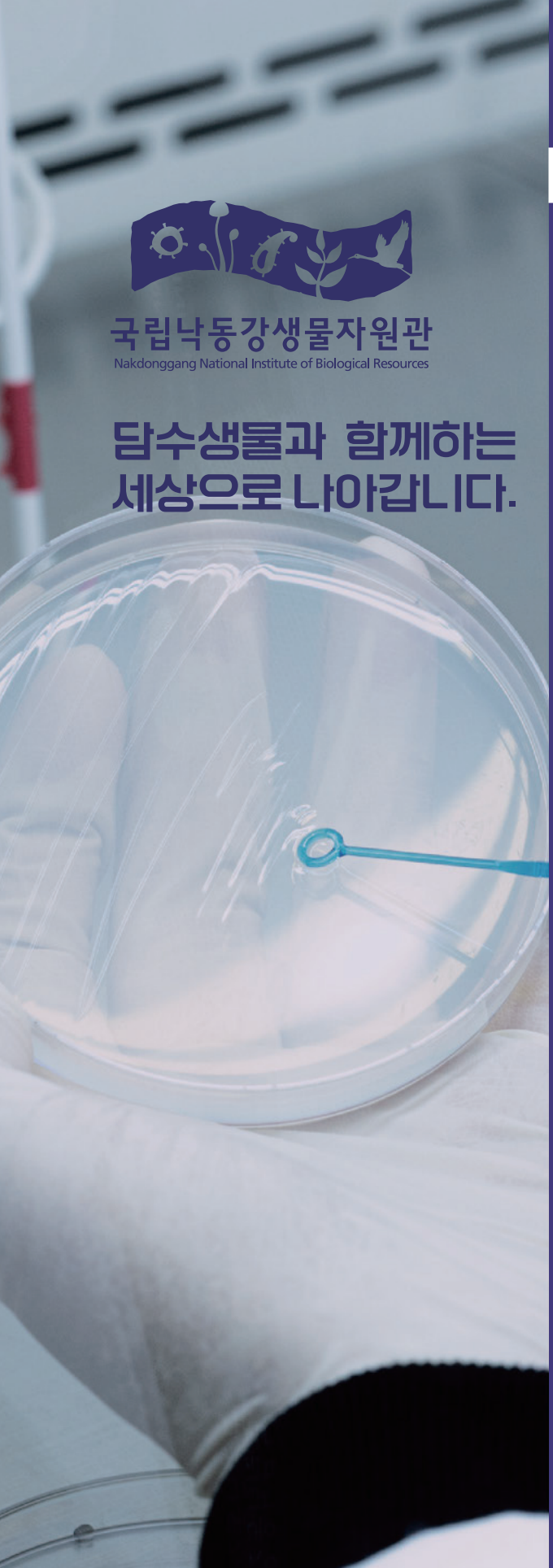
국립낙동강생물자원관 담수생물자원은행(FBCC)은 담수환경에서 유래한 미생물자원을 수집, 보존, 연구하며 생물자원의 지속가능한 이용 기반을 마련해 왔습니다. 담수환경은 토양과 수계, 퇴적물이 서로 영향을 주고받는 곳으로, 이곳에서 분리된 바실러스 균주는 육상 유래 균주와 다른 생리적 특성을 지닐 가능성이 있어 새로운 소재 탐색의 대상으로 의미가 있습니다.

본 책자는 담수생물자원은행이 보유한 바실러스 44균주에 대하여 분류체계, 채집 및 분리 정보, 16S rRNA 유전자 염기서열, 그리고 항균, 식물생장촉진, 효소활성 등 유용성 평가 결과를 균주별로 정리하였습니다. 연구자와 산업계 관계자가 목적에 맞는 균주를 효율적으로 탐색하고, 새로운 응용 가능성을 검토하는 데 도움이 되기를 기대합니다.

앞으로도 FBCC는 담수 미생물자원의 발굴과 연구, 정보의 축적과 공유를 지속하여 생명과학과 산업 분야에 더욱 가치 있는 자료를 제공하고자 합니다. 본 도서의 발간을 위해 지원해 주신 관계자분들, 자료 작성과 검증에 참여해 주신 연구자분들, 그리고 출판에 수고해 주신 모든 분들께 깊은 감사를 드립니다.

2026년 10월

대표저자 정유진



국립낙동강생물자원관
Nakdonggang National Institute of Biological Resources

담수생물과 함께하는 세상으로 나아갑니다.

담수생물자원은행 연혁

- **2025** 공공기관 고객만족도 조사 '우수(A)' 등급(3년 연속)
- **2024** 생물자원은행 국제표준(ISO 20387) 인정 획득
  세계미생물자원센터연맹(WFCC) 회원 가입
- **2023** 품질경영시스템(ISO 9001) 인증 획득
  공공기관 고객만족도 조사 '우수(A)' 등급 획득
- **2021** 다부처 국가생명연구자원 선진화 사업 수주
  담수생물소재선진화 연구단 출범
- **2018** 생물다양성관리기관 지정(기탁·보존기관 등록)
- **2016** 담수생물자원은행 개소

주요기능

유용소재 확보
· 담수생물소재 다양성 확보 및 형태·분자계통 연구

유용정보 DB 구축
· 담수생물소재 유전정보 확보
· 기초 유용성 및 오믹스 정보 확보

보존 · 관리
· 담수생물소재 생체 및 동결건조 보존
· 담수생물소재 품질관리 및 장기보존연구

기탁 · 분양
· 산학연 대상 기탁·분양서비스

교육서비스
· 미세조류 특화 교육

국립낙동강생물자원관 연혁

2026

06 공공기관 경영실적 평가 8년 연속 '우수'

2023

04 공공기관 고객만족도 6년 연속 '우수'

2021

11 안전경영시스템(KOSHA-MS) 인증

2020

02 「생물자원관의 설립 및 운영에 관한 법률」 개정·시행

2019

10 전시관 관람객 100만 명 돌파
07 식물표본수장고, 세계식물표본관 총량 등재
01 연구개발목적기관 지정

2018

01 서식지외 보전기관 지정

2017

12 교육기부 우수기관, 가족친화인증 기관 인증

2016

02 기타공공기관 지정(「공공기관의 운영에 관한 법률」 제5조)

2015

01 「생물자원관의 설립 및 운영에 관한 법률」 제정

2011

02 국립낙동강생물자원관 건립 공사 추진

주요기능

담수생물 국가자산화

· 신종/미기록종 발굴
· 생물표본 확보
· 수장고 운영 등

담수생물 이용기술개발

· 추출물 등 소재 확보
· 유용성 분석
· 생물소재 분양
· 기술개발·이전 등

생물다양성 보전 연구

· 담수생물다양성 조사
· 담수멸종위기종 보전
· 기후변화지표종 연구
· 탄소중립 연구 등

전시 · 교육

· 전시관 운영
· 교육프로그램 운영
· 지역사회 협력 등

CONTENTS

Phylum Bacillota

Class Bacilli

Order Bacillales

Family Bacillaceae

Bacillus velezensis FBCC-B5352 ..... 10p

Bacillus velezensis FBCC-B6034 ..... 12p

Bacillus licheniformis FBCC-B6059 ..... 14p

Bacillus stercoris FBCC-B6062 ..... 16p

Bacillus tequilensis FBCC-B6063 ..... 18p

Bacillus stercoris FBCC-B6064 ..... 20p

Bacillus tequilensis FBCC-B6066 ..... 22p

Bacillus tequilensis FBCC-B6068 ..... 24p

Bacillus sonorensis FBCC-B6070 ..... 26p

Bacillus tequilensis FBCC-B6072 ..... 28p

Bacillus tequilensis FBCC-B6079 ..... 30p

Bacillus subtilis FBCC-B6092 ..... 32p

Bacillus altitudinis FBCC-B6131 ..... 34p

Bacillus siamensis FBCC-B6156 ..... 36p

Bacillus siamensis FBCC-B6157 ..... 38p

Bacillus siamensis FBCC-B6158 ..... 40p

Bacillus siamensis FBCC-B6159 ..... 42p

Bacillus siamensis FBCC-B6160 ..... 44p

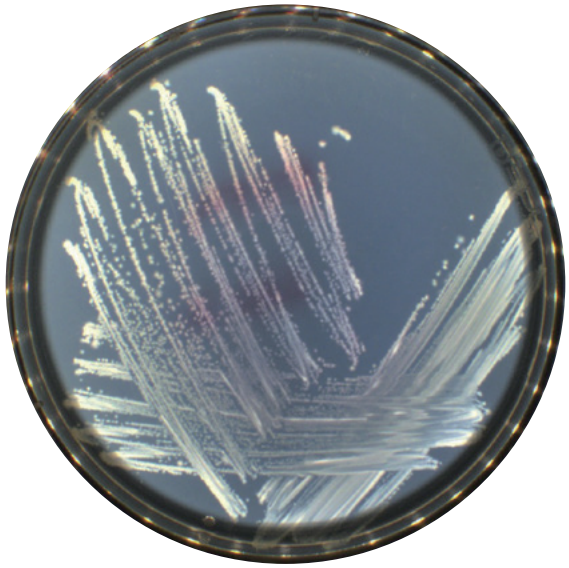
Bacillus siamensis FBCC-B6161 ..... 46p

Bacillus siamensis FBCC-B6162 ..... 48p

Bacillus halotolerans FBCC-B11183 ..... 50p

Bacillus cabrialesii FBCC-B13732 ..... 52p

Bacillus siamensis FBCC-B13737 ..... 54p
Bacillus licheniformis FBCC-B13739 ..... 56p
Bacillus velezensis FBCC-B15011 ..... 58p
Bacillus siamensis FBCC-B15015 ..... 60p
Bacillus tequilensis FBCC-B15762 ..... 62p
Bacillus velezensis FBCC-B16107 ..... 64p
Bacillus tequilensis FBCC-B16836 ..... 66p
Bacillus tequilensis FBCC-B19063 ..... 68p
Bacillus siamensis FBCC-B19144 ..... 70p
Bacillus tequilensis FBCC-B19209 ..... 72p
Bacillus tequilensis FBCC-B19238 ..... 74p
Bacillus halotolerans FBCC-B19315 ..... 76p
Bacillus tequilensis FBCC-B19318 ..... 78p
Bacillus tequilensis FBCC-B19319 ..... 80p
Bacillus tequilensis FBCC-B19320 ..... 82p
Bacillus tequilensis FBCC-B19321 ..... 84p
Bacillus tequilensis FBCC-B19325 ..... 86p
Bacillus siamensis FBCC-B19327 ..... 88p
Bacillus siamensis FBCC-B19328 ..... 90p
Bacillus safensis subsp. *safensis* FBCC-B19329 ..... 92p
Bacillus safensis subsp. *safensis* FBCC-B19330 ..... 94p
Bacillus safensis subsp. *safensis* FBCC-B19331 ..... 96p
APPENDIX 98p
REFERENCE 110p



Bacillus velezensis FBCC-B5352

Ruiz-Garcia C, Bejar V, Martinez-Checa F, Llamas I, Quesada E. *Bacillus velezensis* sp. nov., a surfactant-producing bacterium isolated from the river Velez in Malaga, southern Spain. Int J Syst Evol Microbiol 2005; 55:191-195.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 용마로 164-34
GPS	36°26′53.5″N, 128°15′34.1″E
분리원	담수
배지	Reasoner's 2A agar (R2A)
온도	25°C
유사도	99.86%

유전자 염기서열

>FBCC-B5352_16S rRNA
CTTGCTCCCTGATGTTAGCGGCGGACGGGTGAGTAACACGTGGGTAACCT
GCCTGTAAGACTGGGATAACTCCGGGAAACCGGGGCTAATACCGGATGGT
TGTCTGAACCGCATGGTTCAGACATAAAAGGTGGCTTCGGCTACCACTTAC
AGATGGACCCGCGGCGCATTAGCTAGTTGGTGAGGTAACGGCTCACCAAG
GCGACGATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGGGACTGA
GACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCGCAAT
GGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAGGTTTTCGGA
TCGTAAAGCTCTGTTGTTAGGGAAGAACAAGTGCCGTTCAAATAGGGCGGC
ACCTTGACGGTACCTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGC
CGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGAATTATTGGGCGTAAAGG
GCTCGCAGGCGGTTTCTTAAGTCTGATGTGAAAGCCCCCGGCTCAACCGG
GGAGGGTCATTGGAAACTGGGGAACTTGAGTGCAGAAGAGGAGAGTGGAA
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AGCGAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGAGTGCT
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TCCGCCTGGGGAGTACGGTCGCAAGACTGAAACTCAAAGGAATTGACGGG
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TTCGGGGGCAGAGTGACAGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGT
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AGCATTCAGTTGGGCACTCTAAGGTGACTGCCGGTGACAAACCGGAGGAAG
GTGGGGATGACGTCAAATCATCATGCCCCTTATGACCTGGGCTACACACGT
GCTACAATGGACAGAACAAAGGGCAGCGAAACCGCGAGGTTAAGCCAATCC
CACAAATCTGTTCTCAGTTCGGATCGCAGTCTGCAACTCGACTGCGTGAAG
CTGGAATCGCTAGTAATCGCGGATCAGCATGCCGCGGTGAATACGTTCCC
GGGCCTTGTACACACCGCCCGTCACACCACGAGAGTTTGTAACACCCGAA
GTCGGTGAGGTAACCTTTATGGAGCCAGCCGCCGAAGGTGGGACAGATGA
TTGGGGGTGAAGTCGTAACAAGGTAGCCGTATCGGAAGGTGC

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

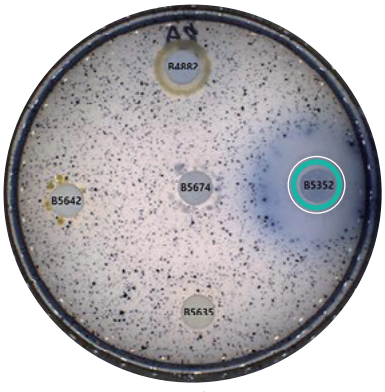


Siderophore production



Phosphate solubilization activity

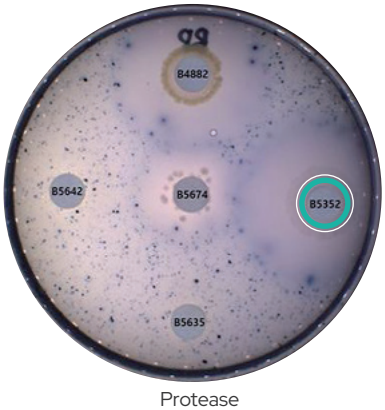
효소 활성
Enzyme Activity



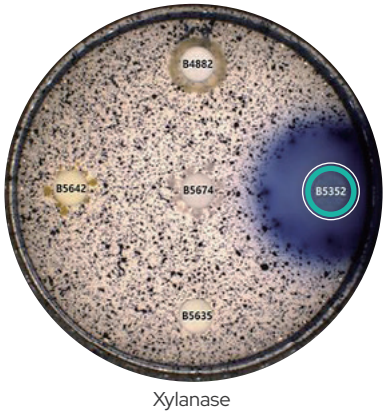
Amylase



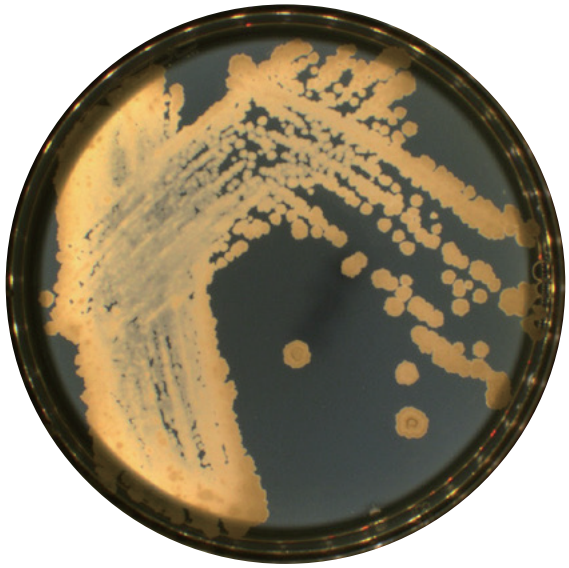
Glycosidase



Protease



Xylanase



Bacillus velezensis FBCC-B6034

Ruiz-Garcia C, Bejar V, Martinez-Checa F, Llamas I, Quesada E. *Bacillus velezensis* sp. nov., a surfactant-producing bacterium isolated from the river Velez in Malaga, southern Spain. Int J Syst Evol Microbiol 2005; 55:191-195.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 달성군 옥포읍 간경리 966-1
GPS	35°48′16.5″N, 128°28′00.5″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B6034_16S rRNA
TTTTGAGGTTTTGAATTCCGGCTCAGGACGAACGCTGGCGGCGTGC
CTAATACATGCAAGTCGAGCGGACAGATGGGAGCTTGCTCCCTGATG
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TGGGATAACTCCGGGAAACCGGGGCTAATACCGGATGGTTGTTTGAA
CCGCATGGTTCAGACATAAAAGGTGGCTTCGGCTACCACTTACAGATG
GACCCGCGGCGCATTAGCTAGTTGGTGAGGTAACGGCTCACCAAGG
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TGAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTT
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GGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCG
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CGTCCCCTTCGGGGGCAGAGTGACAGGTGGTGCATGGTTGTCGTCA
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TTGATCTTAGTTGCCAGCATTCAGTTGGGCACTCTAAGGTGACTGCCG
GTGACAAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGCCCC
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GCGAAACCGCGAGGTTAAGCCAATCCCACAAATCTGTTCTCAGTTCG
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AGTCTAAAAGGGGTGA

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion



Siderophore production



Phosphate solubilization activity

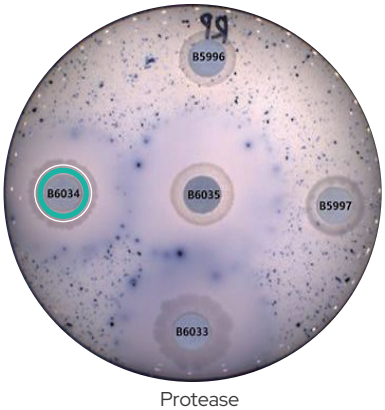
효소 활성
Enzyme Activity



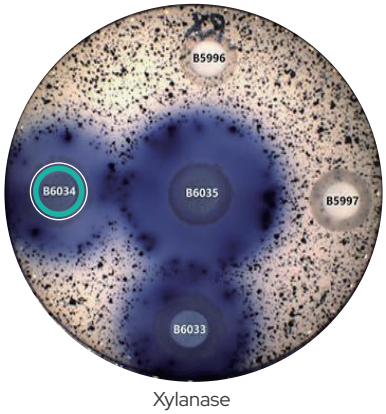
Amylase



Glycosidase



Protease



Xylanase



Bacillus licheniformis FBCC-B6059

Chester FD. A Manual of Determinative Bacteriology. The MacMillan Co., New York, 1901.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	98.91%

유전자 염기서열

>FBCC-B6059_16S rRNA
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항진균 활성
Antifungal Activity

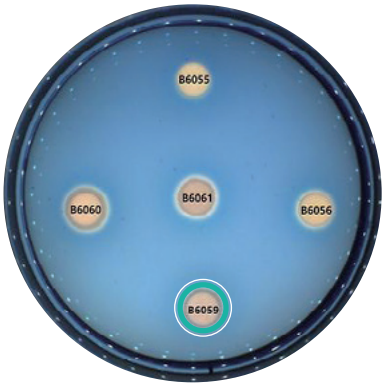


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

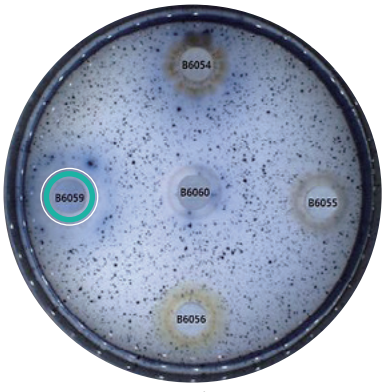


Siderophore production

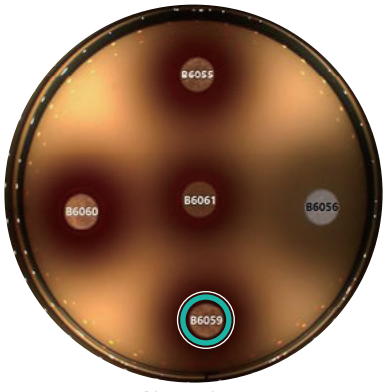


Phosphate solubilization activity

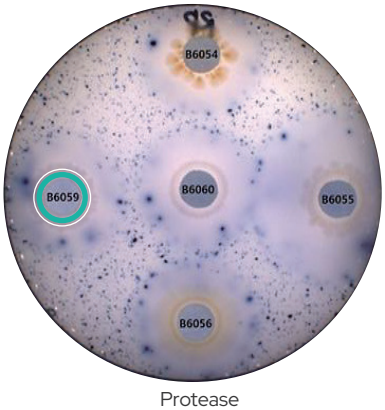
효소 활성
Enzyme Activity



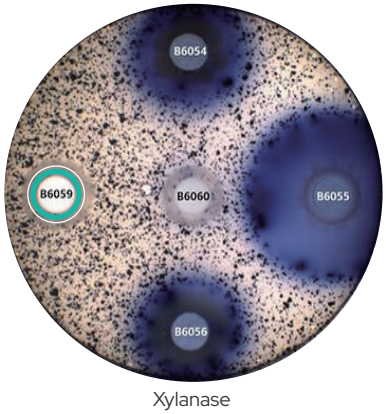
Amylase



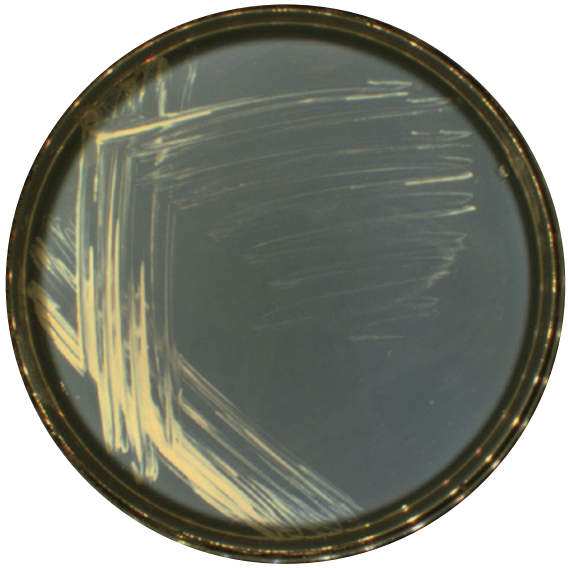
Glycosidase



Protease



Xylanase



Bacillus stercoris FBCC-B6062

Dunlap CA, Bowman MJ, Zeigler DR. Promotion of *Bacillus subtilis* subsp. *inaquosorum*, *Bacillus subtilis* subsp. *spizizenii* and *Bacillus subtilis* subsp. *stercoris* to species status. Antonie Van Leeuwenhoek 2020; 113:1-12.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B6062_16S rRNA
TTTTGATTTGTGAGATCCGCTCAGGACGAACGCTGGCGGCGTGCCTA
ATACATGCAAGTCGAGCGGACAGATGGGAGCTTGCTCCCTGATGTTAG
CGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCTGTAAGACTGG
GATAACTCCGGGAAACCGGGGCTAATACCGGATGCTTGTTTGAACCG
CATGGTTCAAACATAAAAGGTGGCTTCGGCTACCACTTACAGATGGAC
CCGCGGCGCATTAGCTAGTTGGTGAGGTAATGGCTCACCAAGGCGAC
GATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGGGACTGAG
ACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCGC
AATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAGGT
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ATAGGGCGGTACCTTGACGGTACCTAACCAGAAAGCCACGGCTAACT
ACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGG
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GAAACCGCGAGGTTAAGCCAATCCCACAAATCTGTTCTCAGTTCGGAT
CGCAGTCTGCAACTCGACTGCGTGAAGCTGGAATCGCTAGTAATCGC
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CCCGTCACACCACGAGAGTTTGTAACACCCGAAGTCGGTGAGGTAAC
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항진균 활성
Antifungal Activity

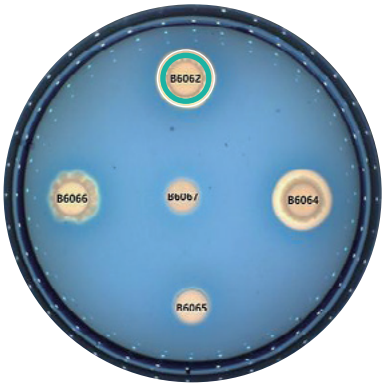


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

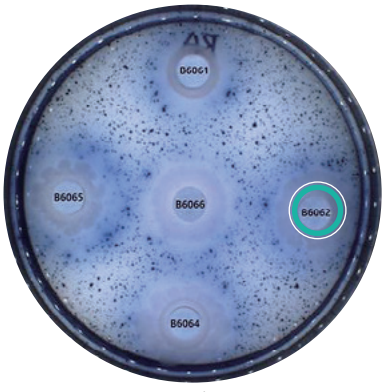


Siderophore production



Phosphate solubilization activity

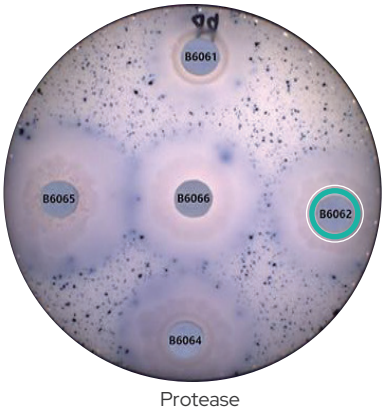
효소 활성
Enzyme Activity



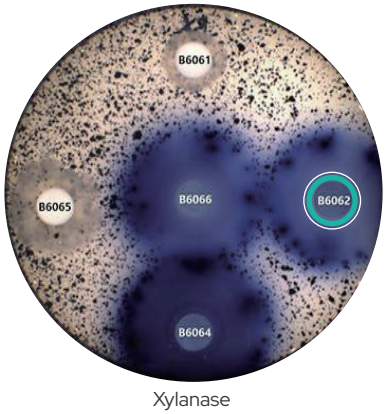
Amylase



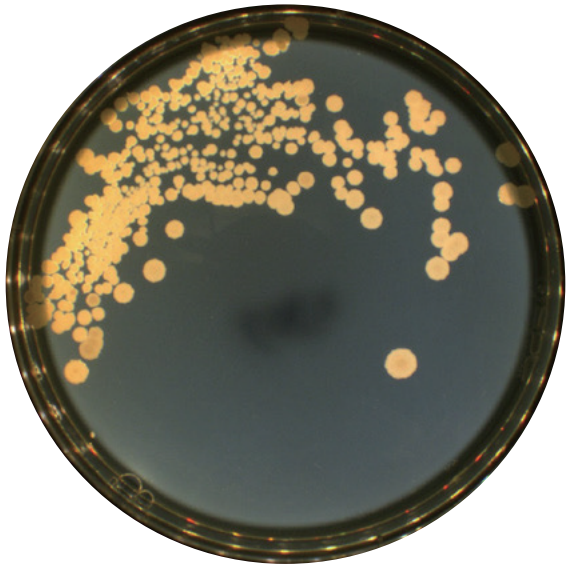
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B6063

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B6063_16S rRNA
TTTTGAGGTTTTGGAAACCGGTCAGGACGAACGCTGGCGGCGTGCC
TAATACATGCAAGTCGAGCGGACAGATGGGAGCTTGCTCCCTGATGTT
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CGAATAGGGCGGTACCTTGACGGTACCTAACCAGAAAGCCACGGCTA
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GGAATTATTGGGCGTAAAGGGCTCGCAGGCGGTTTCTTAAGTCTGAT
GTGAAAGCCCCCGGCTCAACCGGGGAGGGTCATTGGAAACTGGGG
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GGGGGTTTCCGCCCCTTAGTGCTGCAGCTAACGCATTAAGCACTCCG
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GGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCG
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항진균 활성
Antifungal Activity

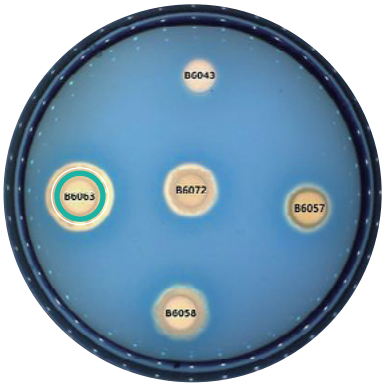


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

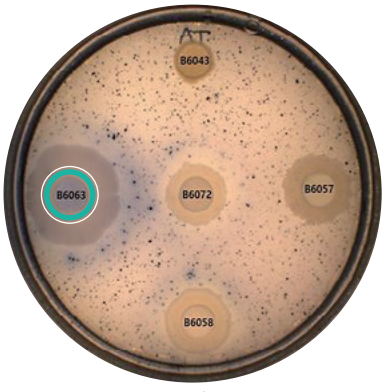


Siderophore production



Phosphate solubilization activity

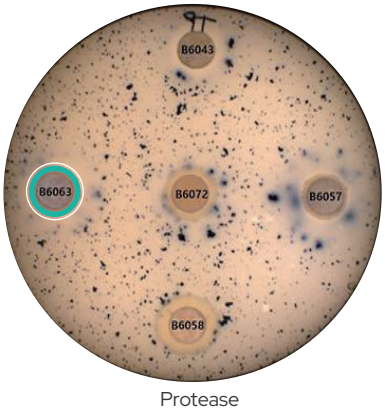
효소 활성
Enzyme Activity



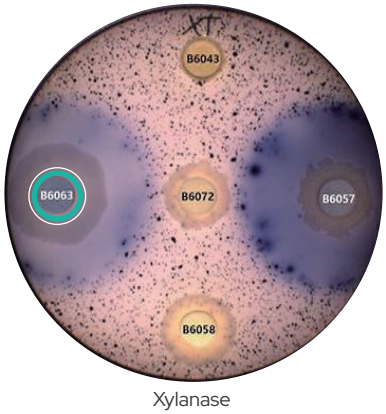
Amylase



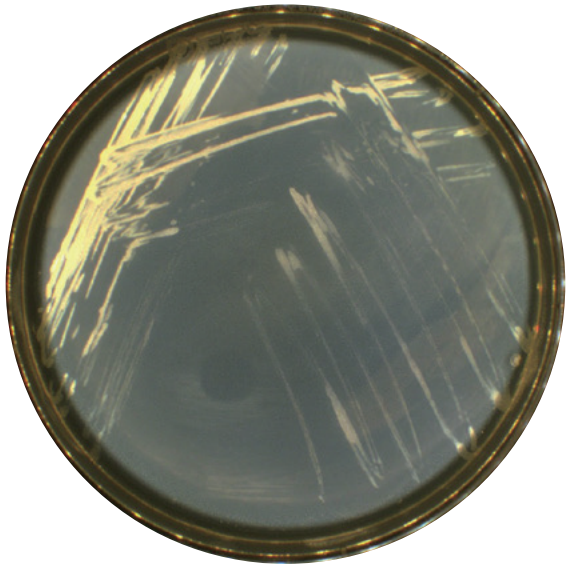
Glycosidase



Protease



Xylanase



Bacillus stercoris FBCC-B6064

Dunlap CA, Bowman MJ, Zeigler DR. Promotion of *Bacillus subtilis* subsp. *inaquosorum*, *Bacillus subtilis* subsp. *spizizenii* and *Bacillus subtilis* subsp. *stercoris* to species status. Antonie Van Leeuwenhoek 2020; 113:1-12.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	100%

유전자 염기서열

>FBCC-B6064_16S rRNA
TTTTGAGGTTTTGGGATCTGGTCAGGACGAACGCTGGCGGCGTGCC
TAATACATGCAAGTCGAGCGGACAGATGGGAGCTTGCTCCCTGATGTT
AGCGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCTGTAAGACT
GGGATAACTCCGGGAAACCGGGGCTAATACCGGATGCTTGTTTGAAC
CGCATGGTTCAAACATAAAAGGTGGCTTCGGCTACCACTTACAGATGG
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GCAATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAG
GTTTTCGGATCGTAAAGCTCTGTTGTTAGGGAAGAACAAGTACCGTTC
GAATAGGGCGGTACCTTGACGGTACCTAACCAGAAAGCCACGGCTAA
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CTTGAGTGCAGAAGAGGAGAGTGGAATTCCACGTGTAGCGGTGAAAT
GCGTAGAGATGTGGAGGAACACCAGTGGCGAAGGCGACTCTCTGGT
CTGTAACTGACGCTGAGGAGCGAAAGCGTGGGGAGCGAACAGGATT
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CCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAA
GAACCTTACCAGGTCTTGACATCCTCTGACAATCCTAGAGATAGGACG
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항진균 활성
Antifungal Activity

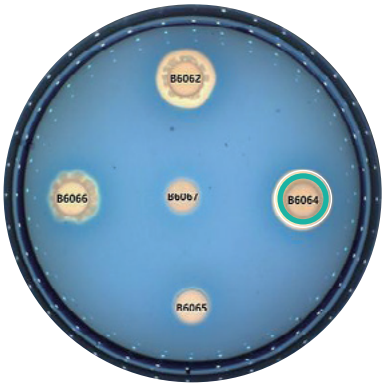


Colletotrichum gloeosporioides

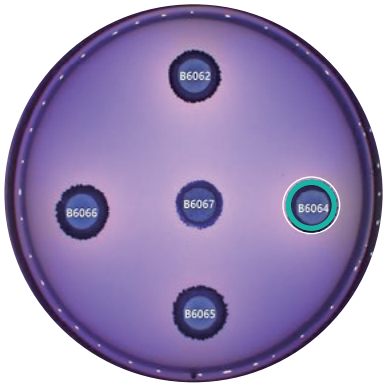


Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

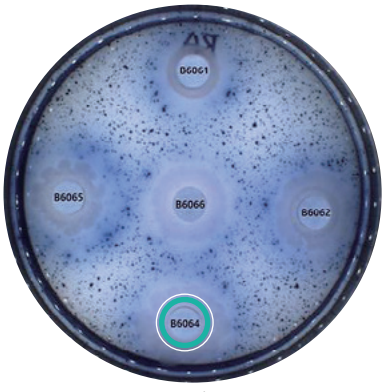


Siderophore production

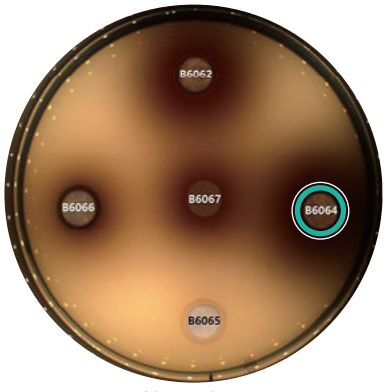


Phosphate solubilization activity

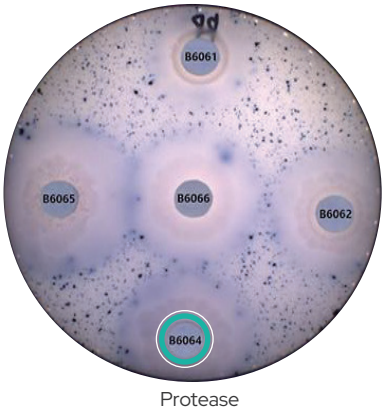
효소 활성
Enzyme Activity



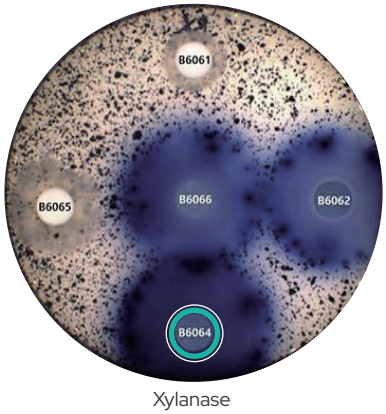
Amylase



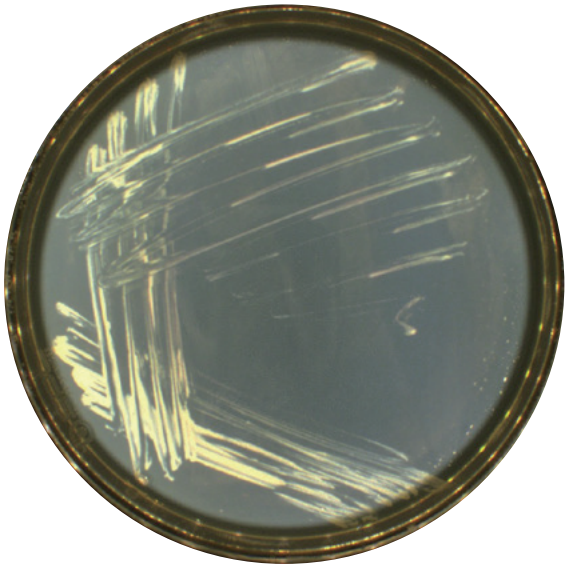
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B6066

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B6066_16S rRNA
TTTTGAGGTTGTGAACCTGCTCAGGACGAACGCTGGCGGCGTGCCT
AATACATGCAAGTCGAGCGGACAGATGGGAGCTTGCTCCCTGATGTTA
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항진균 활성
Antifungal Activity

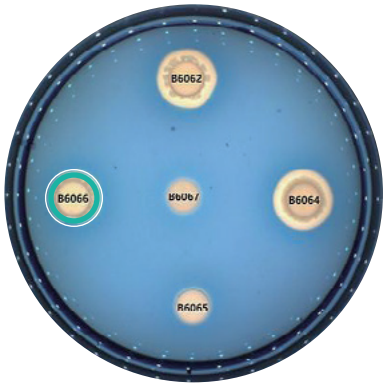


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

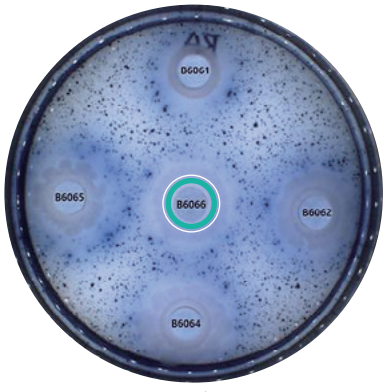


Siderophore production

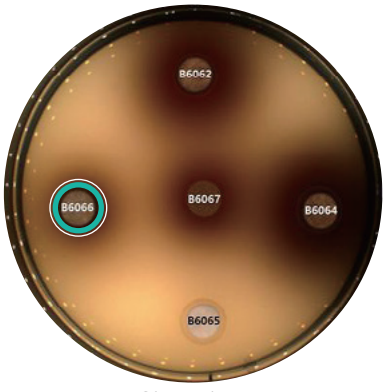


Phosphate solubilization activity

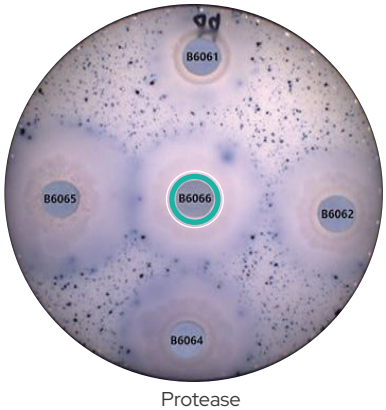
효소 활성
Enzyme Activity



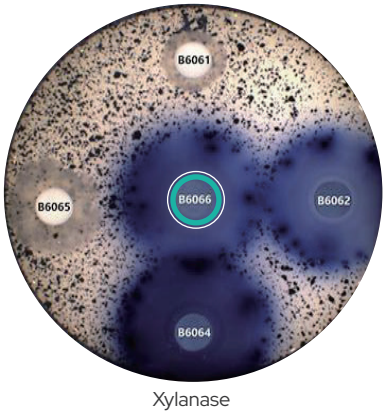
Amylase



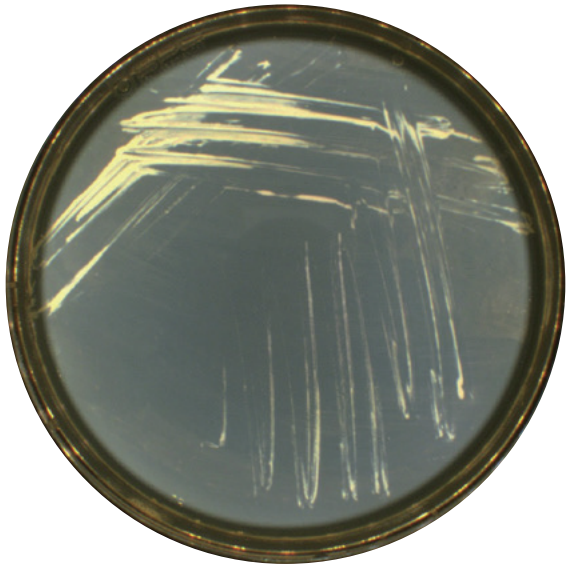
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B6068

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B6068_16S rRNA
TTTTGAGTTTGGGATTCTGCTCAGGACGAACGCTGGCGGCGTGCCTA
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항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

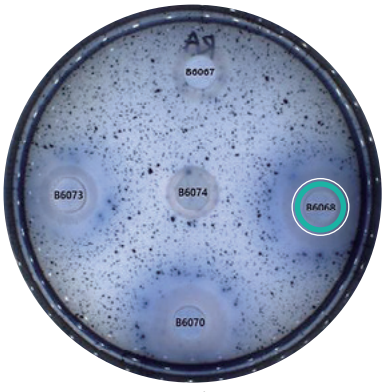


Siderophore production



Phosphate solubilization activity

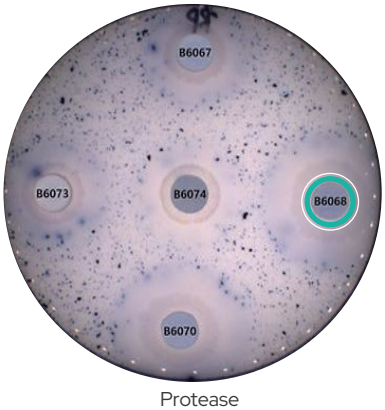
효소 활성
Enzyme Activity



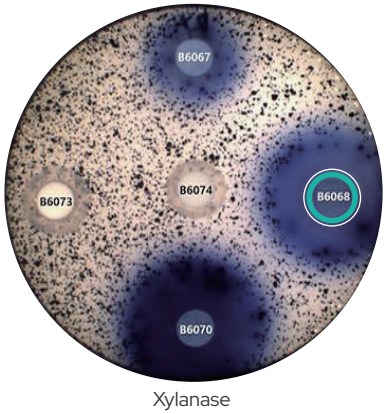
Amylase



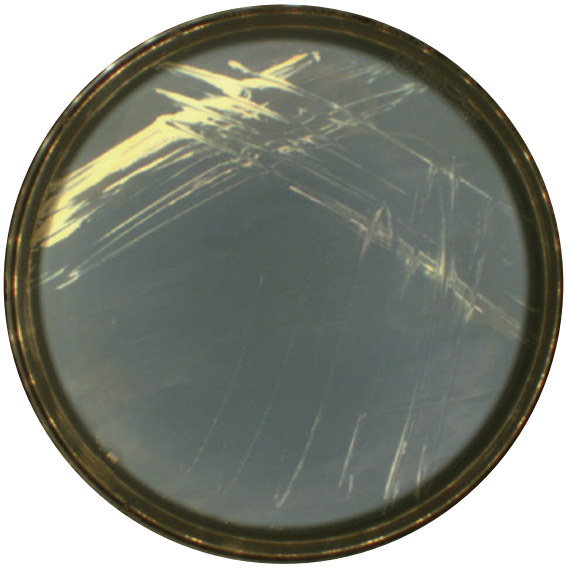
Glycosidase



Protease



Xylanase



Bacillus sonorensis FBCC-B6070

Palmisano MM, Nakamura LK, Duncan KE, Istock CA, Cohan FM. *Bacillus sonorensis* sp. nov., a close relative of *Bacillus licheniformis*, isolated from soil in the Sonoran Desert, Arizona. Int J Syst Evol Microbiol 2001; 51:1671-1679.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.86%

유전자 염기서열

>FBCC-B6070_16S rRNA
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CCTGGGGAGTACGGTCGCAAGACTGAAACTCAAAGGAATTGACGGG
GGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCG
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CTTCCCCTTCGGGGGCAGAGTGACAGGTGGTGCATGGTTGTCGTCA
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TTGATCTTAGTTGCCAGCATTCAGTTGGGCACTCTAAGGTGACTGCCG
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GCGAAGCCGCGAGGCTAAGCCAATCCCACAAATCTGCTCTCAGTTCG
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CGCGGATCAGCATGCCGCGGTGAATACGTTCCCGGGCCTTGTACACA
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항진균 활성
Antifungal Activity

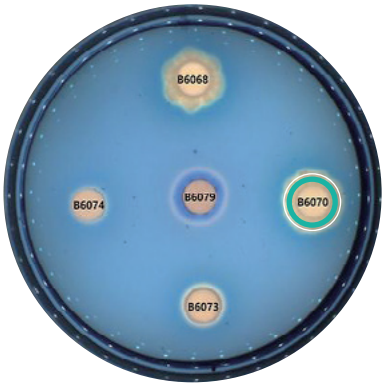


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

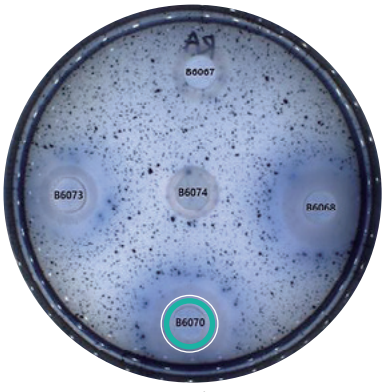


Siderophore production



Phosphate solubilization activity

효소 활성
Enzyme Activity



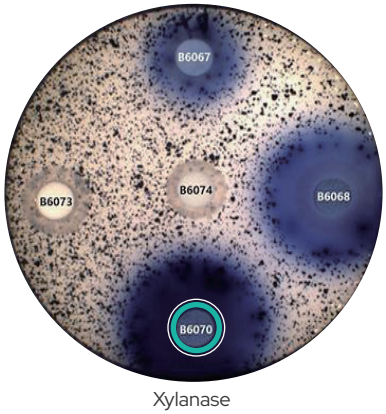
Amylase



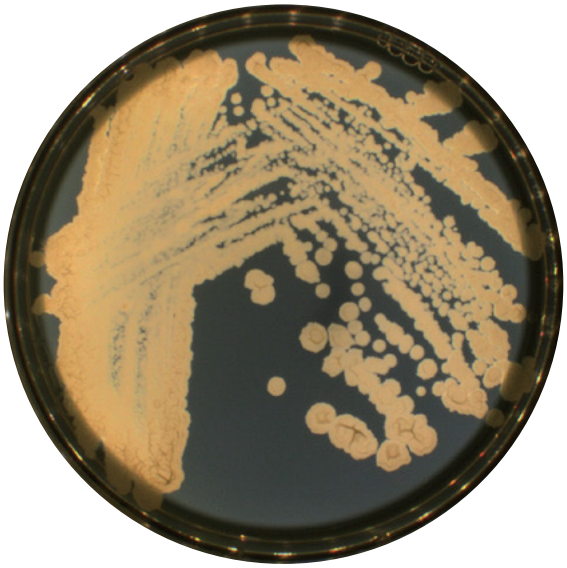
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B6072

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.86%

유전자 염기서열

>FBCC-B6072_16S rRNA
CTTTTGAGTATGATTCTGGCTCAGGACGAACGCTGGCGGCGTGCCTA
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TCTACCCGGGGGTGCCCCCTTAAAAA

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

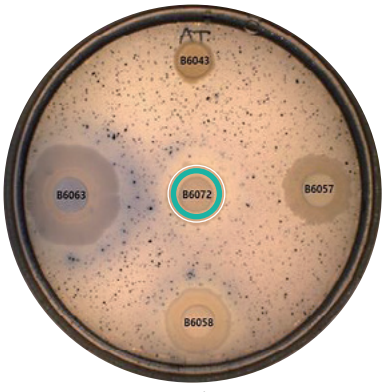


Siderophore production

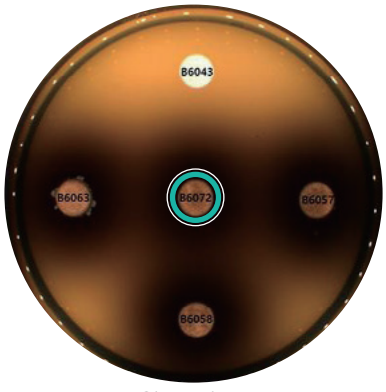


Phosphate solubilization activity

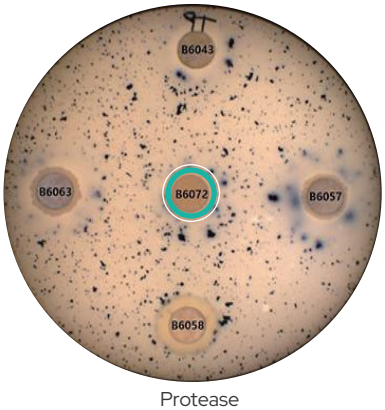
효소 활성
Enzyme Activity



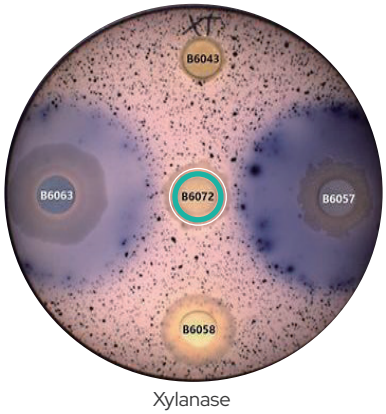
Amylase



Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B6079

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B6079_16S rRNA
CTGAGGTTGATAATTCGCTCAGGACGAACGCTGGCGGCGTGCCTAAT
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ATAACTCCGGGAAACCGGGGCTAATACCGGATGGTTGTTTGAACCGC
ATGGTTCAAACATAAAAGGTGGCTTCGGCTACCACTTACAGATGGACC
CGCGGCGCATTAGCTAGTTGGTGAGGTAACGGCTCACCAAGGCAAC
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ACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCGC
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TTTCGGATCGTAAAGCTCTGTTGTTAGGGAAGAACAAGTACCGTTCGA
ATAGGGCGGTACCTTGACGGTACCTAACCAGAAAGCCACGGCTAACT
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TTGAGTGCAGAAGAGGAGAGTGGAATTCCACGTGTAGCGGTGAAATG
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CCTTCGGGGGCAGAGTGACAGGTGGTGCATGGTTGTCGTCAGCTCG
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GATCAGCATGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGC
CCGTCACACCACGAGAGTTTGTACACCCGAAGTCGGTGAGGTAACCT
TTTAGGAGCCAGCCGCCGAAGGTGGGACAGATGATTGGGGTGAGTC
AAAAGGGGGTGGGCCCCCAATAAAA

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

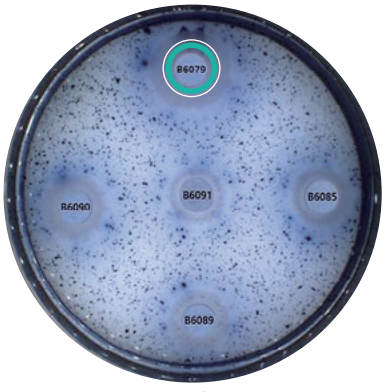


Siderophore production



Phosphate solubilization activity

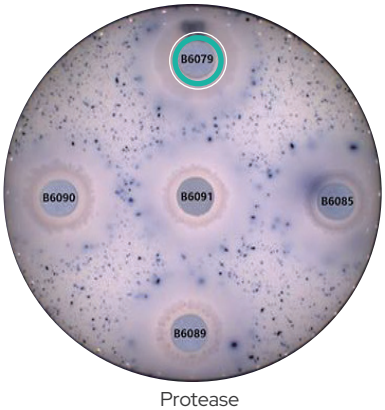
효소 활성
Enzyme Activity



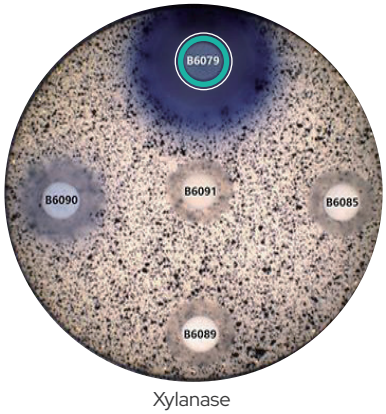
Amylase



Glycosidase



Protease



Xylanase



Bacillus subtilis FBCC-B6092

Cohn F. Untersuchungen über Bakterien. In: Cohn F (eds), Beiträge zur Biologie der Pflanzen 1 (Heft 2), 1872, Max Müller, Breslau, 1875, p. 127-224.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

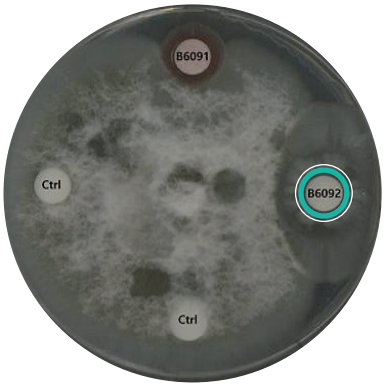
기본정보

채집지역	대구광역시 북구 동천동 850-5
GPS	35°56′20.2″N, 128°33′26.6″E
분리원	담수
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.73%

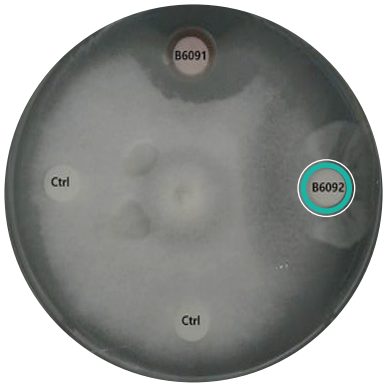
유전자 염기서열

>FBCC-B6092_16S rRNA
TTTTGAGTTTGAGATCCTGCTCAGGACGAACGCTGGCGGCGTGCCTA
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CGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCTGTAAGACTGG
GATAACTCCGGGAAACCGGGGCTAATACCGGATGGTTGTTTGAACCG
CATGGTTCAGACATAAAAGGTGGCTTCGGCTACCACTTACAGATGGAC
CCGCGGCGCATTAGCTAGTTGGTGAGGTAACGGCTCACCAAGGCGA
CGATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGGGACTGA
GACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCG
CAATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAGG
TTTTCGGATCGTAAAGCTCTGTTGTTAGGGAAGAACAAGTGCCGTTCA
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AATTATTGGGCGTAAAGGGCTCGCAGGCGGTTTCTTAAGTCTGATGTG
AAAGCCCCCGGCTCAACCGGGGAGGGTCATTGGAAACTGGGGAAC
TTGAGTGCAGAAGAGGAGAGTGGAATTCCACGTGTAGCGGTGAAATG
CGTAGAGATGTGGAGGAACACCAGTGGCGAAGGCGACTCTCTGGTC
TGTAACTGACGCTGAGGAGCGAAAGCGTGGGGAGCGAACAGGATTA
GATACCCTGGTAGTCCACGCCGTAAACGATGAGTGCTAAGTGTTAGGG
GGTTTCCGCCCCTTAGTGCTGCAGCTAACGCATTAAGCACTCCGCCT
GGGGAGTACGGTCGCAAGACTGAAACTCAAAGGAATTGACGGGGGC
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AACCTTACCAGGTCTTGACATCCTCTGACAATCCTAGAGATAGGACGT
CCCCTTCGGGGGCAGAGTGACAGGTGGTGCATGGTTGTCGTCAGCT
CGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTG
ATCTTAGTTGCCAGCATTCAGTTGGGCACTCTAAGGTGACTGCCGGT
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ATGACCTGGGCTACACACGTGCTACAATGGACAGAACAAAGGGCAGC
GAAACCGCGAGGTTAAGCCAATCCCACAAATCTGTTCTCAGTTCGGAT
CGCAGTCTGCAACTCGACTGCGTGAAGCTGGAATCGCTAGTAATCGC
GGATCAGCATGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCG
CCCGTCACACCACGAGAGTTTGTAACACCCGAAGTCGGTGAAGTAAC
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항진균 활성
Antifungal Activity

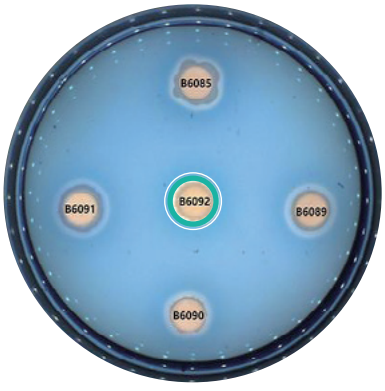


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

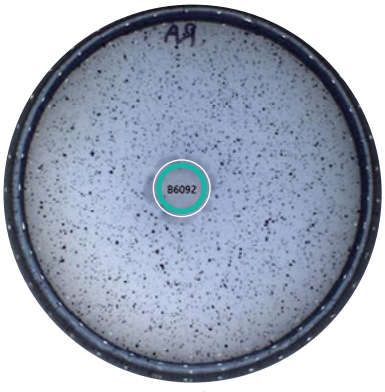


Siderophore production



Phosphate solubilization activity

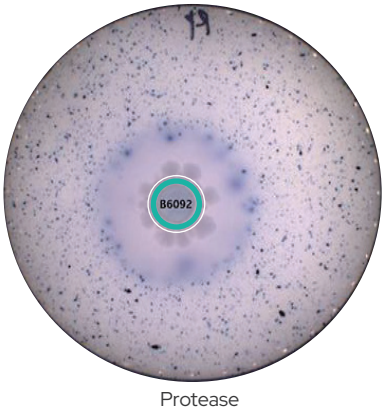
효소 활성
Enzyme Activity



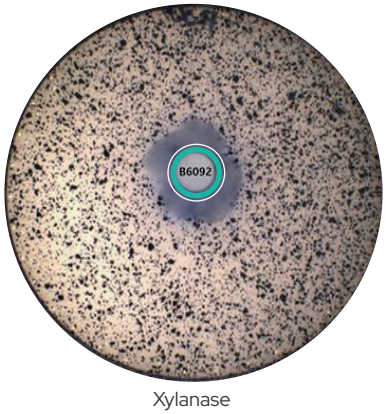
Amylase



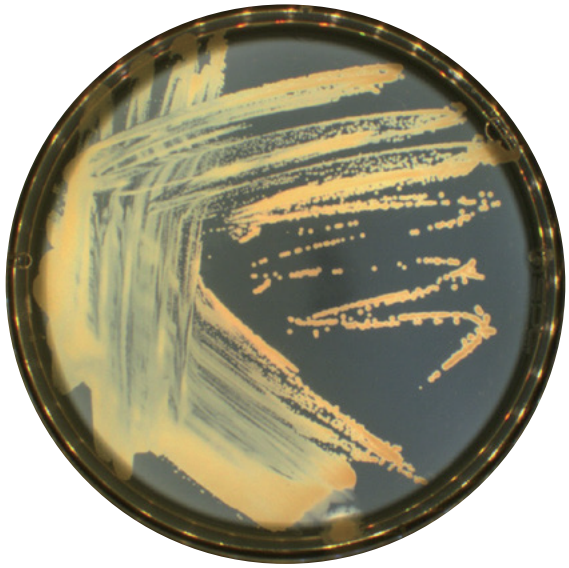
Glycosidase



Protease



Xylanase



Bacillus altitudinis FBCC-B6131

Shivaji S, Chaturvedi P, Suresh K, Reddy GS, Dutt CB, Wainwright M, Narlikar JV, Bhargava PM. *Bacillus aerius* sp. nov., *Bacillus aerophilus* sp. nov., *Bacillus stratosphericus* sp. nov. and *Bacillus altitudinis* sp. nov., isolated from cryogenic tubes used for collecting air samples from high altitudes. Int J Syst Evol Microbiol 2006; 56:1465-1473.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

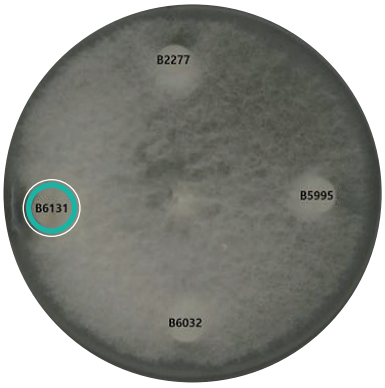
기본정보

채집지역	경상북도 김천시 봉산면 신리 348-7
GPS	36°08′08.3″N, 128°03′53.7″E
분리원	토양
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	100%

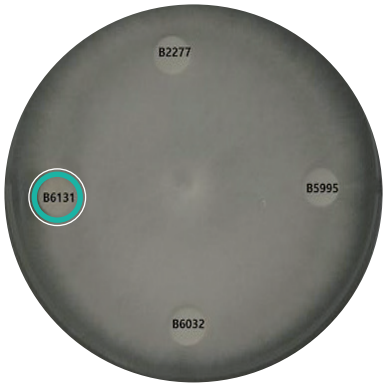
유전자 염기서열

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TGGTTCAAGGATGAAAGACGGTTTCGGCTGTCACTTACAGATGGACC
CGCGGCGCATTAGCTAGTTGGTGAGGTAACGGCTCACCAAGGCGAC
GATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGGGACTGAG
ACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTCCGC
AATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAAGGT
TTTCGGATCGTAAAGCTCTGTTGTTAGGGAAGAACAAGTGCAAGAGTA
ACTGCTTGCACCTTGACGGTACCTAACCAGAAAGCCACGGCTAACTA
CGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGTCCGGA
ATTATTGGGCGTAAAGGGCTCGCAGGCGGTTTCTTAAGTCTGATGTGA
AAGCCCCCGGCTCAACCGGGGAGGGTCATTGGAAACTGGGAAACTT
GAGTGCAGAAGAGGAGAGTGGAATTCCACGTGTAGCGGTGAAATGCG
TAGAGATGTGGAGGAACACCAGTGGCGAAGGCGACTCTCTGGTCTGT
AACTGACGCTGAGGAGCGAAAGCGTGGGGAGCGAACAGGATTAGAT
ACCCTGGTAGTCCACGCCGTAAACGATGAGTGCTAAGTGTTAGGGGG
TTTCCGCCCCTTAGTGCTGCAGCTAACGCATTAAGCACTCCGCCTGG
GGAGTACGGTCGCAAGACTGAAACTCAAAGGAATTGACGGGGGCCC
GCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAAGAAC
CTTACCAGGTCTTGACATCCTCTGACAACCCTAGAGATAGGGCTTTCC
CTTCGGGGACAGAGTGACAGGTGGTGCATGGTTGTCGTCAGCTCGT
GTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTTGATC
TTAGTTGCCAGCATTCAGTTGGGCACTCTAAGGTGACTGCCGGTGAC
AAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGCCCCTTATG
ACCTGGGCTACACACGTGCTACAATGGACAGAACAAAGGGCTGCGA
GACCGCAAGGTTTAGCCAATCCCACAAATCTGTTCTCAGTTCGGATCG
CAGTCTGCAACTCGACTGCGTGAAGCTGGAATCGCTAGTAATCGCGG
ATCAGCATGCCGCGGTGAATACGTTCCCGGGCCTTGTACACACCGCC
CGTCACACCACGAGAGTTTGCAACACCCGAAGTCGGTGAGGTAACCT
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항진균 활성
Antifungal Activity

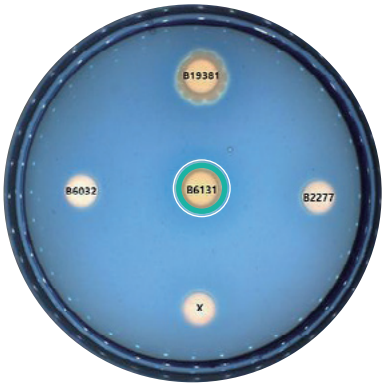


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion



Siderophore production



Phosphate solubilization activity

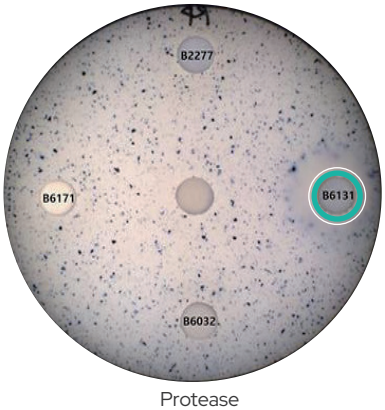
효소 활성
Enzyme Activity



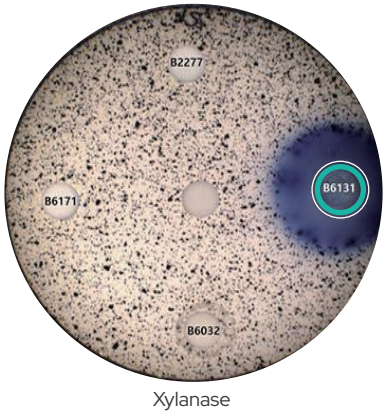
Amylase



Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B6156

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

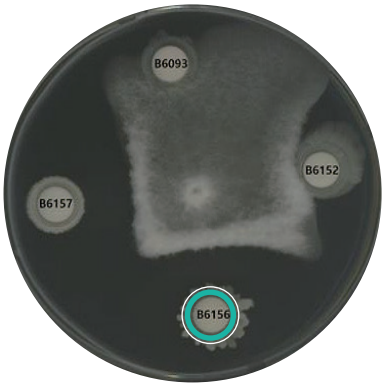
기본정보

채집지역	경상남도 합천군 가야면 이천리 56
GPS	35°43′54.9″N, 128°08′27.4″E
분리원	토양
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.39%

유전자 염기서열

>FBCC-B6156_16S rRNA
TTTTGATTTTGTTGATTCTGCTCAGGACGAACGCTGGCGGCGTGCCT
AATACATGCAAGTCGAGCGGACAGATGGGAGCTTGCTCCCTGATGTTA
GCGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCTGTAAGACTG
GGATAACTCCGGGAAACCGGGGCTAATACCGGATGGTTGTCTGAACC
GCATGGTTCAGACATAAAAGGTGGCTTCGGCTACCACTTACAGATGGA
CCCGCGGCGCATTAGCTAGTTGGTGAGGTAACGGCTCACCAAGGCG
ACGATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGGGACTG
AGACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATTTTCC
GCAATGGACGAAAGTTTGACGGAGCAACGCCGCGTGAGTGATGAAG
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CTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCCAGCGTTGTCCG
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GAAAGCCCCCGGCTCAACCGGGGAGGGTCATTGGAAACTGGGGAA
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CCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCGAA
GAACCTTACCAGGTCTTGACATCCTCTGACAATCCTAGAGATAGGACG
TCCCCTTCGGGGGCAGAGTGACAGGTGGTGCATGGTTGTCGTCAGC
TCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCCTT
GATCTTAGTTGCCAGCATTCAGTTGGGCACTCTAAGGTGACTGCCGG
TGACAAACCGGAGGAAGGTGGGGATGACGTCAAATCATCATGCCCCT
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항진균 활성
Antifungal Activity

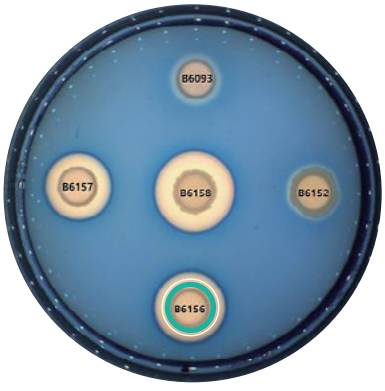


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

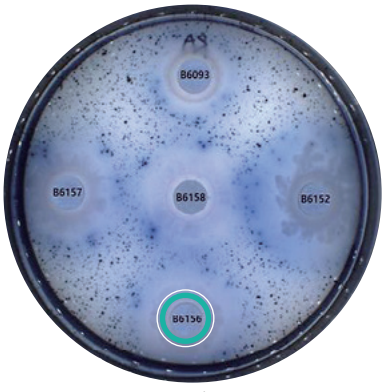


Siderophore production



Phosphate solubilization activity

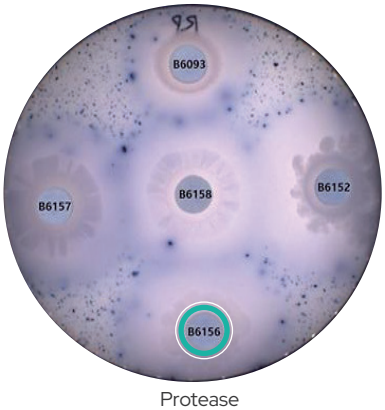
효소 활성
Enzyme Activity



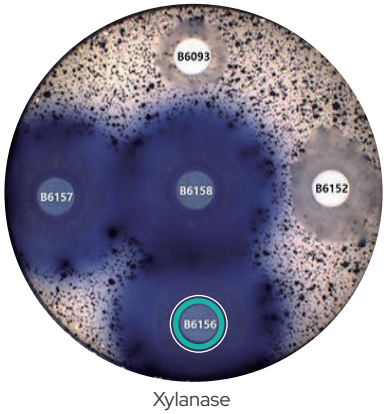
Amylase



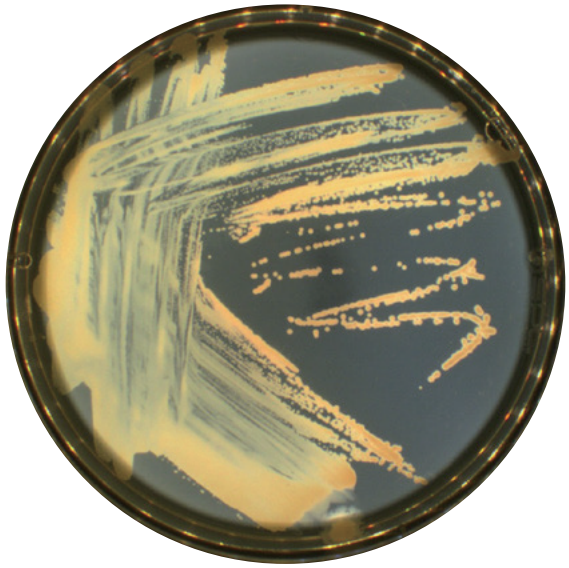
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B6157

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

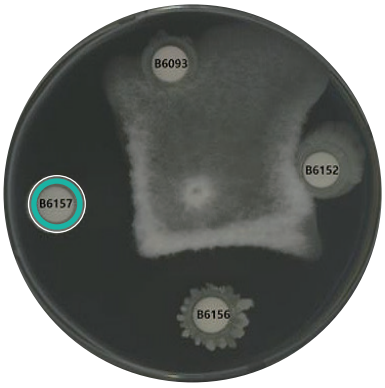
기본정보

채집지역	경상남도 합천군 가야면 이천리 56
GPS	35°43′54.9″N, 128°08′27.4″E
분리원	토양
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.73%

유전자 염기서열

>FBCC-B6157_16S rRNA
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항진균 활성
Antifungal Activity

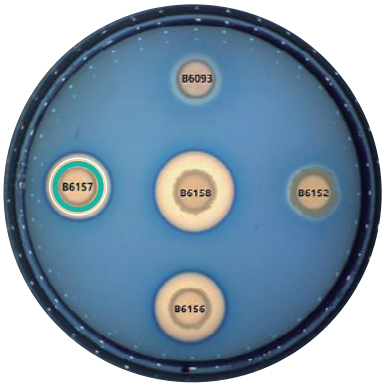


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

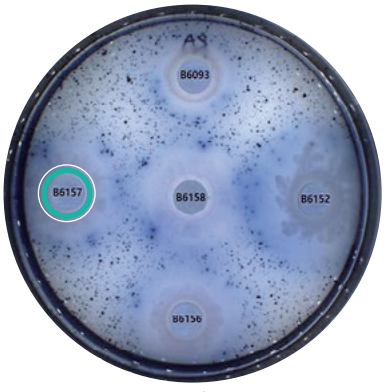


Siderophore production



Phosphate solubilization activity

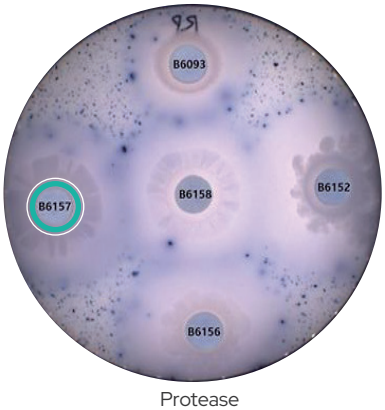
효소 활성
Enzyme Activity



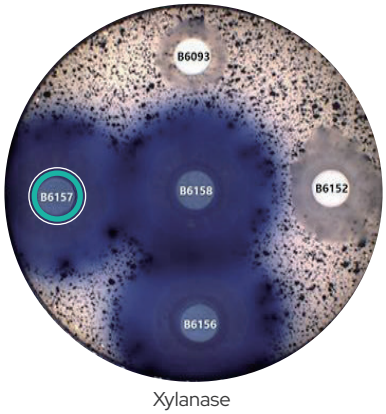
Amylase



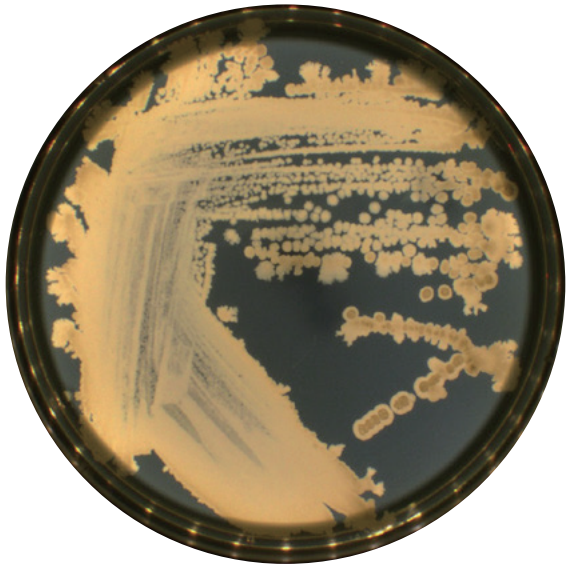
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B6158

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	Bacillus

기본정보

채집지역	경상남도 합천군 가야면 이천리 56
GPS	35°43′54.9″N, 128°08′27.4″E
분리원	토양
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.80%

유전자 염기서열

>FBCC-B6158_16S rRNA
TTTTGAGTTTGGATCTGGCTCAGGACGAACGCTGGCGGCGTGCCTAA
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GATAACTCCGGGAAACCGGGGCTAATACCGGATGGTTGTCTGAACCG
CATGGTTCAGACATAAAAGGTGGCTTCGGCTACCACTTACAGATGGAC
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항진균 활성
Antifungal Activity

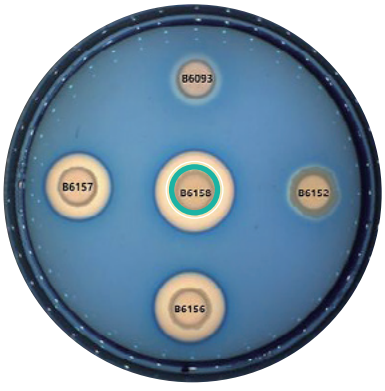


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

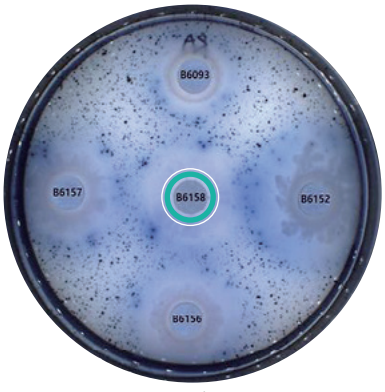


Siderophore production



Phosphate solubilization activity

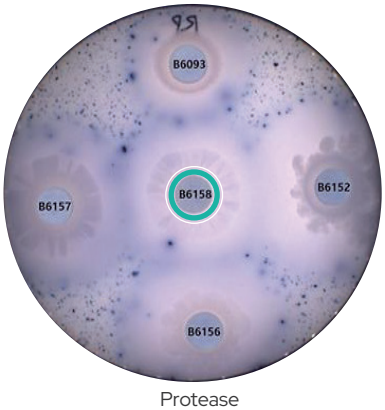
효소 활성
Enzyme Activity



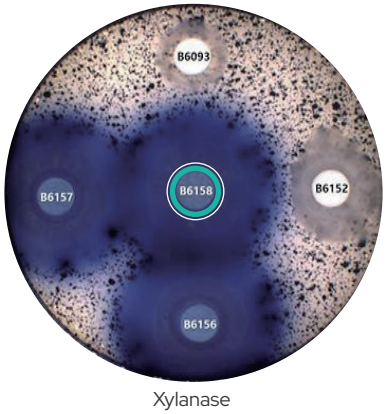
Amylase



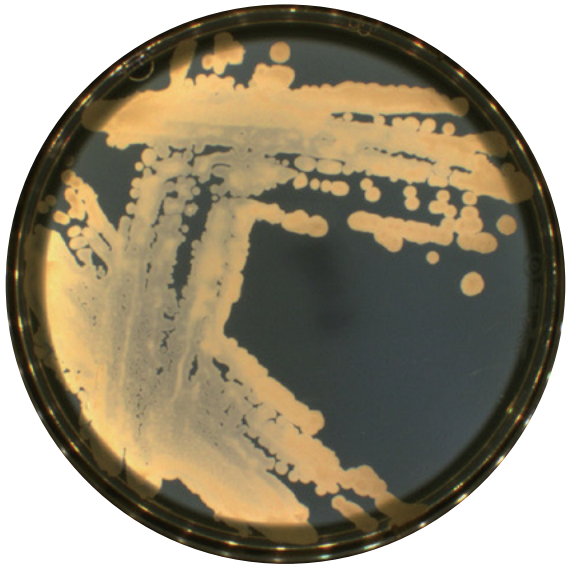
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B6159

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상남도 합천군 가야면 이천리 56
GPS	35°43′54.9″N, 128°08′27.4″E
분리원	토양
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.86%

유전자 염기서열

>FBCC-B6159_16S rRNA
TTTTGAAGTTTTTGATCTCTGCTCAGGACGAACGCTGGCGGCGTGCC
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항진균 활성
Antifungal Activity

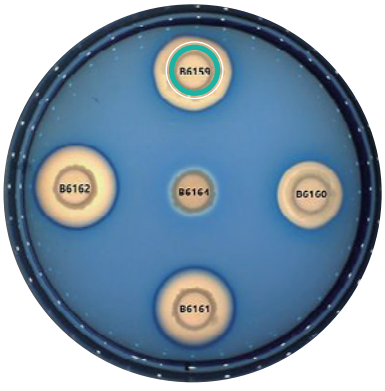


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

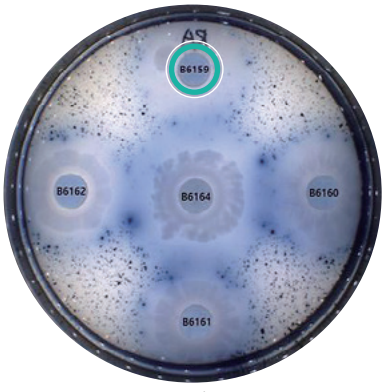


Siderophore production



Phosphate solubilization activity

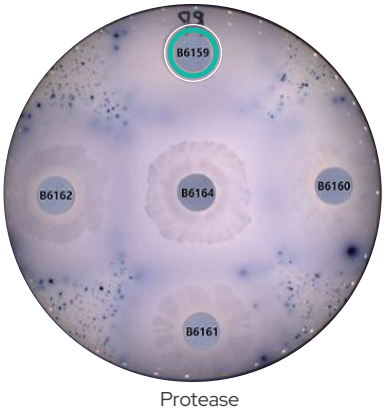
효소 활성
Enzyme Activity



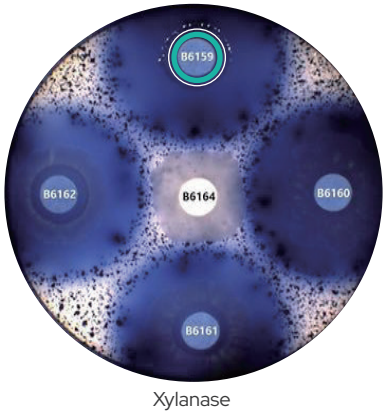
Amylase



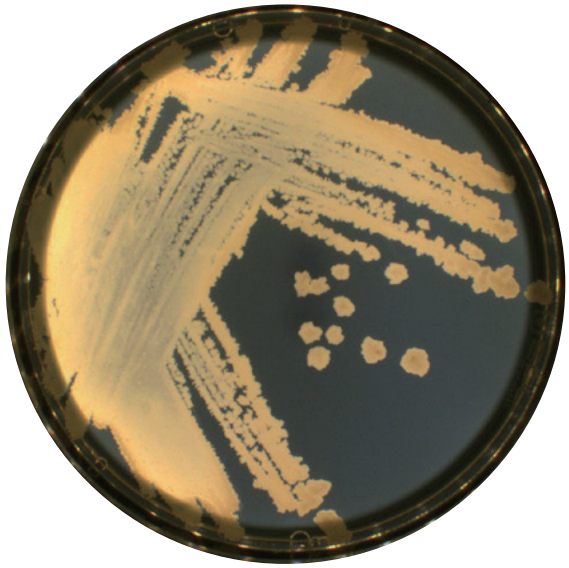
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B6160

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상남도 합천군 가야면 이천리 56
GPS	35°43′54.9″N, 128°08′27.4″E
분리원	토양
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.52%

유전자 염기서열

>FBCC-B6160_16S rRNA
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항진균 활성
Antifungal Activity

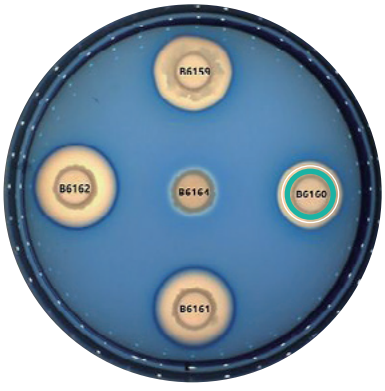


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion



Siderophore production



Phosphate solubilization activity

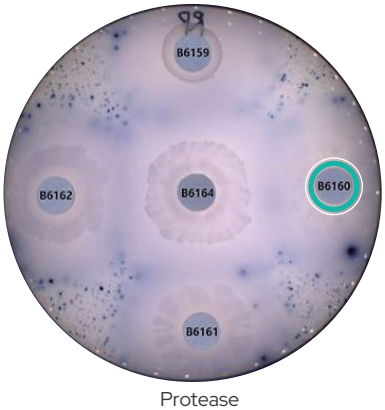
효소 활성
Enzyme Activity



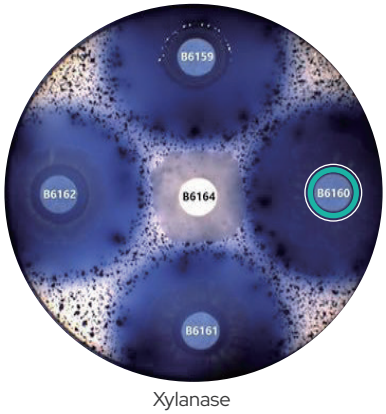
Amylase



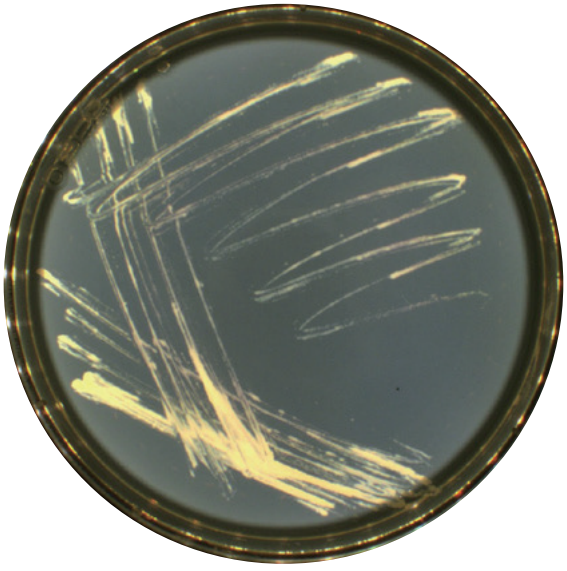
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B6161

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상남도 합천군 가야면 이천리 56
GPS	35°43′54.9″N, 128°08′27.4″E
분리원	토양
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.80%

유전자 염기서열

>FBCC-B6161_16S rRNA
TCCGCTCAGGACGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGA
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GACTGCGTGAAGCTGGAATCGCTAGTAATCGCGGATCAGCATGCCGC
GGTGAATACGTTCCCGGGCCTTGTACACACCGCCCGTCACACCACGA
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항진균 활성
Antifungal Activity

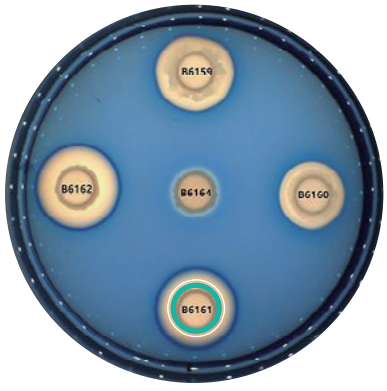


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion



Siderophore production



Phosphate solubilization activity

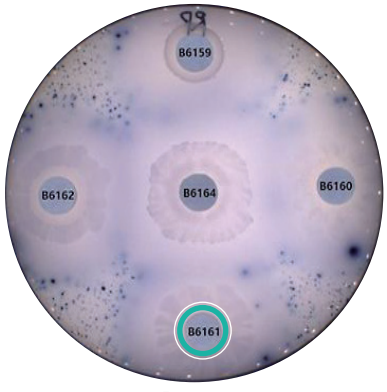
효소 활성
Enzyme Activity



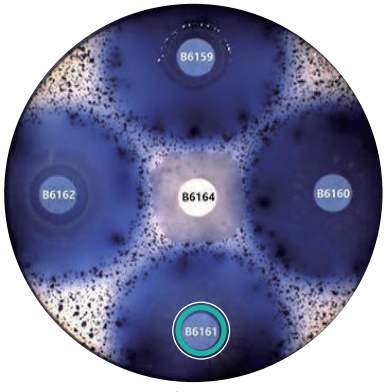
Amylase



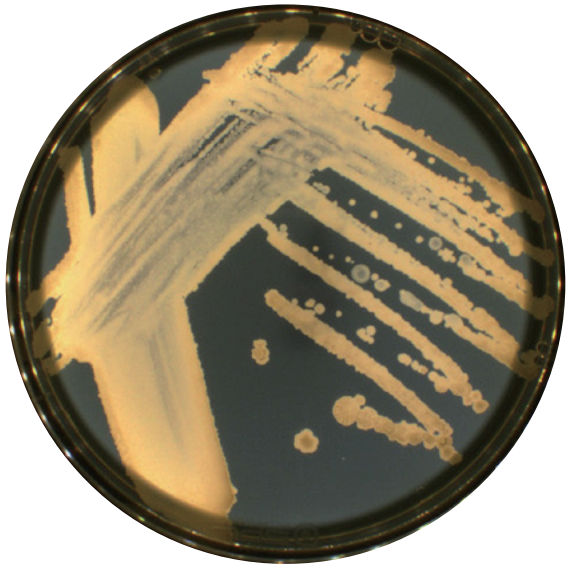
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B6162

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

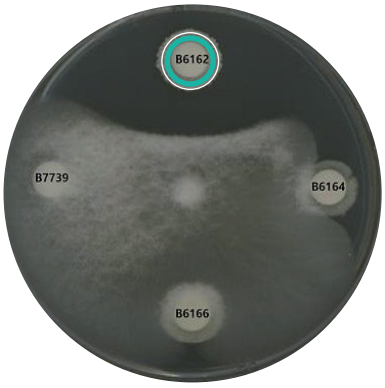
기본정보

채집지역	경상남도 합천군 가야면 이천리 56
GPS	35°43′54.9″N, 128°08′27.4″E
분리원	토양
배지	Luria-Bertani agar(LB)
온도	25°C
유사도	99.80%

유전자 염기서열

>FBCC-B6162_16S rRNA
TTTTGAGGTTGGGGTATCTGCTCAGGACGAACGCTGGCGGCGTGCC
TAATACATGCAAGTCGAGCGGACAGATGGGAGCTTGCTCCCTGATGTT
AGCGGCGGACGGGTGAGTAACACGTGGGTAACCTGCCTGTAAGACT
GGGATAACTCCGGGAAACCGGGGCTAATACCGGATGGTTGTCTGAAC
CGCATGGTTCAGACATAAAAGGTGGCTTCGGCTACCACTTACAGATGG
ACCCGCGGCGCATTAGCTAGTTGGTGAGGTAACGGCTCACCAAGGC
GACGATGCGTAGCCGACCTGAGAGGGTGATCGGCCACACTGGGACT
GAGACACGGCCCAGACTCCTACGGGAGGCAGCAGTAGGGAATCTTC
CGCAATGGACGAAAGTCTGACGGAGCAACGCCGCGTGAGTGATGAA
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TCAAATAGGGCGGCACCTTGACGGTACCTAACCAGAAAGCCACGGC
TAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGGCAAGCGTTGT
CCGGAATTATTGGGCGTAAAGGGCTCGCAGGCGGTTTCTTAAGTCTG
ATGTGAAAGCCCCCGGCTCAACCGGGGAGGGTCATTGGAAACTGGG
GAACTTGAGTGCAGAAGAGGAGAGTGGAATTCCACGTGTAGCGGTGA
AATGCGTAGAGATGTGGAGGAACACCAGTGGCGAAGGCGACTCTCTG
GTCTGTAACTGACGCTGAGGAGCGAAAGCGTGGGGAGCGAACAGG
ATTAGATACCCTGGTAGTCCACGCCGTAAACGATGAGTGCTAAGTGTTA
GGGGGTTTCCGCCCCTTAGTGCTGCAGCTAACGCATTAAGCACTCCG
CCTGGGGAGTACGGTCGCAAGACTGAAACTCAAAGGAATTGACGGG
GGCCCGCACAAGCGGTGGAGCATGTGGTTTAATTCGAAGCAACGCG
AAGAACCTTACCAGGTCTTGACATCCTCTGACAATCCTAGAGATAGGA
CGTCCCCTTCGGGGGCAGAGTGACAGGTGGTGCATGGTTGTCGTCA
GCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAACGAGCGCAACCC
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GCGAAACCGCGAGGTTAAGCCAATCCCACAAATCTGTTCTCAGTTCG
GATCGCAGTCTGCAACTCGACTGCGTGAAGCTGGAATCGCTAGTAAT
CGCGGATCAGCATGCCGCGGTGAATACGTTCCCGGGCCTTGTACACA
CCGCCCGTCACACCACGAGAGTTTGTAACACCGAAGTCGGTGAGGTA
CCNTTTATGGAGCAGCCGCCGAAGGTGGACAGATGATGGGGTGATCA
AA

항진균 활성
Antifungal Activity

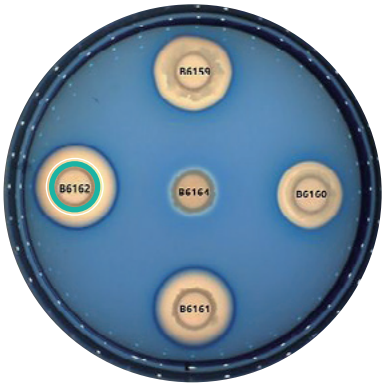


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

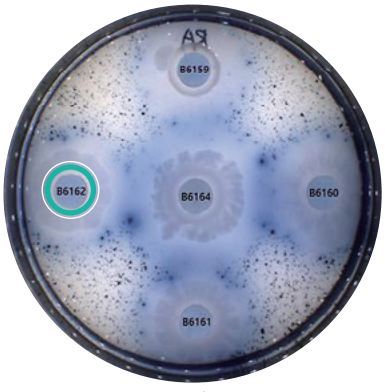


Siderophore production



Phosphate solubilization activity

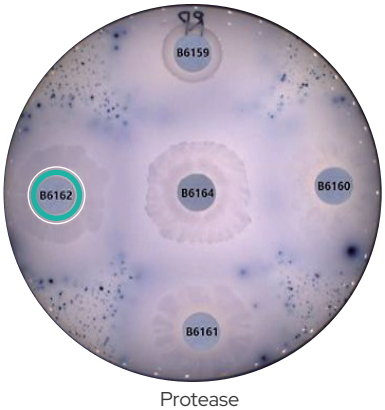
효소 활성
Enzyme Activity



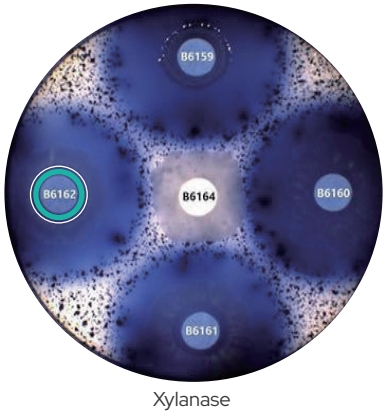
Amylase



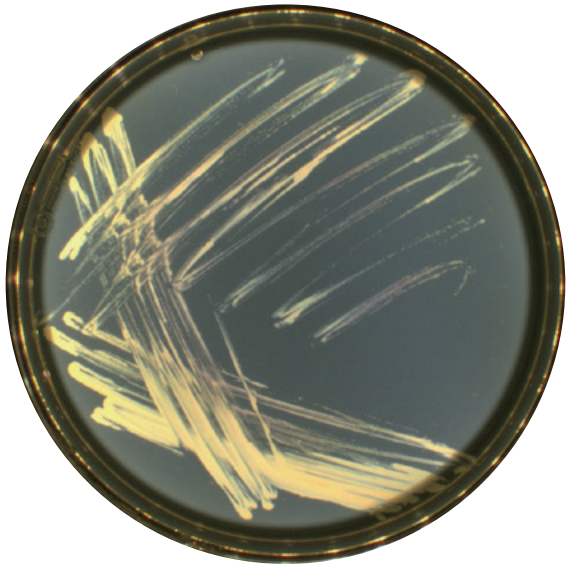
Glycosidase



Protease



Xylanase



Bacillus halotolerans FBCC-B11183

Tindall BJ. The consequences of *Bacillus axarquiensis* Ruiz-Garcia et al. 2005, *Bacillus malacitensis* Ruiz-Garcia et al. 2005 and *Brevibacterium halotolerans* Delaporte and Sasson 1967 (Approved Lists 1980) being treated as heterotypic synonyms. Int J Syst Evol Microbiol 2017; 67:175-176.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	부산광역시 강서구 대저1동 571-49
GPS	35°13′25.8″N, 128°58′46.1″E
분리원	토양
배지	Luria-Bertani agar(LB)
온도	28°C
유사도	100%

유전자 염기서열

>FBCC-B11183_16S rRNA
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CTCCCTGATGTTAGCGGCGGACGGGTGAGTAACACGTGGGTAACCTG
CCTGTAAGACTGGGATAACTCCGGGAAACCGGGGCTAATACCGGATG
CTTGTTTGAACCGCATGGTTCAAACATAAAAGGTGGCTTCGGCTACC
ACTTACAGATGGACCCGCGGCGCATTAGCTAGTTGGTGAGGTAATGG
CTCACCAAGGCAACGATGCGTAGCCGACCTGAGAGGGTGATCGGCC
ACACTGGGACTGAGACACGGCCCAGACTCCTACGGGAGGCAGCAGT
AGGGAATCTTCCGCAATGGACGAAAGTCTGACGGAGCAACGCCGCG
TGAGTGATGAAGGTTTTCGGATCGTAAAGCTCTGTTGTTAGGGAAGAA
CAAGTACCGTTCGAATAGGGCGGTACCTTGACGGTACCTAACCAGAA
AGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGG
CAAGCGTTGTCCGGAATTATTGGGCGTAAAGGGCTCGCAGGCGGTT
CCTTAAGTCTGATGTGAAAGCCCCCGGCTCAACCGGGGAGGGTCATT
GGAAACTGGGGAACTTGAGTGCAGAAGAGGAGAGTGGAATTCCACG
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GCCTTGTACACACCGCCCGTCACACCACGAGAGTTTGTAACACCCGA
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GCTGG

항진균 활성
Antifungal Activity

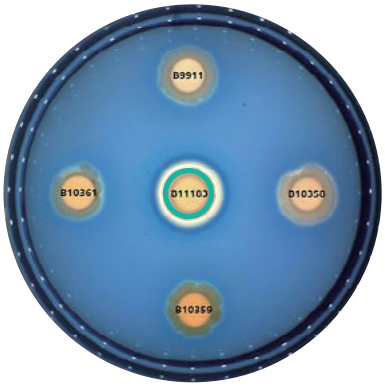


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion



Siderophore production

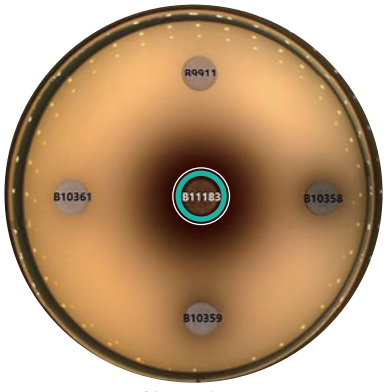


Phosphate solubilization activity

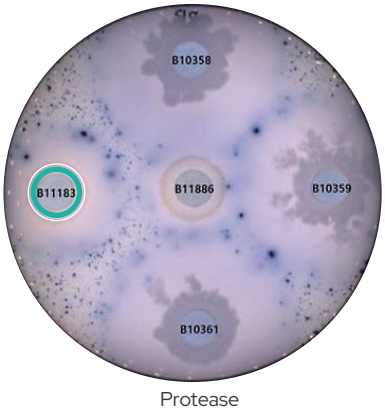
효소 활성
Enzyme Activity



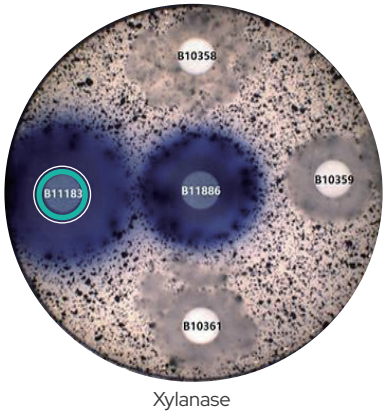
Amylase



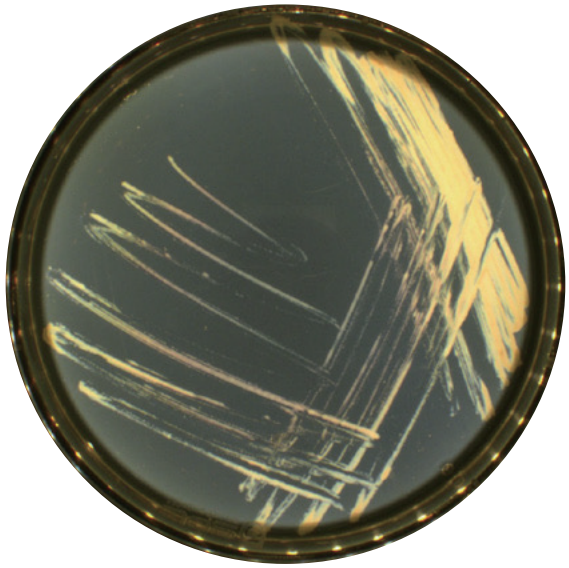
Glycosidase



Protease



Xylanase



Bacillus cabrialesii FBCC-B13732

de Los Santos Villalobos S, Robles RI, Parra Cota FI, Larsen J, Lozano P, Tiedje JM. *Bacillus cabrialesii* sp. nov., an endophytic plant growth promoting bacterium isolated from wheat (*Triticum turgidum* subsp. *durum*) in the Yaqui Valley, Mexico. Int J Syst Evol Microbiol 2019; 69:3939-3945.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 지천동 3
GPS	36°22′51.8″N, 128°09′19.1″E
분리원	슬러지
배지	Tryptic Soy Agar (TSA)
온도	30°C
유사도	99.38%

유전자 염기서열

>FBCC-B13732_16S rRNA
CGCGGCGGCGTGCTTAATACATGCAAGTCGAGCGGACAGATGGGAG
CTTGCTCCCTGATGTAAGCGGCGGACGGGTGAGTAACACGTGGGTAA
CCTGCCTGTAAGACTGGGATAACTCCGGGAAACCGGGGCTAATACCG
GATGCTTGTTTGAACCGCATGGTTCAAACATAAAAGGTGGCTTCGGCT
ACCACTTACAGATGGACCCGCGGCGCATTAGTTAGTTGGTGAGGTAAC
GGCTCACCAAGGCAACGATGCGTAGCCGACCTGAGAGGGTGATCGG
CCACACTGGGACTGAGACACGGCCCAGACTCCTACGGGAGGCAGCA
GTAGGGAATCTTCCGCAATGGACGAAAGTCTGACGGAGCAACGCCG
CGTGAGTGATGAAGGTTTTCGGATCGTAAAGCTCTGTTGTTAGGGAAG
AACAAGTACCGTTCGAATAGGGCGGTACCTTGACGGTACCTAACCAG
AAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTG
GCCAGCGTTGTCCGGAATTATTGGGCGTAAAGGGCTCGCAGGCGGT
TTCTTAAGTCTGATGTGAAAGCCCCCGGCTCAACCGGGGAGGGTCAT
TGGAAACTGGGGAACTTGAGTGCAGAAGAGGAGAGTGGAATTCCAC
GTGTAGCGGTGAAATGCGTAGAGATGTGGAGGAACACCAGTGGCGAA
GGCGACTCTCTGGTCTGTAACTGACGCTGAGGAGCGAAAGCGTGGG
GAGCGAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACGATGA
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ATTAAGCACTCCGCCTGGGGAGTACGGTCGCAAGACTGAAACTCAAA
GGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTTTAATT
CGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCCTCTGACAAT
CCTAGAGATAGGACGTCCCCTTCGGGGGCAGAGTGACAGGTGGTGC
ATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCGCAA
CGAGCGCAACCCTTGATCTTAGTTGCCAGCATTCAGTTGGGCACTCT
AAGGTGACTGCCGGTGACAAACCGGAGGAAGGTGGGGATGACGTCA
AATCATCATGCCCCTTATGACCTGGGCTACACACGTGCTACAATGGAC
AGAACAAAGGGCAGCGAAACCGCGAGGTTAAGCCAATCCCACAAAT
CTGTTCTCAGTTCGGATCGCAGTCTGCAACTCGACTGCGTGAAGCTG
GAATCGCTAGTAATCGCGGATCAGCATGCCGCGGTGAATACGTTCCCG
GGCCTTGTACACACCGCCCGTCACACCACGAGAGTTTGTAACACCCG
AAGTCGGTGAGGTAACCTTTTAGGAGCCAGCCGCCGAAGGTGGGAC
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GG

항진균 활성
Antifungal Activity

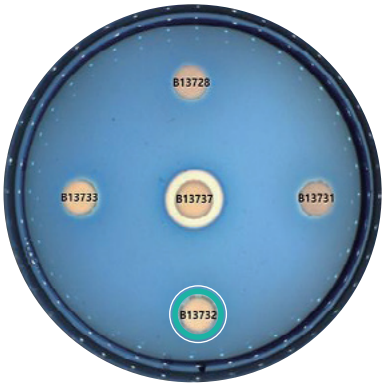


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

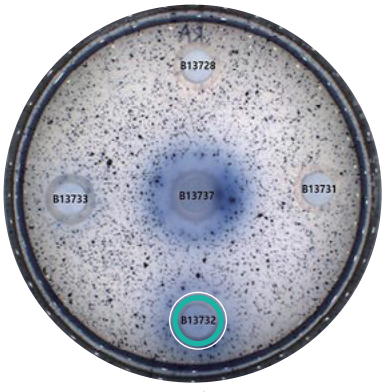


Siderophore production

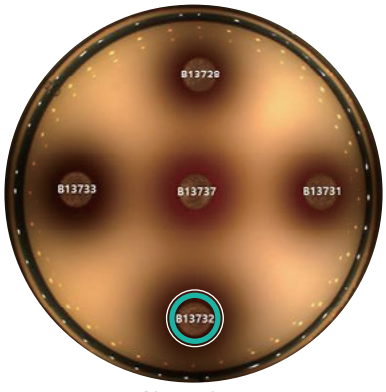


Phosphate solubilization activity

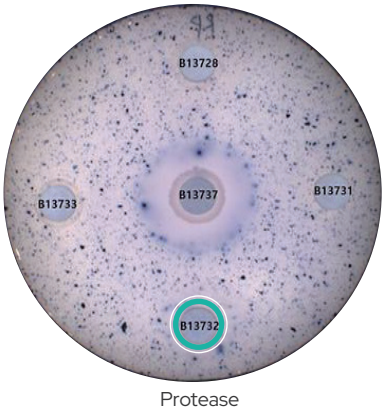
효소 활성
Enzyme Activity



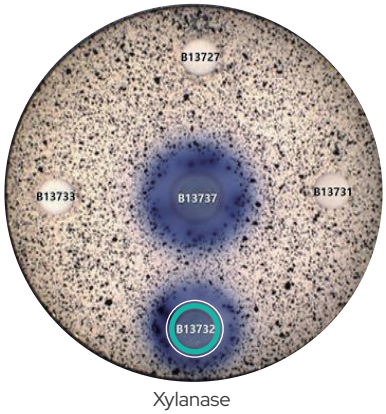
Amylase



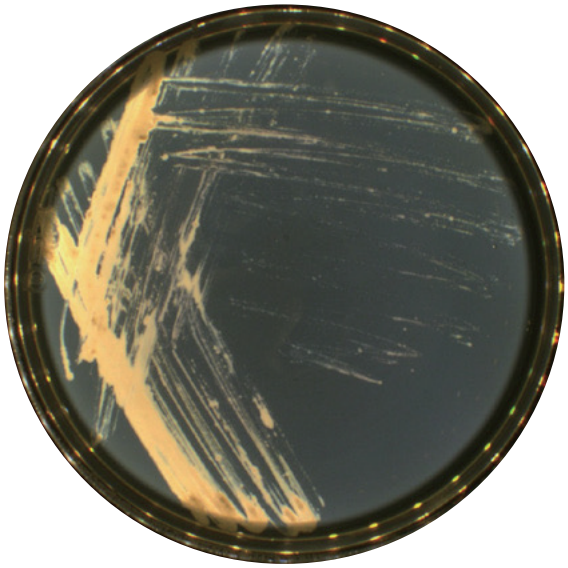
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B13737

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 내서면 서만리 489
GPS	36°27′31.2″N, 128°02′24.4″E
분리원	슬러지
배지	Tryptic Soy Agar (TSA)
온도	30°C
유사도	99.79%

유전자 염기서열

>FBCC-B13737_16S rRNA
ACGCCGGCGGCGTGCCTAATACATGCAAGTCGAGCGGACAGATGGG
AGCTTGCTCCCTGATGTTAGCGGCGGACGGGTGAGTAACACGTGGGT
AACCTGCCTGTAAGACTGGGATAACTCCGGGAAACCGGGGCTAATAC
CGGATGGTTGTCTGAACCGCATGGTTCAGACATAAAAGGTGGCTTCG
GCTACCACTTACAGATGGACCCGCGGCGCATTAGCTAGTTGGTGAGG
TAACGGCTCACCAAGGCGACGATGCGTAGCCGACCTGAGAGGGTGA
TCGGCCACACTGGGACTGAGACACGGCCCAGACTCCTACGGGAGGC
AGCAGTAGGGAATCTTCCGCAATGGACGAAAGTCTGACGGAGCAACG
CCGCGTGAGTGATGAAGGTTTTCGGATCGTAAAGCTCTGTTGTTAGG
GAAGAACAAGTGCCGTTCAAATAGGGCGGCACCTTGACGGTACCTAA
CCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTA
GGTGGCAAGCGTTGTCCGGAATTATTGGGCGTAAAGGGCTCGCAGG
CGGTTTCTTAAGTCTGATGTGAAAGCCCCCGGCTCAACCGGGGAGG
GTCATTGGAAACTGGGGAACTTGAGTGCAGAAGAGGAGAGTGGAATT
CCACGTGTAGCGGTGAAATGCGTAGAGATGTGGAGGAACACCAGTGG
CGAAGGCGACTCTCTGGTCTGTAACTGACGCTGAGGAGCGAAAGCG
TGGGGAGCGAACAGGATTAGATACCCTGGTAGTCCACGCCGTAAACG
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ACGCATTAAGCACTCCGCCTGGGGAGTACGGTCGCAAGACTGAAAC
TCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGTGGTT
TAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCCTCTGA
CAATCCTAGAGATAGGACGTCCCCTTCGGGGGCAGAGTGACAGGTGG
TGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGTCCCG
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GACAGAACAAAGGGCAGCGAAACCGCGAGGTTAAGCCAATCCCACA
AATCTGTTCTCAGTTCGGATCGCAGTCTGCAACTCGACTGCGTGAAG
CTGGAATCGCTAGTAATCGCGGATCAGCATGCCGCGGTGAATACGTTC
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CCGAAGTCGGTGAGGTAACCTTTATGGAGCCAGCCGCCGAAGGTGG
GACAGATGATTGGGGTGAAGTCGTAACAAGGTAGCCGTATCGGAAGG
TGC

항진균 활성
Antifungal Activity

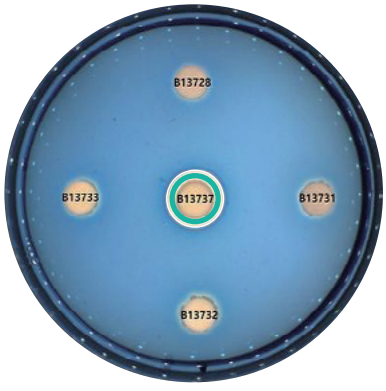


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

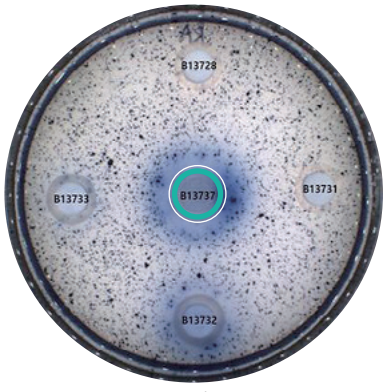


Siderophore production

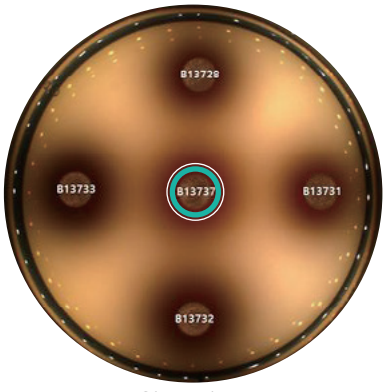


Phosphate solubilization activity

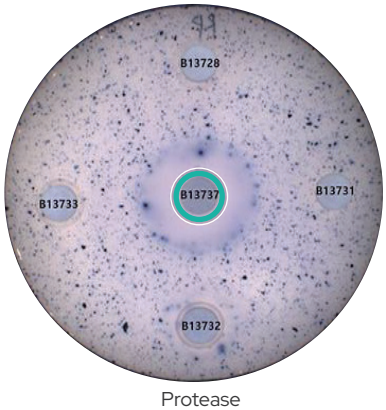
효소 활성
Enzyme Activity



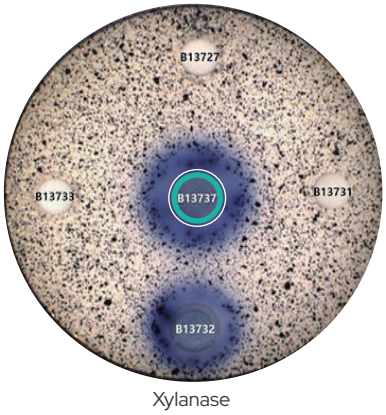
Amylase



Glycosidase



Protease



Xylanase



Bacillus licheniformis FBCC-B13739

Chester FD. A Manual of Determinative Bacteriology. The MacMillan Co., New York, 1901.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 내서면 서만리 489
GPS	36°27′31.2″N, 128°02′24.4″E
분리원	슬러지
배지	Tryptic Soy Agar (TSA)
온도	30°C
유사도	99.78%

유전자 염기서열

>FBCC-B13739_16S rRNA
CCTGTAAGACTGGGATAACTCCGGGAAACCGGGGCTAATACCGGATG
CTTGATTGAACCGCATGGTTCAATCATAAAAGGTGGCTTTTAGCTACC
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CTCACCAAGGCGACGATGCGTAGCCGACCTGAGAGGGTGATCGGCC
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CAAGTACCGTTCGAATAGGGCGGTACCTTGACGGTACCTAACCAGAA
AGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAATACGTAGGTGG
CAAGCGTTGTCCGGAATTATTGGGCGTAAAGCGCGCGCAGGCGGTT
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ATCATCATGCCCCTTATGACCTGGGCTACACACGTGCTACAATGGGCA
GAACAAAGGGCAGCGAAGCCGCGAGGCTAAGCCAATCCCACAAATC
TGTTCTCAGTTCGGATCGCAGTCTGCAACTCGACTGCGTGAAGCTGG
AATCGCTAGTAATCGCGGATCAGCATGCCGCGGTGAATACGTTCCCGG
GCCTTGTACACACCGCCCGTCACACCACGAGAGTTTGTAACACCCGA
AGTCGGTGAGGTAACCTTTTGGAGCCAGCCGCCGAAGGTGGGACAG
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항진균 활성
Antifungal Activity

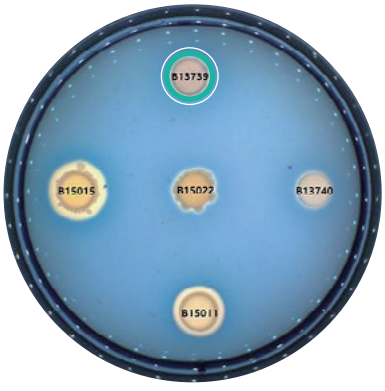


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion



Siderophore production

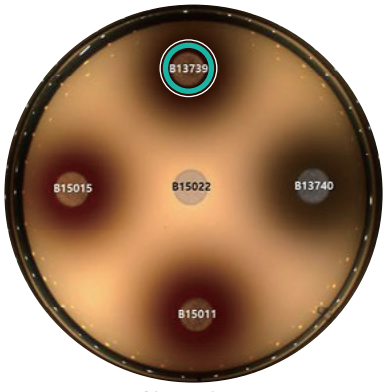


Phosphate solubilization activity

효소 활성
Enzyme Activity



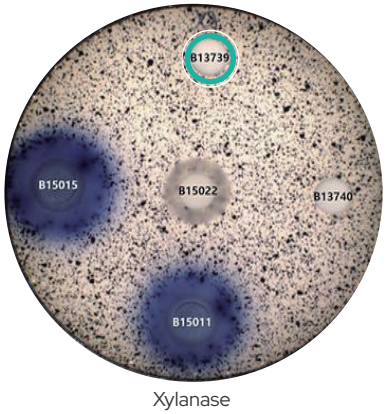
Amylase



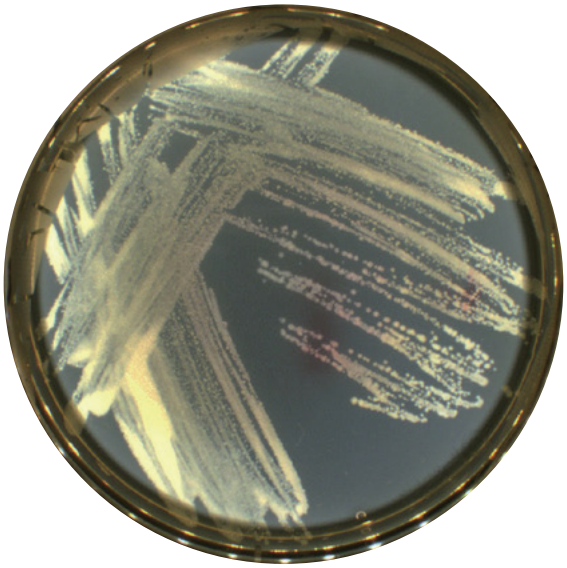
Glycosidase



Protease



Xylanase



Bacillus velezensis FBCC-B15011

Ruiz-Garcia C, Bejar V, Martinez-Checa F, Llamas I, Quesada E. *Bacillus velezensis* sp. nov., a surfactant-producing bacterium isolated from the river Velez in Malaga, southern Spain. Int J Syst Evol Microbiol 2005; 55:191-195.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 울릉군 울릉읍 독도리 30
GPS	37°14′21.9″N, 131°52′13.6″E
분리원	토양
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.86%

유전자 염기서열

>FBCC-B15011_16S rRNA
CGCTGGCGGCGTGCCTAATACATGCAAGTCGAGCGGACAGATGGGA
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CGGATGGTTGTCTGAACCGCATGGTTCAGACATAAAAGGTGGCTTCG
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AGGTGC

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

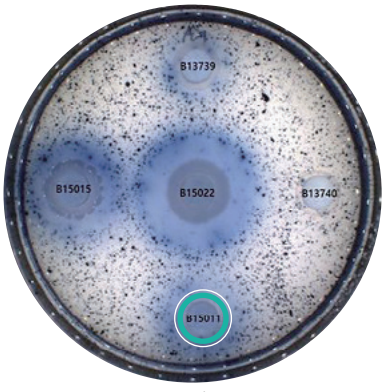


Siderophore production

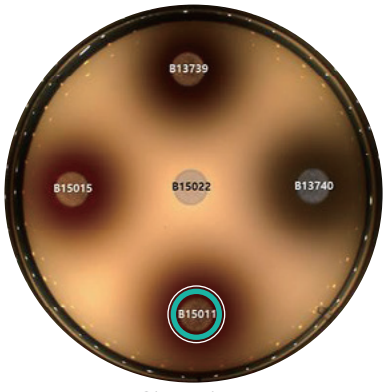


Phosphate solubilization activity

효소 활성
Enzyme Activity



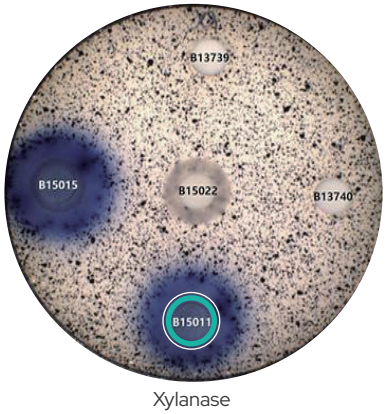
Amylase



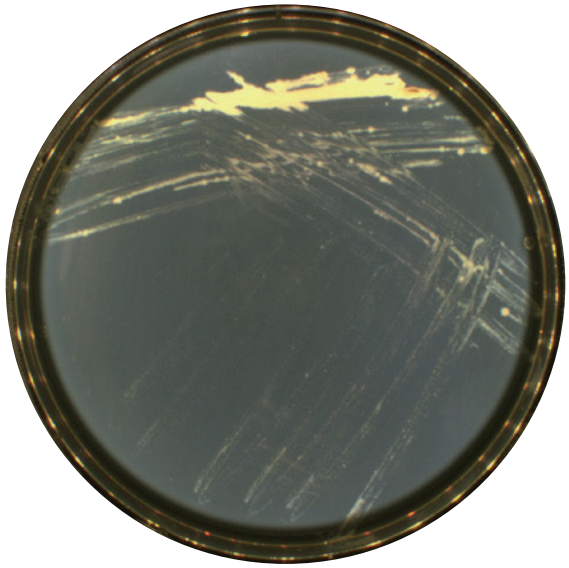
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B15015

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 울릉군 울릉읍 독도리 30
GPS	37°14′21.9″N, 131°52′13.6″E
분리원	토양
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	98.63%

유전자 염기서열

>FBCC-B15015_16S rRNA
GCTGGCGGCGTGCCTAATACATGCAAGTCGAGCGGACAGATGGGAG
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GATGGTTGTCTGAACCGCATGGTTCAGACATAAAAGGTGGCTTCGGC
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CGGCTCACCAAGGCGACGATGCGTAGCCGACCTGAGAGGGTGATCG
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GG

항진균 활성
Antifungal Activity

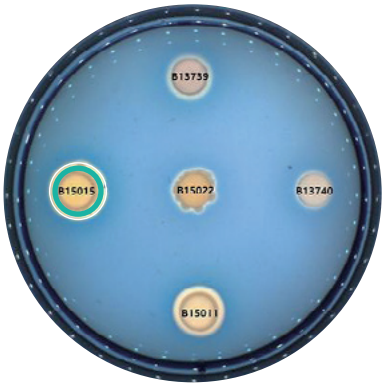


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion



Siderophore production



Phosphate solubilization activity

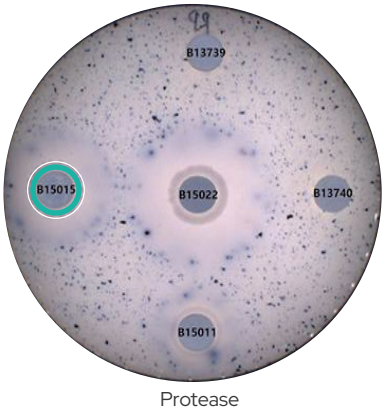
효소 활성
Enzyme Activity



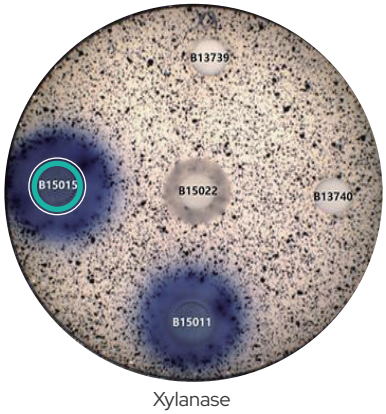
Amylase



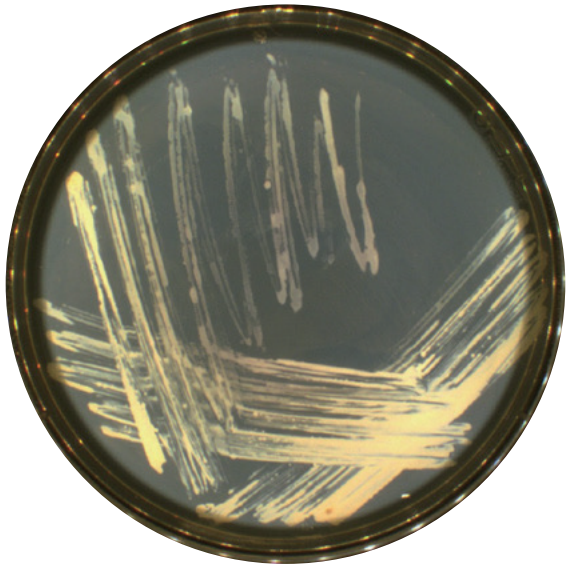
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B15762

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상남도 밀양시 상동면 가곡리 942-9
GPS	35°31′26.0″N, 128°46′16.0″E
분리원	토양
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	100%

유전자 염기서열

>FBCC-B15762_16S rRNA
CAGACGACGCTGGCGGCGTGCCTAATACATGCAAGTCGAGCGGACA
GATGGGAGCTTGCTCCCTGATGTTAGCGGCGGACGGGTGAGTAACAC
GTGGGTAACCTGCCTGTAAGACTGGGATAACTCCGGGAAACCGGGG
CTAATACCGGATGGTTGTTTGAACCGCATGGTTCAAACATAAAAGGTG
GCTTCGGCTACCACTTACAGATGGACCCGCGGCGCATTAGCTAGTTG
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GGGTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCCTACG
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TCGGAAGGTG

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

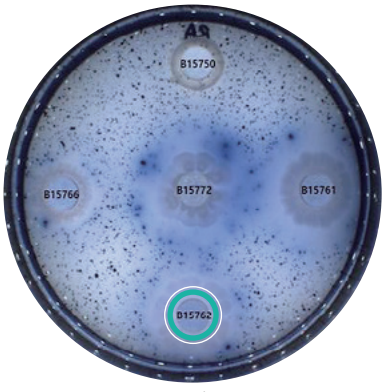


Siderophore production



Phosphate solubilization activity

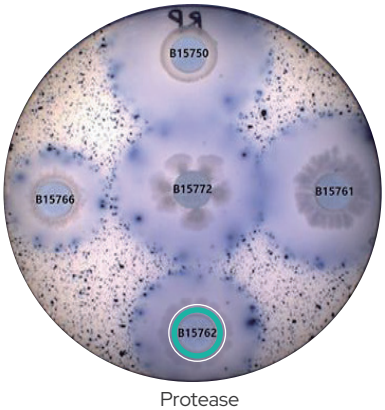
효소 활성
Enzyme Activity



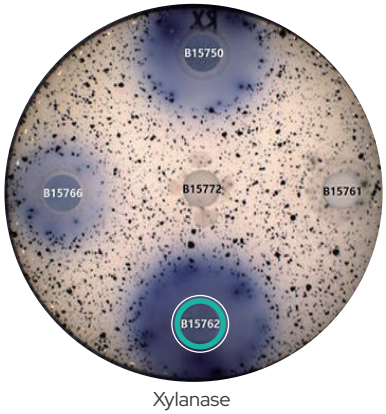
Amylase



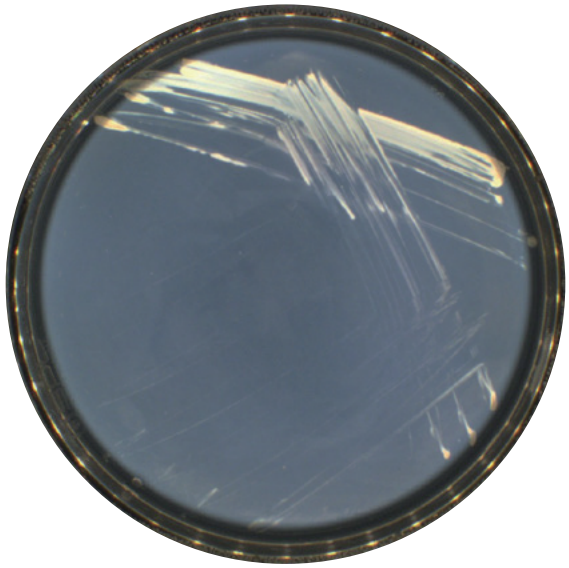
Glycosidase



Protease



Xylanase



Bacillus velezensis FBCC-B16107

Ruiz-Garcia C, Bejar V, Martinez-Checa F, Llamas I, Quesada E. *Bacillus velezensis* sp. nov., a surfactant-producing bacterium isolated from the river Velez in Malaga, southern Spain. Int J Syst Evol Microbiol 2005; 55:191-195.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	전북특별자치도 임실군 강진면 용수리 638
GPS	35°31′13.8″N, 127°06′49.4″E
분리원	담수
배지	Reasoner's 2A agar (R2A)
온도	25°C
유사도	99.85%

유전자 염기서열

>FBCC-B16107_16S rRNA
CCTGTAAGACTGGGATAACTCCGGGAAACCGGGGCTAATACCGGATG
GTTGTCTGAACCGCATGGTTCAGACATAAAAGGTGGCTTCGGCTACC
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AGCTGGAATCGCTAGTAATCGCGGATCAGCATGCCGCGGTTGAATAC
GTTCCCGGGCCTTGTACACACCGCCCGTCACACCACGAGAGTTTGTA
ACACCCGAAGTCGGTGAGGTAACCTTTTAGGAGCCAGCCGCCGAAA
GTGGGACAGATGATGG

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

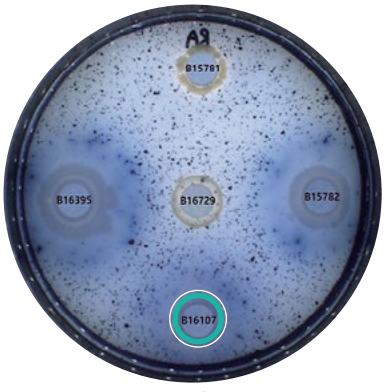


Siderophore production



Phosphate solubilization activity

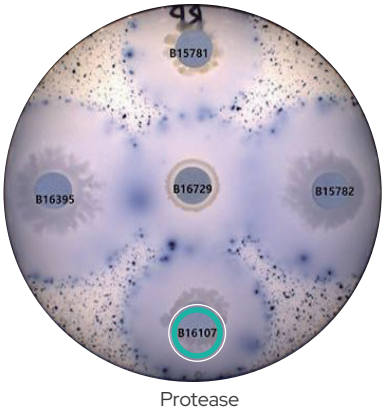
효소 활성
Enzyme Activity



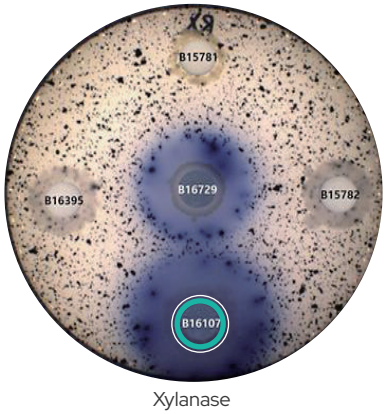
Amylase



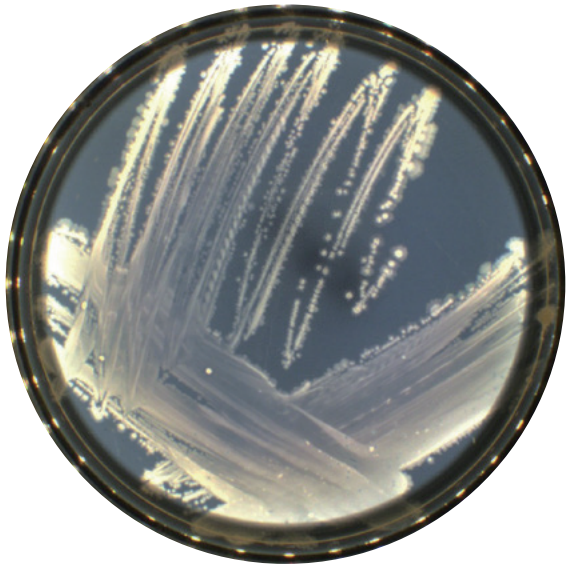
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B16836

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	전라남도 광양시 진상면 섬거리 1562
GPS	35°01′02.6″N, 127°43′21.2″E
분리원	담수
배지	Reasoner's 2A agar (R2A)
온도	25°C
유사도	99.86%

유전자 염기서열

>FBCC-B16836_16S rRNA
GACGACCGCTGCGGCGTGCCTAATACATGCAAGTCGAGCGGACAGAT
GGGAGCTTGCTCCCTGATGTTAGCGGCGGACGGGTGAGTAACACGT
GGGTAACCTGCCTGTAAGACTGGGATAACTCCGGGAAACCGGGGCT
AATACCGGATGGTTGTTTGAACCGCATGGTTCAAACATAAAAGGTGGC
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GTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCCTACGGG
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항진균 활성
Antifungal Activity

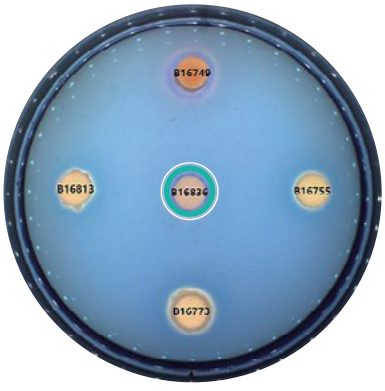


Colletotrichum gloeosporioides

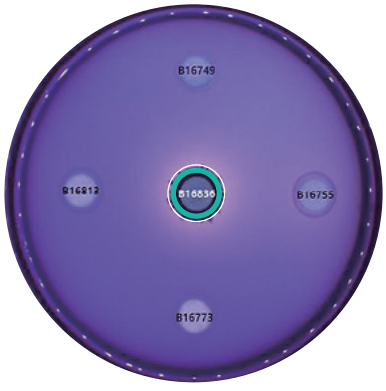


Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

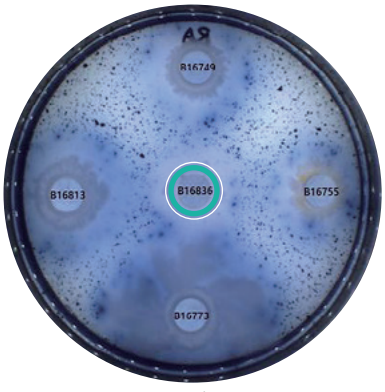


Siderophore production

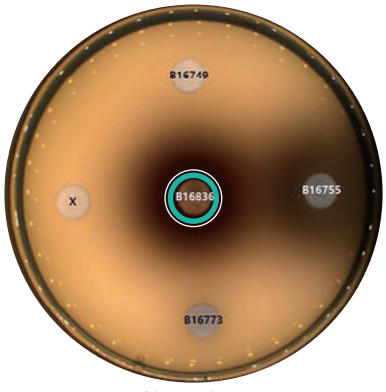


Phosphate solubilization activity

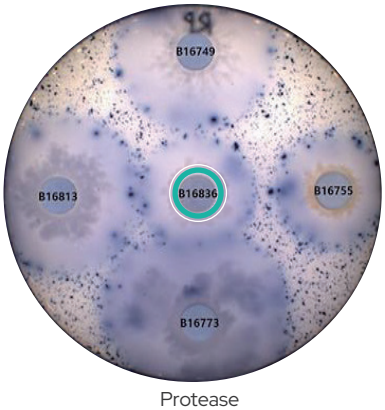
효소 활성
Enzyme Activity



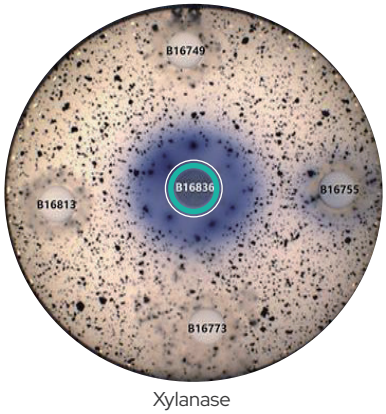
Amylase



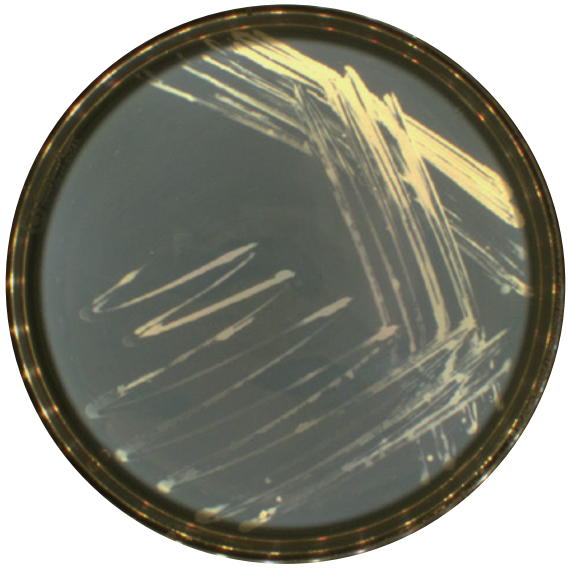
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B19063

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상남도 밀양시 상동면 가곡리 942-9
GPS	35°31′24.4″N, 128°46′14.8″E
분리원	토양
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.93%

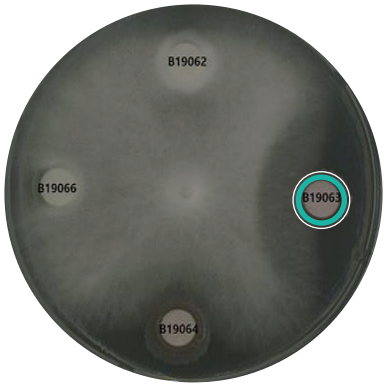
유전자 염기서열

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CTGTTCTCAGTTCGGATCGCAGTCTGCAACTCGACTGCGTGAAGCTG
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항진균 활성
Antifungal Activity

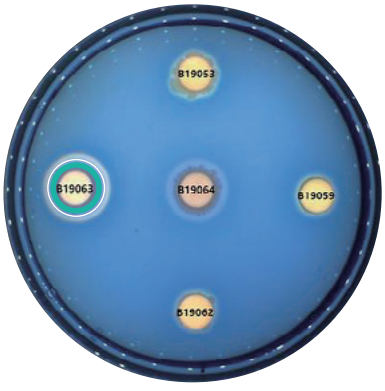


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

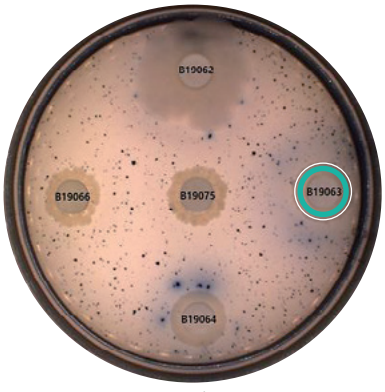


Siderophore production



Phosphate solubilization activity

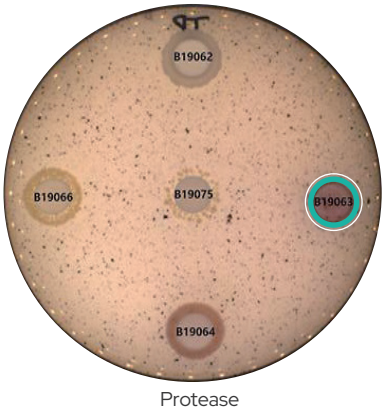
효소 활성
Enzyme Activity



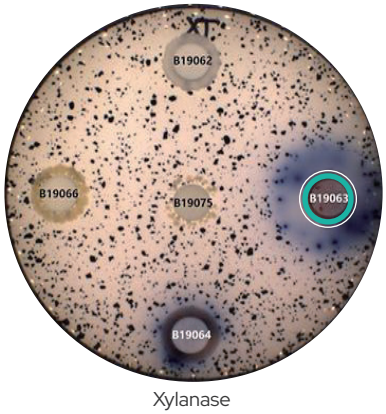
Amylase



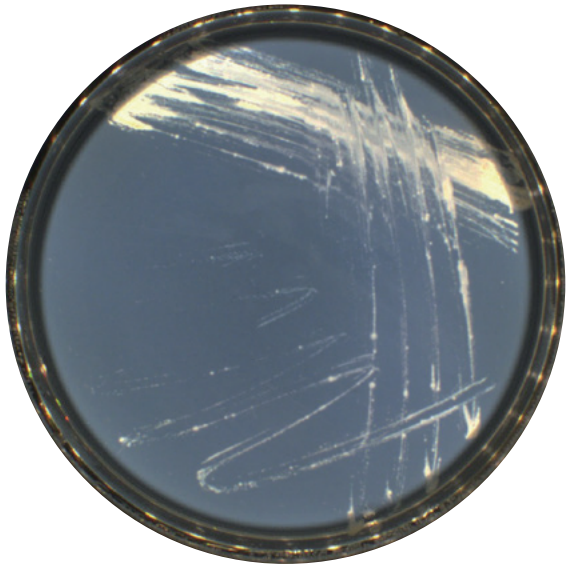
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B19144

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

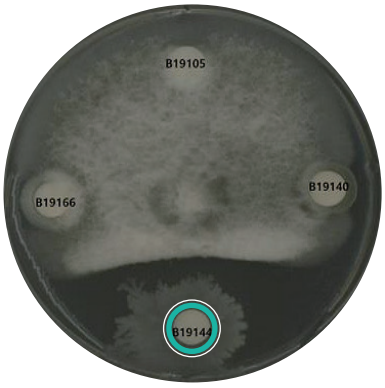
기본정보

채집지역	강원특별자치도 영월군 주천면 판운리 479
GPS	37°17′37.2″N, 128°19′29.5″E
분리원	토양
배지	Reasoner's 2A agar (R2A)
온도	15°C
유사도	100%

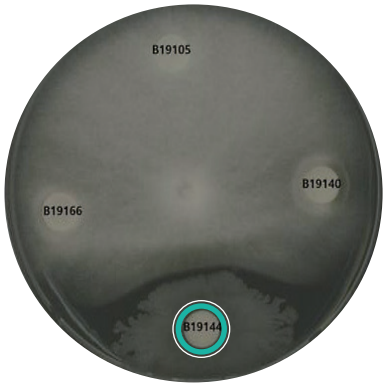
유전자 염기서열

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AATACCGGATGGTTGTCTGAACCGCATGGTTCAGACATAAAAGGTGGC
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AGGCAGCAGTAGGGAATCTTCCGCAATGGACGAAAGTCTGACGGAG
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항진균 활성
Antifungal Activity

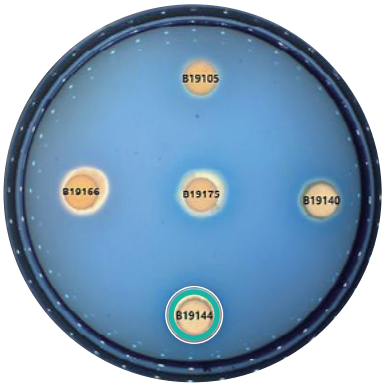


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

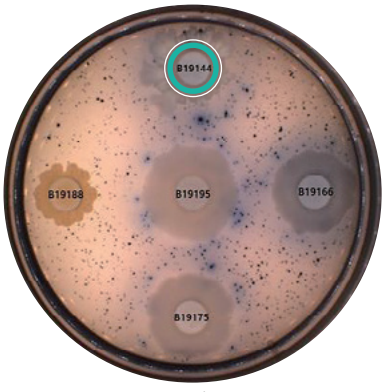


Siderophore production



Phosphate solubilization activity

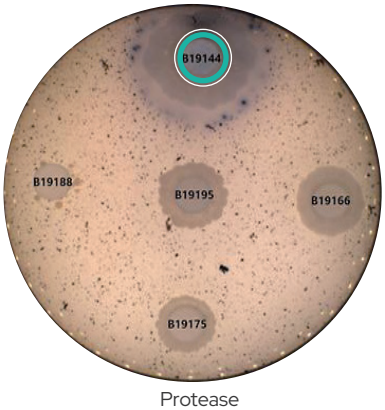
효소 활성
Enzyme Activity



Amylase



Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B19209

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상남도 밀양시 상남면 기산리 1026-4
GPS	35°26'46.5"N, 128°45'18.1"E
분리원	토양
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.59%

유전자 염기서열

>FBCC-B19209_16S rRNA
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항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

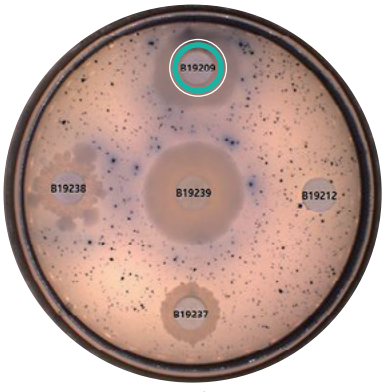


Siderophore production



Phosphate solubilization activity

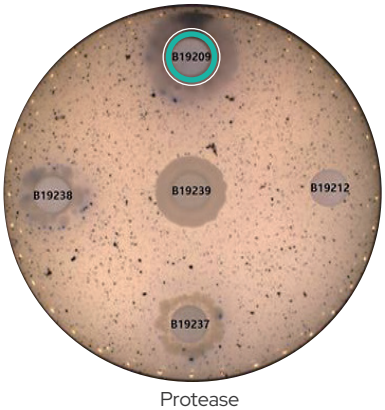
효소 활성
Enzyme Activity



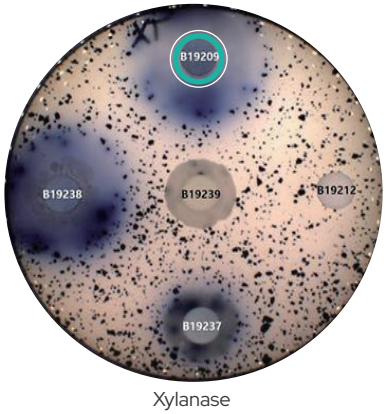
Amylase



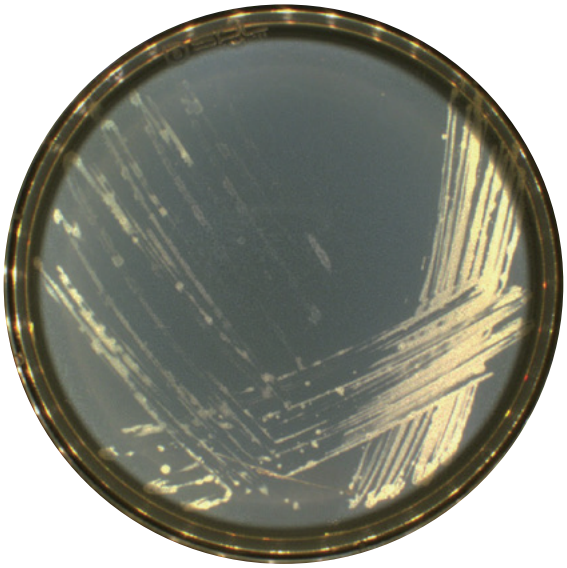
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B19238

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상남도 밀양시 상남면 기산리 1026-4
GPS	35°26'46.5"N, 128°45'18.1"E
분리원	토양
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.80%

유전자 염기서열

>FBCC-B19238_16S rRNA
GACGACGCTGGCGGCGTGCCTAATACATGCAAGTCGAGCGGACAGAT
GGGAGCTTGCTCCCTGATGTTAGCGGCGGACGGGTGAGTAACACGT
GGGTAACCTGCCTGTAAGACTGGGATAACTCCGGGAAACCGGGGCT
AATACCGGATGGTTGTTTGAACCGCATGGTTCAAACATAAAAAGGTGG
CTTCGGCTACCACTTACAGATGGACCCGCGGCGCATTAGCTAGTTGG
TGAGGTAACGGCTCACCAAGGCAACGATGCGTAGCCGACCTGAGAG
GGTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCCTACGG
GAGGCAGCAGTAGGGAATCTTCCGCAATGGACGAAAGTCTGACGGA
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GGAGGGTCATTGGAAACTGGGGAACTTGAGTGCAGAAGAGGAGAGT
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GTGGTTTAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATC
CTCTGACAATCCTAGAGATAGGACGTCCCCTTCGGGGGCAGAGTGAC
AGGTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTA
AGTCCCGCAACGAGCGCAACCCTTGATCTTAGTTGCCAGCATTCAGT
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GATGACGTCAAATCATCATGCCCCTTATGACCTGGGCTACACACGTGC
TACAATGGACAGAACAAAGGGCAGCGAAACCGCGAGGTTAAGCCAA
TCCCACAAATCTGTTCTCAGTTCGGATCGCAGTCTGCAACTCGACTGC
GTGAAGCTGGAATCGCTAGTAATCGCGGATCAGCATGCCGCGGTGAA
TACGTTCCCGGGCCTTGTACACACCGCCCGTCACACCACGAGAGTTT
GTAACACCCGAAGTCGGTGAGGTAACCTTTTAGGAGCCAGCCGCCGA
AGGTGGGACAGATGATTGGGGGTGAAGT

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

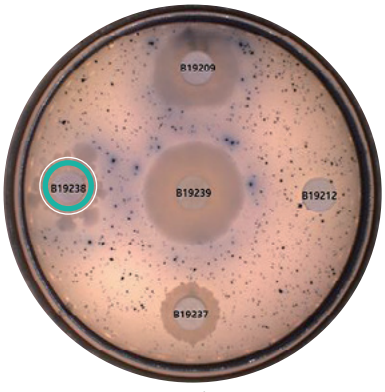


Siderophore production



Phosphate solubilization activity

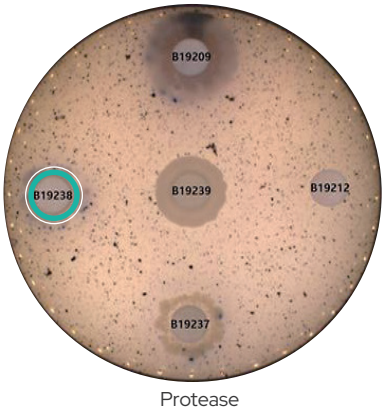
효소 활성
Enzyme Activity



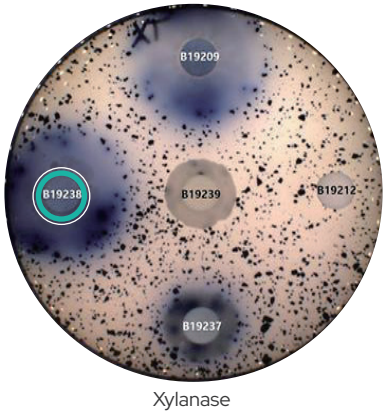
Amylase



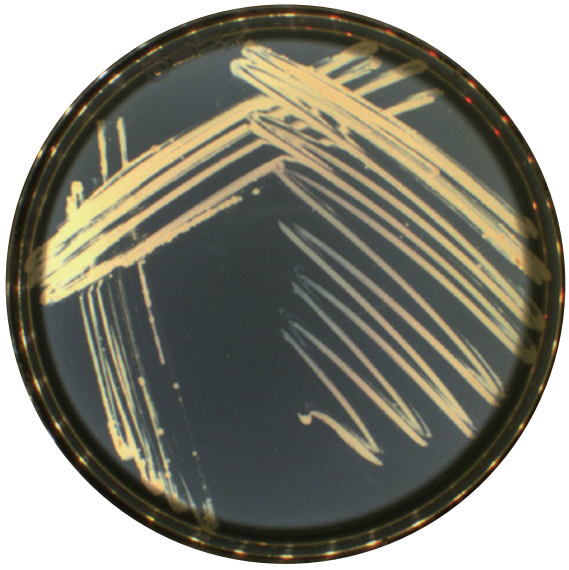
Glycosidase



Protease



Xylanase



Bacillus halotolerans FBCC-B19315

Tindall BJ. The consequences of *Bacillus axarquiensis* Ruiz-Garcia et al. 2005, *Bacillus malacitensis* Ruiz-Garcia et al. 2005 and *Brevibacterium halotolerans* Delaporte and Sasson 1967 (Approved Lists 1980) being treated as heterotypic synonyms. Int J Syst Evol Microbiol 2017; 67:175-176.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	100%

유전자 염기서열

>FBCC-B19315_16S rRNA
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GCTAATACCGGATGCTTGTTTGAACCGCATGGTTCAAACATAAAAGGT
GGCTTCGGCTACCACTTACAGATGGACCCGCGGCGCATTAGCTAGTT
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GAAAGCGTGGGGAGCGAACAGGATTAGATACCCTGGTAGTCCACGCC
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CTGAAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCA
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CTACAATGGACAGAACAAAGGGCAGCGAAACCGCGAGGTTAAGCCA
ATCCCACAAATCTGTTCTCAGTTCGGATCGCAGTCTGCAACTCGACTG
CGTGAAGCTGGAATCGCTAGTAATCGCGGATCAGCATGCCGCGGTGA
ATACGTTCCCGGGCCTTGTACACACCGCCCGTCACACCACGAGAGTT
TGTAACACCCGAAGTCGGTGAGGTAACCTTTATGGAGCCAGCCGCCG
AAGGTGGGACAGATGATTGG

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

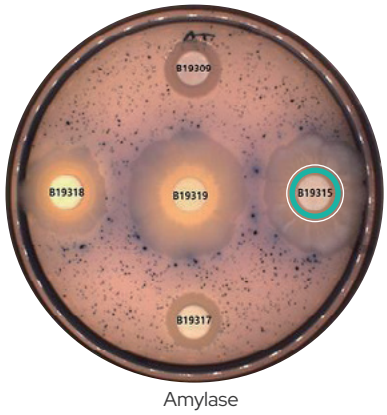


Siderophore production



Phosphate solubilization activity

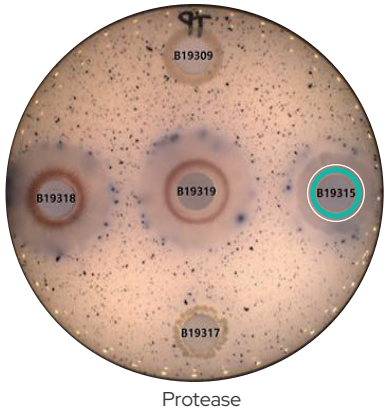
효소 활성
Enzyme Activity



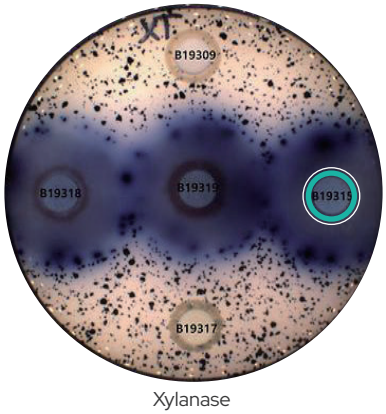
Amylase



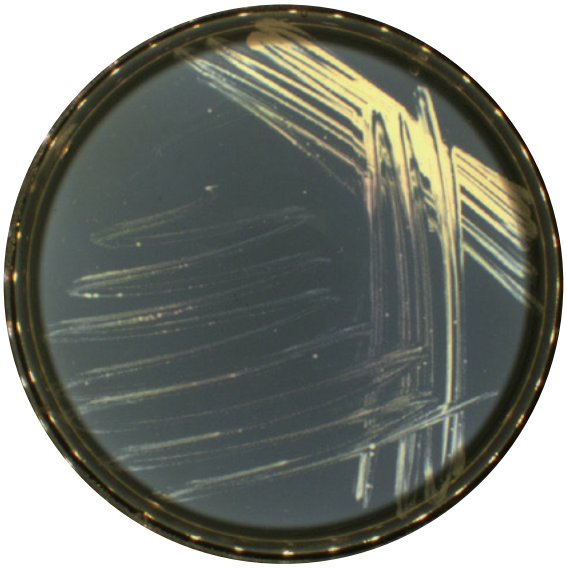
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B19318

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B19318_16S rRNA
CTCAGGACGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAGCG
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GGGGCTAATACCGGATGGTTGTTTGAACCGCATGGTTCAAACATAAAA
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GAGAGGGTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCC
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CGGAGCAACGCCGCGTGAGTGATGAAGGTTTTCGGATCGTAAAGCTC
TGTTGTTAGGGAAGAACAAGTACCGTTCGAATAGGGCGGTACCTTGA
CGGTACCTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGC
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GGCTCGCAGGCGGTTTCTTAAGTCTGATGTGAAAGCCCCCGGCTCAA
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ACACCAGTGGCGAAGGCGACTCTCTGGTCTGTAACTGACGCTGAGG
AGCGAAAGCGTGGGGAGCGAACAGGATTAGATACCCTGGTAGTCCAC
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GCTGCAGCTAACGCATTAAGCACTCCGCCTGGGGAGTACGGTCGCA
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GCATGTGGTTTAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGA
CATCCTCTGACAATCCTAGAGATAGGACGTCCCCTTCGGGGGCAGAG
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TTTGTAACACCCGAAGTCGGTGAGGTAACCTTTTAGGAGCCAGCCGC
CGAAGGTGGGACAGATGATTGGGGTGAAGTCGTA

항진균 활성
Antifungal Activity

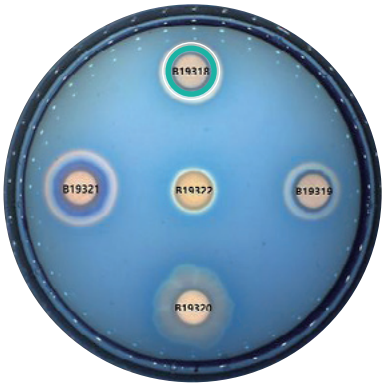


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

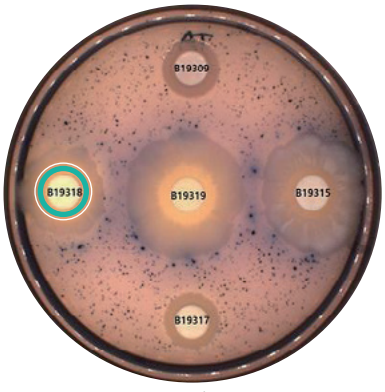


Siderophore production



Phosphate solubilization activity

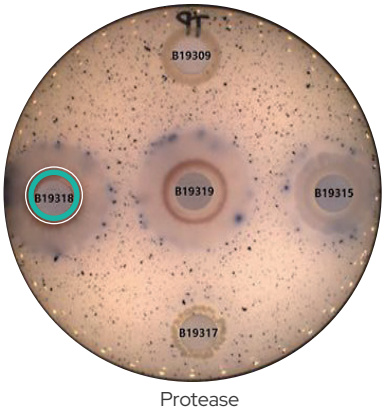
효소 활성
Enzyme Activity



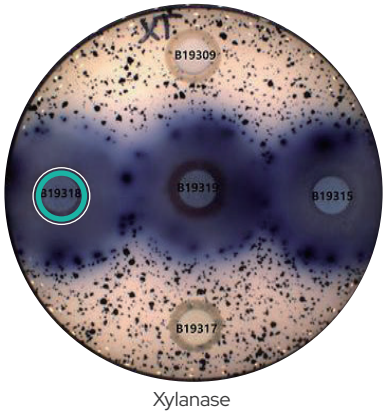
Amylase



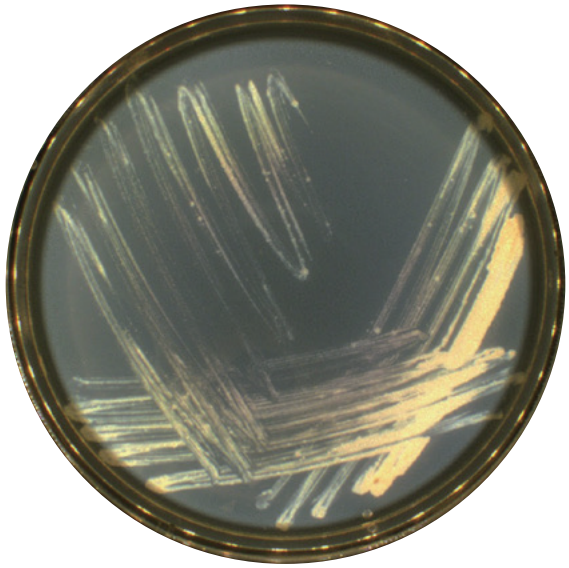
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B19319

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

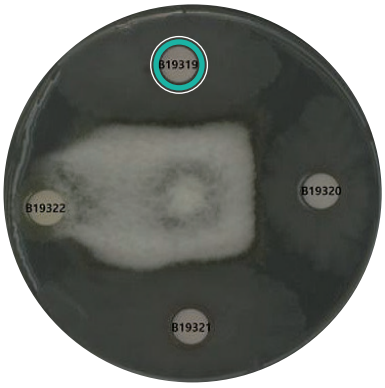
기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B19319_16S rRNA
AGACGACGCTGCGGCGTGCCTAATACATGCAAGTCGAGCGGACAGAT
GGGAGCTTGCTCCCTGATGTTAGCGGCGGACGGGTGAGTAACACGT
GGGTAACCTGCCTGTAAGACTGGGATAACTCCGGGAAACCGGGGCT
AATACCGGATGGTTGTTTGAACCGCATGGTTCAAACATAAAAGGTGGC
TTCGGCTACCACTTACAGATGGACCCGCGGCGCATTAGCTAGTTGGT
GAGGTAACGGCTCACCAAGGCAACGATGCGTAGCCGACCTGAGAGG
GTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCCTACGGG
AGGCAGCAGTAGGGAATCTTCCGCAATGGACGAAAGTCTGACGGAG
CAACGCCGCGTGAGTGATGAAGGTTTTCGGATCGTAAAGCTCTGTTG
TTAGGGAAGAACAAGTACCGTTCGAATAGGGCGGTACCTTGACGGTA
CCTAACCAGAAAGCCACGGCTAACTACGTGCCAGCAGCCGCGGTAAT
ACGTAGGTGGCAAGCGTTGTCCGGAATTATTGGGCGTAAAGGGCTCG
CAGGCGGTTTCTTAAGTCTGATGTGAAAGCCCCCGGCTCAACCGGG
GAGGGTCATTGGAAACTGGGGAACTTGAGTGCAGAAGAGGAGAGTG
GAATTCCACGTGTAGCGGTGAAATGCGTAGAGATGTGGAGGAACACC
AGTGGCGAAGGCGACTCTCTGGTCTGTAACTGACGCTGAGGAGCGA
AAGCGTGGGGAGCGAACAGGATTAGATACCCTGGTAGTCCACGCCGT
AAACGATGAGTGCTAAGTGTTAGGGGGTTTCCGCCCCTTAGTGCTGC
AGCTAACGCATTAAGCACTCCGCCTGGGGAGTACGGTCGCAAGACTG
AAACTCAAAGGAATTGACGGGGGCCCGCACAAGCGGTGGAGCATGT
GGTTTAATTCGAAGCAACGCGAAGAACCTTACCAGGTCTTGACATCCT
CTGACAATCCTAGAGATAGGACGTCCCCTTCGGGGGCAGAGTGACAG
GTGGTGCATGGTTGTCGTCAGCTCGTGTCGTGAGATGTTGGGTTAAGT
CCCGCAACGAGCGCAACCCTTGATCTTAGTTGCCAGCATTCAGTTGG
GCACTCTAAGGTGACTGCCGGTGACAAACCGGAGGAAGGTGGGGAT
GACGTCAAATCATCATGCCCCTTATGACCTGGGCTACACACGTGCTAC
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CACAAATCTGTTCTCAGTTCGGATCGCAGTCTGCAACTCGACTGCGTG
AAGCTGGAATCGCTAGTAATCGCGGATCAGCATGCCGCGGTGAATAC
GTTCCCGGGCCTTGTACACACCGCCCGTCACACCACGAGAGTTTGTA
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GTGGGACAGATGATTGGGGTG

항진균 활성
Antifungal Activity

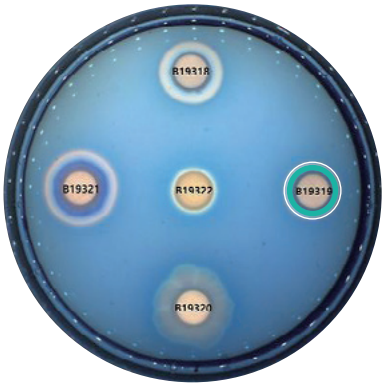


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

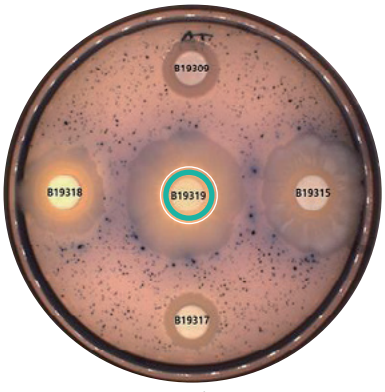


Siderophore production



Phosphate solubilization activity

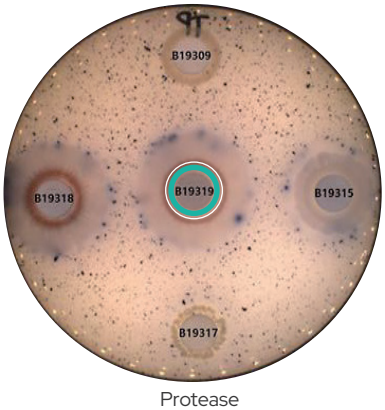
효소 활성
Enzyme Activity



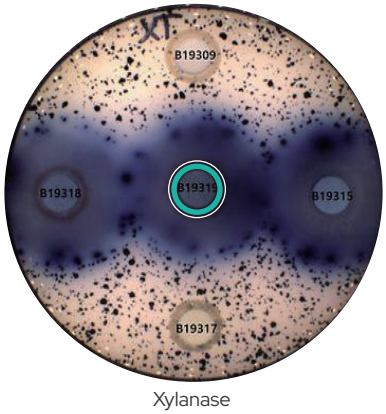
Amylase



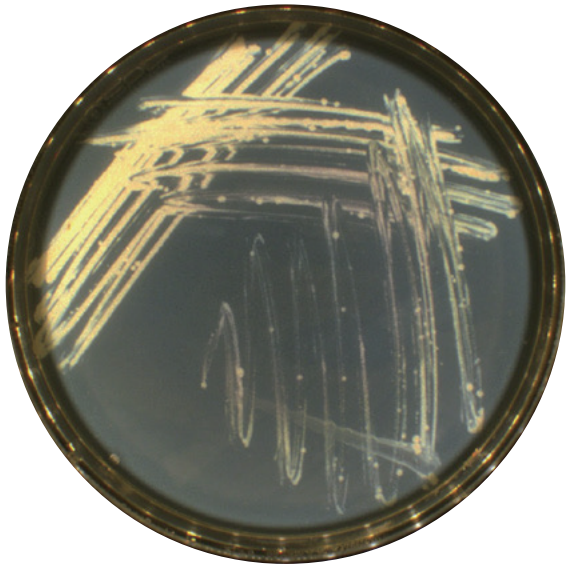
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B19320

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

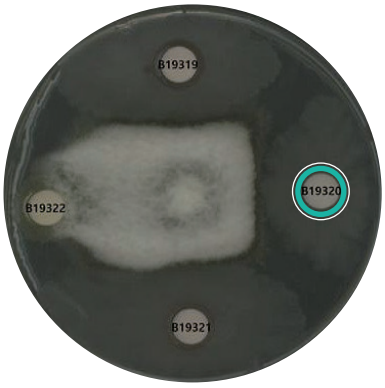
기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B19320_16S rRNA
CTCAGGACGAACGCTGGCGGCGTGCCTAATACATGCAAGTCGAGCG
GACAGATGGGAGCTTGCTCCCTGATGTTAGCGGCGGACGGGTGAGT
AACACGTGGGTAACCTGCCTGTAAGACTGGGATAACTCCGGGAAACC
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GGTGGCTTCGGCTACCACTTACAGATGGACCCGCGGCGCATTAGCTA
GTTGGTGAGGTAACGGCTCACCAAGGCAACGATGCGTAGCCGACCT
GAGAGGGTGATCGGCCACACTGGGACTGAGACACGGCCCAGACTCC
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항진균 활성
Antifungal Activity

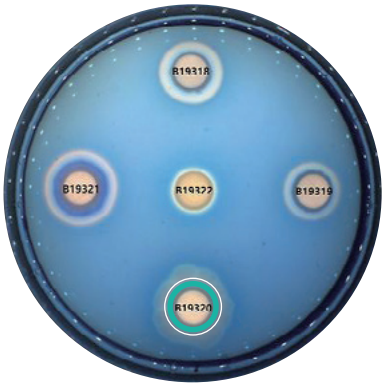


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

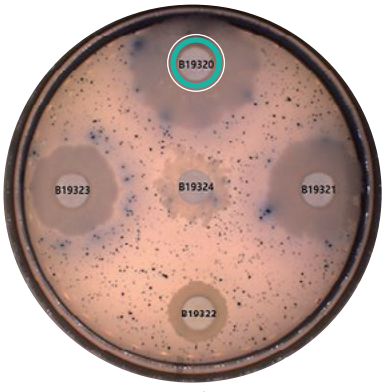


Siderophore production



Phosphate solubilization activity

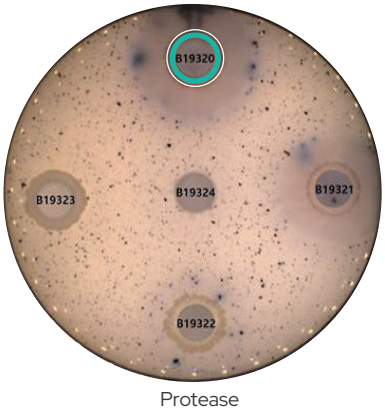
효소 활성
Enzyme Activity



Amylase



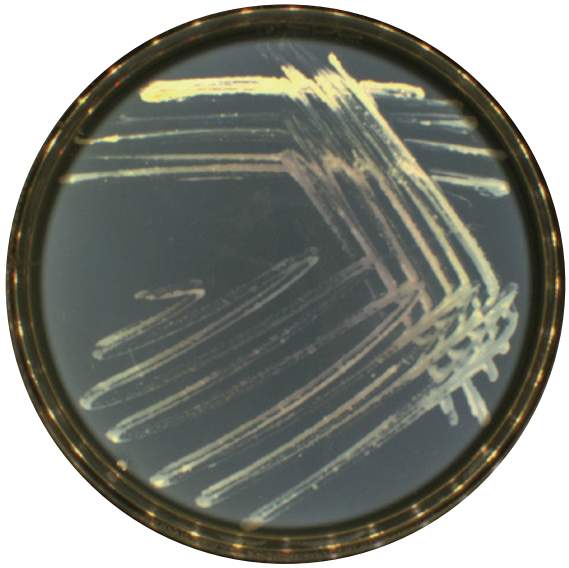
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B19321

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

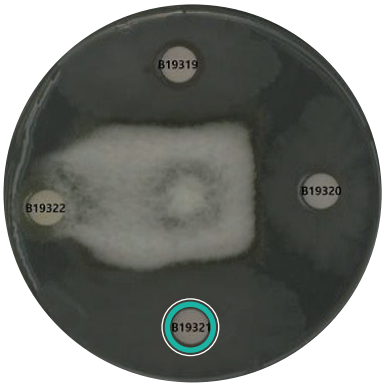
기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.93%

유전자 염기서열

>FBCC-B19321_16S rRNA
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항진균 활성
Antifungal Activity

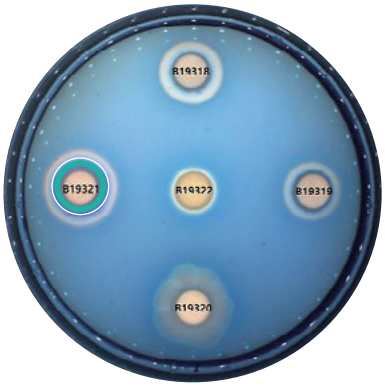


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

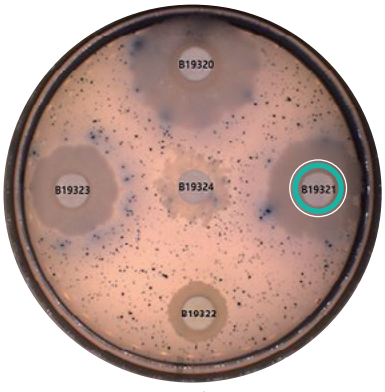


Siderophore production



Phosphate solubilization activity

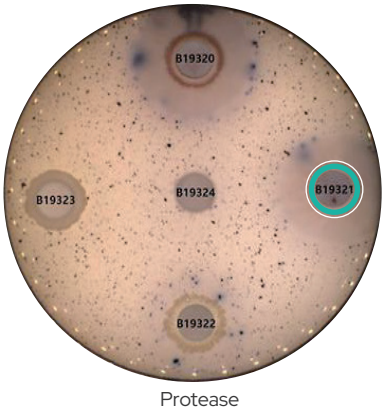
효소 활성
Enzyme Activity



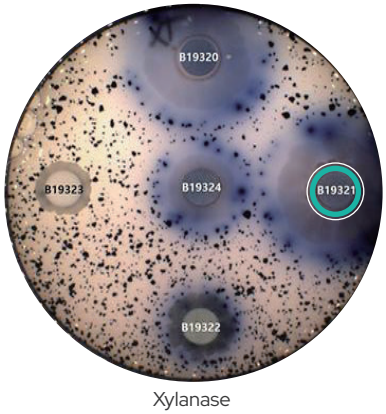
Amylase



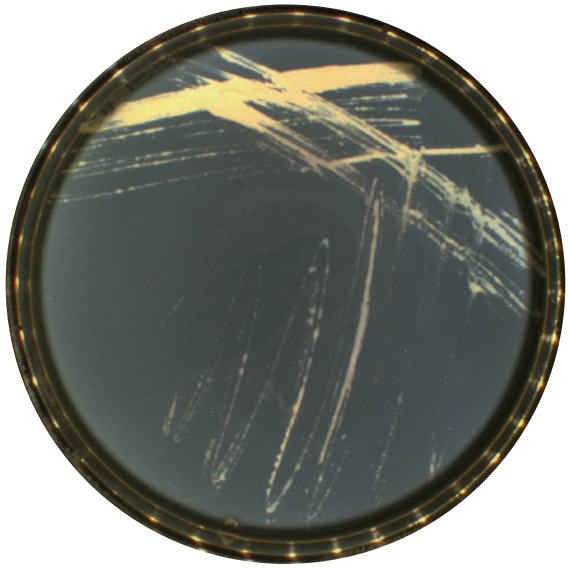
Glycosidase



Protease



Xylanase



Bacillus tequilensis FBCC-B19325

Gatson JW, Benz BF, Chandrasekaran C, Satomi M, Venkateswaran K, Hart ME. *Bacillus tequilensis* sp. nov., isolated from a 2000-year-old Mexican shaft-tomb, is closely related to *Bacillus subtilis*. Int J Syst Evol Microbiol 2006; 56:1475-1484.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.73%

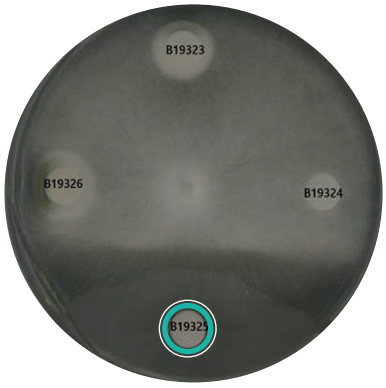
유전자 염기서열

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CCCGAAGTCGGTGAGGTAACCTTTTAGGAGCCAGCCGCCGAAGGTG
GGACAGATGATTGGGGTGAAGTCGACAA

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

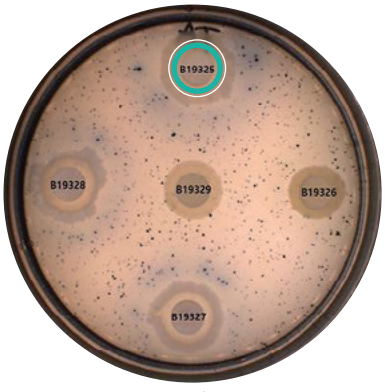


Siderophore production



Phosphate solubilization activity

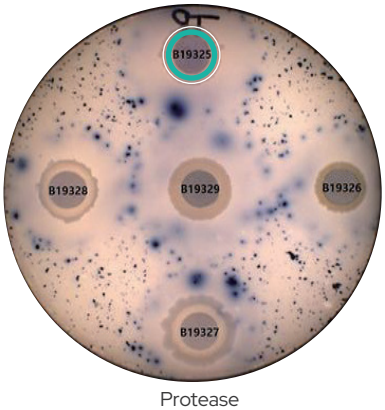
효소 활성
Enzyme Activity



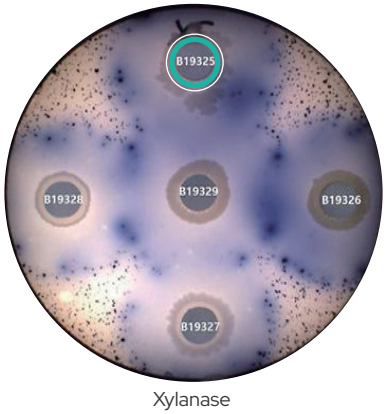
Amylase



Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B19327

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.86%

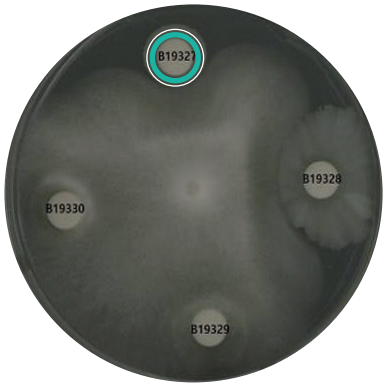
유전자 염기서열

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GAGTTTGTAACACCCGAAGTCGGTGAGGTAACCTTT

항진균 활성
Antifungal Activity



Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

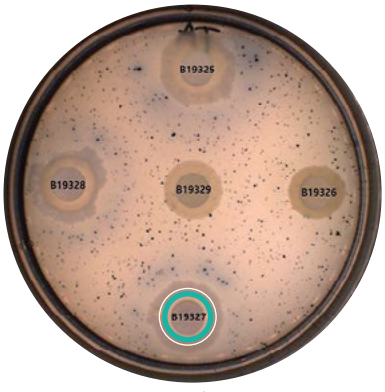


Siderophore production



Phosphate solubilization activity

효소 활성
Enzyme Activity



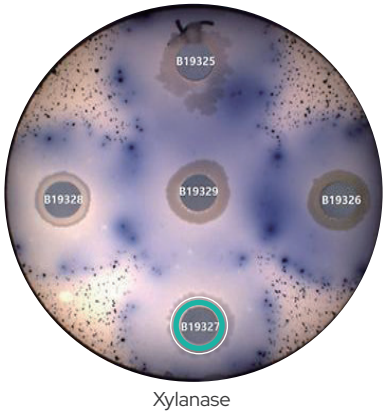
Amylase



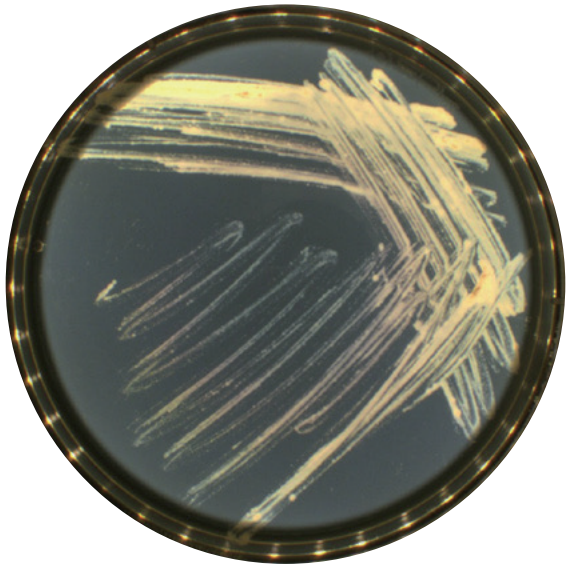
Glycosidase



Protease



Xylanase



Bacillus siamensis FBCC-B19328

Sumpavapol P, Tongyonk L, Tanasupawat S, Chokesajjawatee N, Luxananil P, Visessanguan W. *Bacillus siamensis* sp. nov., isolated from salted crab (poo-khem) in Thailand. Int J Syst Evol Microbiol 2010; 60:2364-2370.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.86%

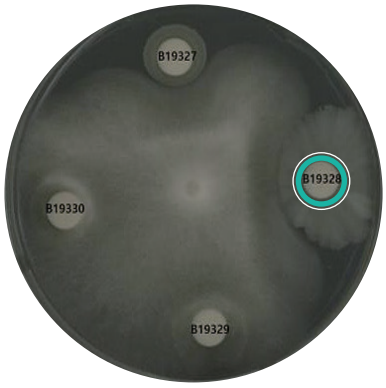
유전자 염기서열

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항진균 활성
Antifungal Activity

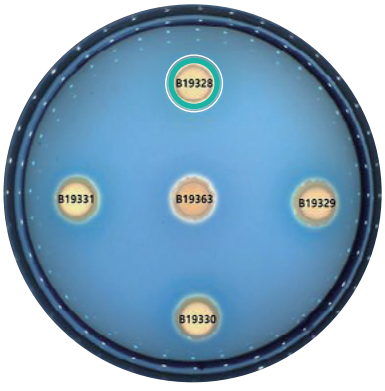


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

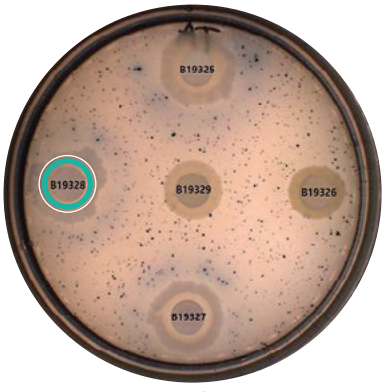


Siderophore production

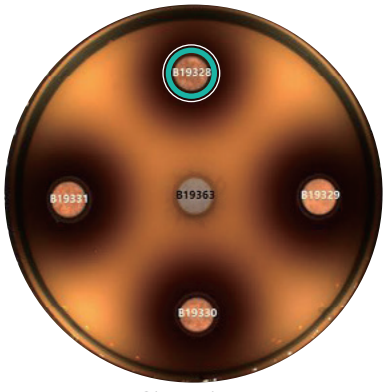


Phosphate solubilization activity

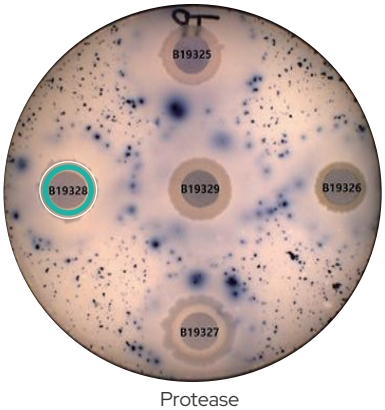
효소 활성
Enzyme Activity



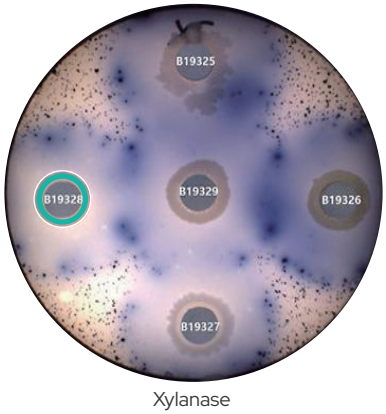
Amylase



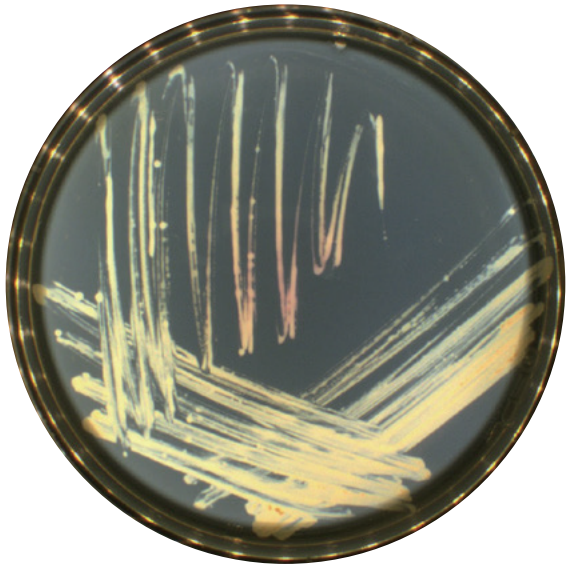
Glycosidase



Protease



Xylanase



Bacillus safensis subsp. *safensis* FBCC-B19329

Abril AG, Rama JLR, Feijoo-Siota L, Calo-Mata P, Salazar S, Peix A, Velazquez E, Villa TG. *Bacillus safensis* subsp. *osmophilus* subsp. nov., isolated from condensed milk, and description of *Bacillus safensis* subsp. *safensis* subsp. nov. Int J Syst Evol Microbiol 2019; 69:189-195.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.93%

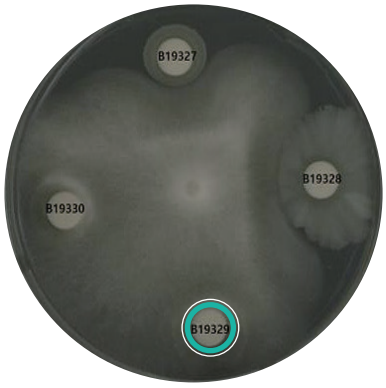
유전자 염기서열

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항진균 활성
Antifungal Activity

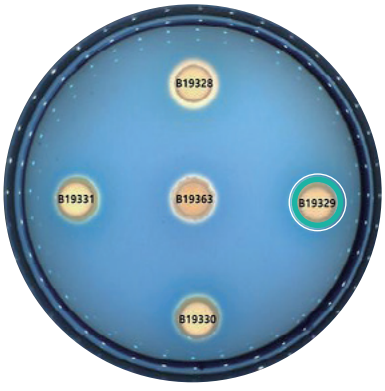


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion

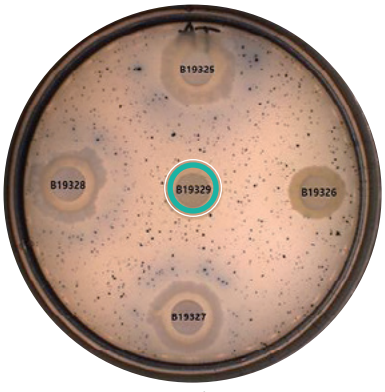


Siderophore production

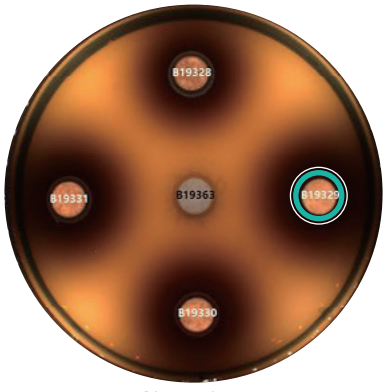


Phosphate solubilization activity

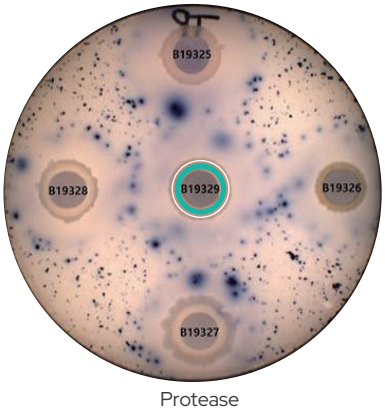
효소 활성
Enzyme Activity



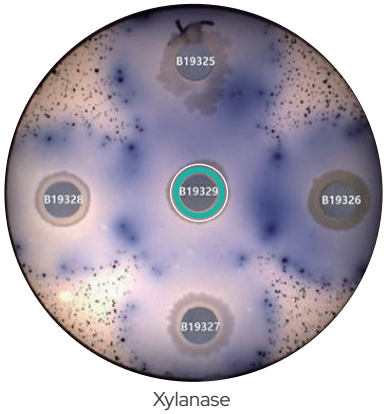
Amylase



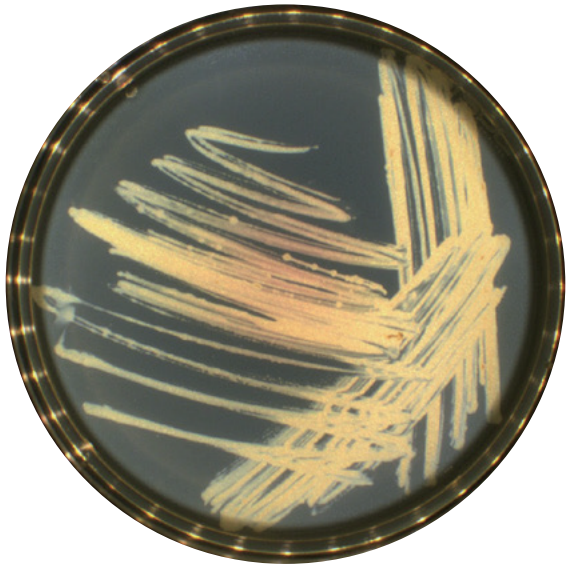
Glycosidase



Protease



Xylanase



Bacillus safensis subsp. *safensis* FBCC-B19330

Abril AG, Rama JLR, Feijoo-Siota L, Calo-Mata P, Salazar S, Peix A, Velazquez E, Villa TG. *Bacillus safensis* subsp. *osmophilus* subsp. nov., isolated from condensed milk, and description of *Bacillus safensis* subsp. *safensis* subsp. nov. Int J Syst Evol Microbiol 2019; 69:189-195.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	99.73%

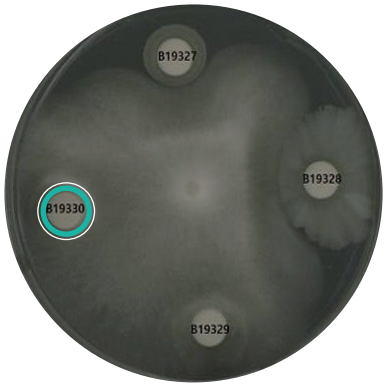
유전자 염기서열

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항진균 활성
Antifungal Activity

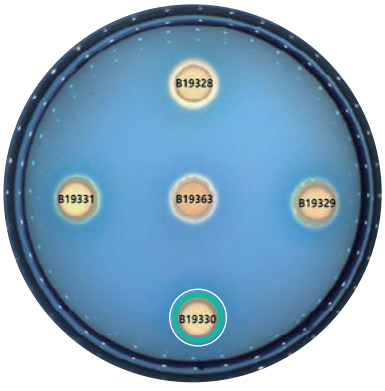


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion



Siderophore production



Phosphate solubilization activity

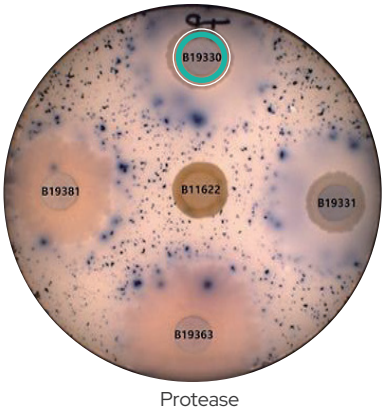
효소 활성
Enzyme Activity



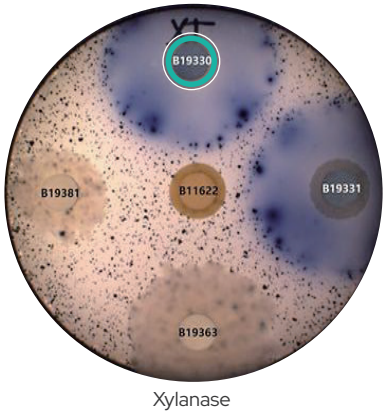
Amylase



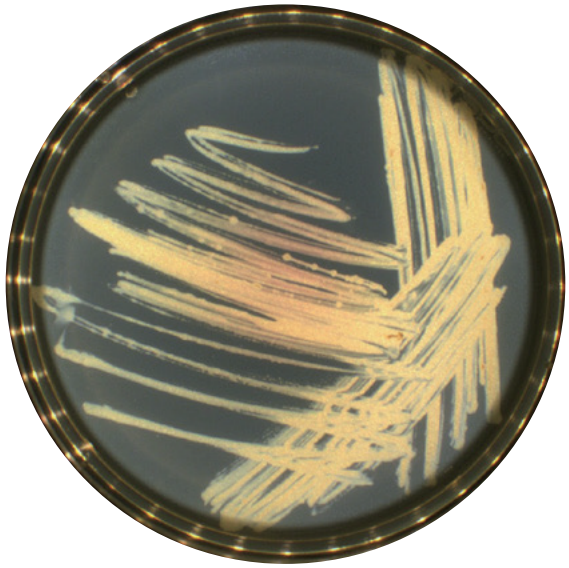
Glycosidase



Protease



Xylanase



Bacillus safensis subsp. *safensis* FBCC-B19331

Abril AG, Rama JLR, Feijoo-Siota L, Calo-Mata P, Salazar S, Peix A, Velazquez E, Villa TG. *Bacillus safensis* subsp. *osmophilus* subsp. nov., isolated from condensed milk, and description of *Bacillus safensis* subsp. *safensis* subsp. nov. Int J Syst Evol Microbiol 2019; 69:189-195.

분류체계

Phylum	Bacillota
Class	Bacilli
Order	Bacillales
Family	Bacillaceae
Genus	*Bacillus*

기본정보

채집지역	경상북도 상주시 외서면 이촌리 76-3
GPS	36°29′59.0″N, 128°03′47.0″E
분리원	새우
배지	Tryptic Soy Agar (TSA)
온도	25°C
유사도	100%

유전자 염기서열

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항진균 활성
Antifungal Activity

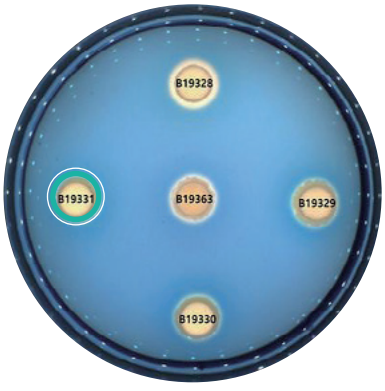


Colletotrichum gloeosporioides



Fusarium oxysporum

식물생장촉진
Plant Growth Promotion



Siderophore production



Phosphate solubilization activity

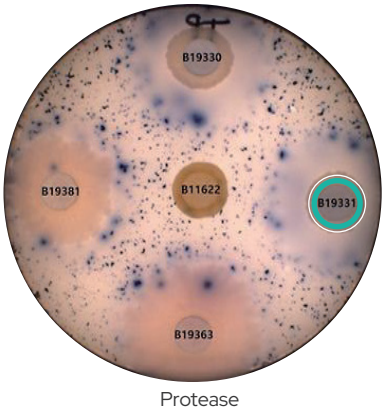
효소 활성
Enzyme Activity



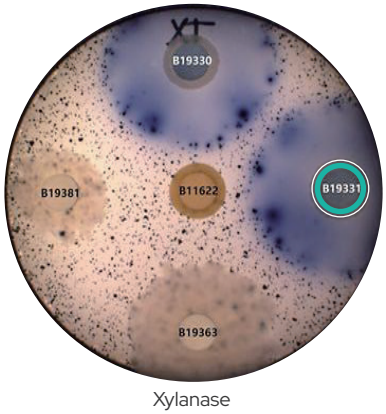
Amylase



Glycosidase



Protease



Xylanase

APPENDIX

담수생물소재 기능성 확보
바이오 연구 데이터 표준 등록 양식

Functional Characterization of Freshwater Biological Resources
Standardized Bio-Research Data Registration Form

국립낙동강생물자원관
Nakdonggang National Institute of Biological Resources

담수생물자원은행
FBCC
Freshwater Bioresources Culture Collection

담수 미생물소재의 기능성 분야

담수세균 분야

part 1 ——— 세균의 실데이터
Raw Data

part 2 ——— 세균의 항진균활성 평가 데이터
Antifungal Activity Evaluation Data

part 3 ——— 세균의 불용성 인산가용화능 평가 데이터
Insoluble Phosphate Solubilization Evaluation Data

part 4 ——— 세균의 사이드로포어 생성능 평가 데이터
Siderophore Production Evaluation Data

part 5 ——— 세균의 효소활성 평가 데이터
Enzyme Activity Evaluation Data

담수생물소재 기능성 분야

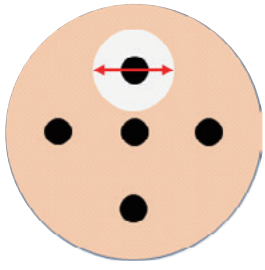
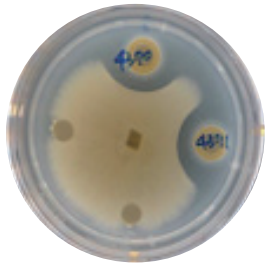
Part 1. 세균의 실데이터

No	FBCC No.	항균활성(%)		식물생장촉진(mm)		효소 활성(mm)			
		F.oxysporum	*C.gloeosporioides*	사이드로포어 생성능	인산가용화능	Protease	Amylase	Xylanase	Glycosidase
1	FBCC-B5352	44.17±2.46	52.57±1.65	19.45±0.21	19.45±0.57	38.56±0.39	28.34±0.92	35.11±0.96	21.48±1.27
2	FBCC-B6034	21.02±4.11	47.28±1.17	11.74±0.04	16.44±0.23	30.32±0.56	29.97±0.69	30.37±1.10	0.00±0.00
3	FBCC-B6059	13.43±1.44	13.47±2.47	11.74±0.23	15.63±0.18	25.54±0.92	21.95±0.73	0.00±0.00	19.47±0.99
4	FBCC-B6062	22.77±1.08	39.27±1.22	14.88±0.30	18.61±0.70	29.05±0.41	25.33±0.20	32.24±0.60	22.72±0.57
5	FBCC-B6063	39.92±0.04	26.57±0.50	16.83±0.32	18.94±0.06	19.78±0.45	29.19±0.79	40.16±0.31	31.64±0.56
6	FBCC-B6064	21.67±3.21	39.39±1.36	14.62±0.05	18.51±0.99	30.29±0.16	27.84±0.87	35.37±0.82	22.34±0.22
7	FBCC-B6066	18.13±2.65	34.22±1.32	11.86±0.21	18.12±0.26	29.80±0.71	26.13±0.29	33.40±0.15	19.65±0.57
8	FBCC-B6068	10.81±0.58	35.76±2.70	14.27±0.12	20.50±0.35	30.04±0.75	26.57±0.47	32.74±0.99	0.00±0.00
9	FBCC-B6070	12.99±1.77	36.27±0.92	15.29±0.57	20.62±0.19	28.89±0.27	27.29±0.30	33.63±0.94	21.03±0.56
10	FBCC-B6072	25.86±3.47	26.77±1.92	13.10±0.14	14.92±0.13	18.11±0.50	19.76±0.30	0.00±0.00	30.87±0.93
11	FBCC-B6079	21.54±0.65	38.22±1.59	14.54±0.19	16.94±0.13	27.93±0.39	26.68±0.31	31.36±0.36	23.47±0.63
12	FBCC-B6092	3.54±0.18	40.36±1.06	11.46±0.29	19.09±0.73	34.48±0.46	0.00±0.00	0.00±0.00	23.28±1.37
13	FBCC-B6131	5.62±0.68	6.13±1.47	12.03±0.12	16.98±0.04	22.47±0.04	0.00±0.00	28.08±0.37	27.32±0.87
14	FBCC-B6156	35.68±1.19	54.97±1.39	18.10±0.01	17.44±0.30	39.54±0.21	26.75±0.44	35.84±0.42	23.78±0.62
15	FBCC-B6157	38.71±2.76	52.49±0.98	17.00±0.62	17.57±0.25	38.19±0.51	24.73±0.46	34.43±0.07	22.07±1.01
16	FBCC-B6158	31.43±1.69	51.00±1.80	19.92±0.23	19.73±0.48	37.67±0.36	26.30±0.66	35.16±0.48	20.80±0.69
17	FBCC-B6159	40.18±1.24	53.93±1.34	19.79±0.31	20.12±0.28	38.87±0.93	26.71±1.42	37.11±0.41	21.60±0.28
18	FBCC-B6160	43.68±0.80	58.57±1.24	16.61±0.23	19.47±0.32	40.63±0.70	28.87±0.57	38.95±0.63	20.93±0.92
19	FBCC-B6161	39.12±2.22	53.37±2.08	20.09±0.55	20.49±0.41	39.85±1.16	27.16±0.61	36.54±0.23	23.76±1.20
20	FBCC-B6162	38.53±3.32	60.82±1.99	20.68±0.17	19.68±0.73	40.49±0.57	27.77±0.87	37.06±0.12	24.60±0.32
21	FBCC-B11183	25.28±0.98	24.94±1.24	17.74±0.43	20.98±0.57	30.41±0.29	30.87±5.85	30.45±1.17	24.47±0.79
22	FBCC-B13732	27.92±1.63	32.64±2.48	10.26±0.19	18.25±0.31	18.93±1.33	19.22±0.18	19.14±0.11	22.80±1.00
23	FBCC-B13737	41.33±0.94	50.69±1.01	15.25±0.27	16.73±0.60	26.48±0.15	22.81±0.82	21.65±0.23	23.16±0.61
24	FBCC-B13739	19.44±1.62	16.98±1.27	10.88±0.24	16.20±0.62	0.00±0.00	15.24±0.21	0.00±0.00	23.81±1.08
25	FBCC-B15011	24.89±3.30	28.47±2.41	12.50±0.54	18.63±0.44	21.30±0.43	20.41±0.78	21.59±0.23	25.51±0.17
26	FBCC-B15015	23.76±0.79	43.38±1.10	14.85±0.53	18.86±0.26	27.33±0.44	23.54±0.44	22.79±0.29	26.21±1.02
27	FBCC-B15762	28.46±2.19	38.90±1.40	17.25±0.23	19.81±0.15	27.26±0.17	24.96±0.37	28.82±0.65	29.08±1.06
28	FBCC-B16107	40.00±0.59	53.28±0.90	14.85±0.16	18.22±0.26	31.15±0.31	22.35±1.03	30.66±0.25	21.11±0.69
29	FBCC-B16836	21.39±2.70	28.40±2.87	13.07±0.62	18.46±0.92	25.87±0.67	23.19±0.79	25.10±0.20	27.49±1.01
30	FBCC-B19063	11.63±1.61	23.30±1.09	16.67±0.12	20.73±0.35	0.00±0.00	25.04±0.91	24.70±0.21	26.43±1.14
31	FBCC-B19144	42.76±1.94	58.57±1.76	13.10±0.84	20.08±0.48	30.44±0.43	26.33±0.03	35.44±0.43	28.46±0.49
32	FBCC-B19209	15.99±1.00	41.46±1.44	16.10±0.20	19.21±0.30	19.54±0.62	28.20±0.26	30.93±0.36	25.92±0.95
33	FBCC-B19238	13.88±0.83	29.27±1.65	16.46±0.43	17.77±0.38	14.93±0.85	27.77±0.45	17.88±1.03	28.23±0.05
34	FBCC-B19315	18.66±3.12	42.41±0.13	16.32±0.83	19.25±0.24	22.03±0.62	33.52±0.91	34.74±0.43	29.38±0.94
35	FBCC-B19318	26.54±2.06	42.97±1.40	15.78±0.20	21.55±0.44	24.48±0.38	28.49±0.54	34.37±0.33	28.14±0.84
36	FBCC-B19319	26.54±2.06	41.99±2.37	14.58±0.24	21.31±0.09	25.35±0.70	33.93±0.20	34.28±0.37	29.01±1.20
37	FBCC-B19320	22.54±2.22	42.13±2.52	18.42±0.13	21.30±0.22	25.98±0.58	30.63±1.10	33.22±0.52	28.44±0.69
38	FBCC-B19321	19.79±1.53	43.10±1.89	19.23±0.63	20.81±0.60	24.85±0.93	27.45±0.57	35.26±0.88	27.45±0.55
39	FBCC-B19325	22.79±2.84	34.84±3.40	19.93±0.69	21.18±0.31	31.62±0.65	27.19±0.78	35.29±0.56	27.99±0.52
40	FBCC-B19327	25.61±1.75	36.67±0.92	12.10±0.19	18.47±0.30	29.19±0.88	23.74±0.56	33.57±0.80	24.26±0.56
41	FBCC-B19328	31.22±3.44	48.58±0.35	12.39±0.28	18.80±0.40	28.89±0.81	23.70±0.83	35.48±0.70	25.30±0.98
42	FBCC-B19329	9.17±0.68	16.83±2.13	11.45±0.27	15.02±0.46	30.88±2.14	0.00±0.00	36.95±0.14	28.54±0.12
43	FBCC-B19330	16.47±2.01	17.94±1.20	11.49±0.11	14.87±0.12	31.54±0.94	0.00±0.00	36.35±0.28	27.67±0.78
44	FBCC-B19331	16.02±2.22	21.69±1.03	11.18±0.19	16.80±0.33	33.05±1.05	0.00±0.00	38.09±0.14	27.35±0.74

<table>
<tr><th>No</th><th>항목</th><th>고정(F)
변동(V)</th><th>값</th><th>도움말</th></tr>
<tr><td>1</td><td>샘플 종류
(Sample type)</td><td>V</td><td>Index</td><td>· 설명 등록하려는 샘플에 가장 적절한 생물군
· 가능한 값 다음 중 택일
<table><tr><th>No</th><th>가능한 값</th><th>설명</th></tr><tr><td>1</td><td>세균</td><td>세균 배양체 샘플</td></tr><tr><td>2</td><td>진균</td><td>진균 배양체 샘플</td></tr><tr><td>3</td><td>추출물</td><td>식물 또는 미생물 추출물 샘플</td></tr></table></td></tr>
<tr><td>2</td><td>배양 콜렉션
(FBCC-number)</td><td>V</td><td>Num</td><td>· 설명 담수생물자원은행 배양체 고유 번호
· 예시 FBCC-B1</td></tr>
<tr><td>3</td><td>생명체 명
(Taxon name)</td><td>V</td><td>Text</td><td>· 설명 담수생물자원은행에 등록된 생명체 이름(가능하면 종 단위까지). 미확인 종의 경우 'sp.'로 (예: Escherichia sp.), 균주(strain) 또는 분리주(isolate) 이름 입력 가능(예: "Pseudomonas sp. UK4")</td></tr>
<tr><td>4</td><td>배양배지</td><td>V</td><td>Text</td><td>· 설명 실험 균주 배양을 위해 사용된 배지
· 예시 R2A Agar (Reasoner's 2A Agar)</td></tr>
<tr><td>5</td><td>배양온도</td><td>V</td><td>Num</td><td>· 설명 실험균 배양에 사용된 온도(°C)
· 예시 25</td></tr>
<tr><td>6</td><td>배양기간</td><td>F</td><td>Num</td><td>· 설명 실험균주 배양기간(일)
· 예시 5</td></tr>
<tr><td>7</td><td>항균활성</td><td>V</td><td>Num</td><td>· 설명 병원성 미생물의 생장 억제능을 정량 표기하는 방법
- 항식물병원균 : 3회 반복 실험한 균사생장억제율(%)을 평균과 표준편차로 표기 (소수점 셋째자리에서 반올림)
· 예시 10.2±0.36
- 항인체병원균 : 3회 반복 실험한 저지원(inhibition zone)에서 집락 가장자리까지의 거리(mm)를 평균과 표준편차로 표기 (소수점 셋째자리에서 반올림)
· 예시 10.2±0.36</td></tr>
<tr><td>8</td><td>인산가용화능</td><td>V</td><td>Num</td><td>· 설명 불용성 인산염을 가용화하는 능력을 정량 표기하는 방법
- 3회 반복 실험한 투명환의 지름(mm)을 평균과 표준편차로 표기(소수점 셋째자리에서 반올림)
· 예시 10.2±0.36</td></tr>
<tr><td>9</td><td>사이드로포어 생성</td><td>V</td><td>Num</td><td>· 설명 사이드로포어 생성능을 정량 표기하는 방법
- 3회 반복실험한 배지변색환의 지름(mm)을 평균과 표준편차로 표기 (소수점 셋째자리에서 반올림)
· 예시 10.0±0.36</td></tr>
<tr><td>10</td><td>효소활성</td><td>V</td><td>Num</td><td>· 설명 효소활성을 정량 표기하는 방법
- 3회 반복실험한 배지변색환의 지름(mm)을 평균과 표준편차로 표기(소수점 셋째자리에서 반올림)
· 예시 10.0±0.36</td></tr>
</table>

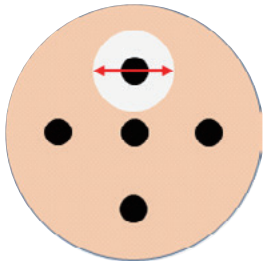
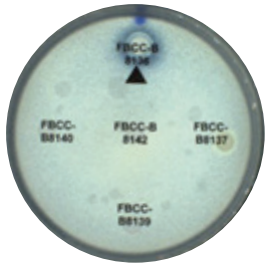
Part 2. 세균의 항진균활성 평가 데이터

<table>
<tr><th>No</th><th colspan="2">항목</th><th>고정(F)
변동(V)</th><th>값</th><th>도움말</th></tr>
<tr><td>1</td><td colspan="2">병원균</td><td>V</td><td>Index
(선택)</td><td>· 설명 생장을 억제하고자하는 대상 병원균
· 가능한 값 다음 중 택일
<table>
<tr><th>No</th><th>가능한 값</th><th>설명</th><th>생물안전등급</th></tr>
<tr><td>1</td><td>Fusarium oxysporum</td><td>시들음병균</td><td rowspan="2">BSL-1</td></tr>
<tr><td>2</td><td>Colletotrichum gloeosporioides</td><td>탄저병원균</td></tr>
</table></td></tr>
<tr><td>2</td><td colspan="2">항진균 활성분석 프로토콜</td><td>F</td><td>Text</td><td>· 설명 항진균 활성을 측정하는데 사용된 프로토콜
· 예시 - 대치배양법: 병원균과 실험균을 단일 배양 접시에 치상하여 저지원 관찰</td></tr>
<tr><td rowspan="3">3</td><td rowspan="3">병원균 배양</td><td>배양배지</td><td>F</td><td>Text</td><td>· 설명 병원균 배양을 위해 사용된 배지
· 예시 PDA(potato dextrose agar)</td></tr>
<tr><td>배양온도</td><td>F</td><td>Num</td><td>· 설명 병원균 배양온도(°C)
· 예시 25</td></tr>
<tr><td>배양기간</td><td>F</td><td>Num</td><td>· 설명 실험균주 배양기간(일)
· 예시 5</td></tr>
<tr><td rowspan="4">4</td><td rowspan="4">실험균주 배양</td><td>배양배지</td><td>F</td><td>Text</td><td>· 설명 실험 균주 배양을 위해 사용된 배지
· 가능한 값 다음 중 택일
<table>
<tr><th>No</th><th>가능한 값</th><th>설명</th></tr>
<tr><td>1</td><td>MRSB</td><td>유산균</td></tr>
<tr><td>2</td><td>GSS</td><td>방선균</td></tr>
<tr><td>3</td><td>TSB</td><td rowspan="2">그외세균</td></tr>
<tr><td>4</td><td>R2B</td></tr>
</table></td></tr>
<tr><td>배양온도</td><td>F</td><td>Num</td><td>· 설명 실험수행 온도(°C)
· 예시 25</td></tr>
<tr><td>진탕배양</td><td>F</td><td>Num</td><td>· 설명 진탕배양시 분당회전수(rpm)
· 고정값 150</td></tr>
<tr><td>배양기간</td><td>F</td><td>Num</td><td>· 설명 배양 기간(일)
· 예시 5</td></tr>
<tr><td rowspan="3">5</td><td rowspan="3">항균활성 분석</td><td>병원균 접종량</td><td>F</td><td>Num</td><td>· 설명 병원균을 배지 상에 접종하는 양
- 코르크보러 1호 크기(5mm)의 아가플러그 개수
· 예시 1</td></tr>
<tr><td>실험균주 접종량</td><td>F</td><td>Num</td><td>· 설명 실험균주를 8mm paper disc 위에 접종하는 양
- 2~7일 배양한 OD_{600}=0.5 이상 농도의 미생물 배양액의 양(μl)
· 예시 30</td></tr>
<tr><td>배양접시 규격</td><td>F</td><td>Num</td><td>· 설명 실험에 사용되는 plate의 직경(cm)
· 예시 9</td></tr>
</table>

No	항목		고정(F) 변동(V)	값	도움말
		배양접시 당 측정 개수	F	Num	· 설명 실험에 사용되는 plate당 처리하는 실험균 수 · 예시 4
		병원균과 실험균주의 접종거리	F	Num	· 설명 실험에 사용되는 plate상에서 병원균과 실험균주를 접종하는 paper disc사이의 거리(cm) · 예시 3
		활성측정 온도	F	Num	· 설명 실험수행 온도(°C) · 예시 25
		활성측정 기간	F	Num	· 설명 대치배양 기간(일) · 예시 10
		활성측정 배지	F	Text	· 설명 항균활성 측정을 위해 사용된 배지 · 예시 PDA(potato dextrose agar)
		활성측정 배지 용량	F	Num	· 설명 항균활성 측정을 위해 사용된 배지의 양(ml) · 예시 25
6	항진균 활성값 측정		V	Num	· 설명 항진균 활성을 정량하는 방법 - 병원균의 생장억제율(%)=[(대조구 병원균 생장길이(A)-처리구 병원균 생장길이(B))/대조구 병원균 생장길이(A)]x100 · 예시 10  <산출식 설명 데이터>  <실 데이터>
7	항진균활성 이미지파일		V	Text	· 설명 항진균활성을 측정한 배양접시 사진을 저장한 이미지파일명 · 예시 1_FBCC-B1_항균FO.JPG
8	참고문헌(Reference)		F	Text	· 설명 실험방법과 관련된 참고 문헌 · 예시 Kim et al. (2020) Plant Growth Promoting and Disease Controlling Activities of Pseudomonas geniculata ANG3, Exiguobacterium acetylicum ANG40 and Burkholderia stabilis ANG51 Isolated from Soil. Microbiol. Biotechnol. Lett. 48(1), 38–47

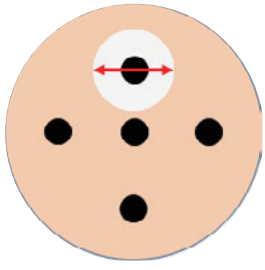
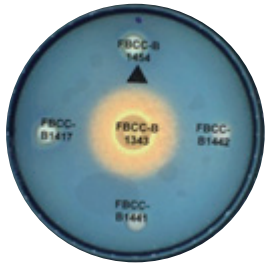
Part 3. 세균의 불용성 인산가용화능 평가 데이터

<table>
<tr><th>No</th><th colspan="2">항목</th><th>고정(F)
변동(V)</th><th>값</th><th>도움말</th></tr>
<tr><td>1</td><td colspan="2">불용성 인산가용화능 분석
프로토콜</td><td>F</td><td>Text</td><td>· 설명 인산가용화능을 측정하는데 사용된 프로토콜
· 예시 Pikovskaya(PVK)-BPB배지를 이용한 plate assay법</td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">실험균주 배양</td><td>배양배지</td><td>F</td><td>Text</td><td>· 설명 250ml의 플라스크에 50ml로 제작된 배지 종류
· 가능한 값 다음 중 택일
<table>
<tr><th>No</th><th>가능한 값</th><th>설명</th></tr>
<tr><td>1</td><td>MRSB</td><td>유산균</td></tr>
<tr><td>2</td><td>GSS</td><td>방선균</td></tr>
<tr><td>3</td><td>TSB</td><td rowspan="2">그외세균</td></tr>
<tr><td>4</td><td>R2B</td></tr>
</table></td></tr>
<tr><td>배양온도</td><td>F</td><td>Num</td><td>· 설명 실험균주 배양온도(°C)
· 예시 25</td></tr>
<tr><td>진탕배양</td><td>F</td><td>Num</td><td>· 설명 진탕배양시 분당회전수(rpm)
· 고정값 25</td></tr>
<tr><td>배양기간</td><td>F</td><td>Num</td><td>· 설명 실험균주 배양기간(일)
· 예시 5</td></tr>
<tr><td>3</td><td colspan="2">인산가용화능 배지</td><td>F</td><td>Text</td><td>· 설명 실험수행에 사용된 배지
· 예시 PVK-BPB
※ PVK(Pikovskaya)-BPB(Bromophenol blue) 배지 조성: glucose 1%, $(NH_4)_2SO_4$ 0.05%, NaCl 0.02%, KCl 0.02%, $MgSO_4{\cdot}7H_2O$ 0.01%, $MnSO_4{\cdot}7H_2O$ 0.05%, $FeSO_4{\cdot}7H_2O$ 0.05 %, yeast extract 0.05%, $Ca_3(PO_4)_2$ 0.5%, Agar 1.5% (pH 7.0), 0.025g/L bromophenol blue</td></tr>
<tr><td>4</td><td colspan="2">접종량</td><td>F</td><td>Num</td><td>· 설명 실험균주를 8mm paper disc 위에 접종하는 양
- 2~7일 배양한 OD_{600}=0.5 농도의 미생물 배양액의 양(μl)
· 예시 30</td></tr>
<tr><td>5</td><td colspan="2">실험온도</td><td>F</td><td>Num</td><td>· 설명 실험수행 온도(°C)
· 예시 25</td></tr>
<tr><td>6</td><td colspan="2">배양기간</td><td>F</td><td>Num</td><td>· 설명 배양 기간(일)
· 예시 5</td></tr>
<tr><td>7</td><td colspan="2">배양접시 규격</td><td>F</td><td>Num</td><td>· 설명 실험에 사용되는 plate의 직경(cm)
· 예시 9</td></tr>
<tr><td>8</td><td colspan="2">활성측정 배지 용량</td><td>F</td><td>Num</td><td>· 설명 인산가용화능 측정을 위해 plate 당 사용된 배지의 양(ml)
· 예시 20</td></tr>
<tr><td>9</td><td colspan="2">배양접시 당 측정 개수</td><td>F</td><td>Num</td><td>· 설명 실험에 사용되는 plate당 처리하는 실험균 수
· 예시 5</td></tr>
</table>

No	항목	고정(F) 변동(V)	값	도움말
10	실험균주 간 접종거리	F	Num	· 설명 실험에 사용되는 plate상에서 실험균주를 접종하는 paper disc 사이의 거리(cm) · 예시 3
11	인산가용화능 측정	V	Num	· 설명 인산가용화능을 정량하는 방법(mm) · 예시 실험균주 주변의 배지변색환 지름 측정  <산출식 설명 데이터>  <실 데이터>
12	인산가용화능 이미지파일	V	Text	· 설명 인산가용화능을 측정한 배양접시 사진을 저장한 이미지파일명 · 예시 1_FBCC-B1_PVK-BPB.JPG
13	참고문헌(Reference)	F	Text	· 설명 실험방법과 관련된 참고 문헌 · 예시 Nautiyal C. S. (1999). An efficient microbiological growth medium for screening phosphate solubilizing microorganisms. FEMS microbiology letters, 170(1), 265–270

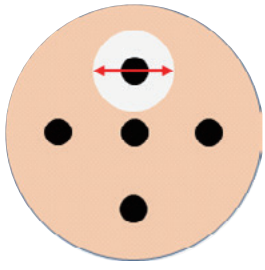
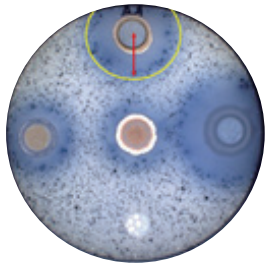
Part 4. 세균의 사이드로포어 생성능 평가 데이터

<table>
<tr><th>No</th><th colspan="2">항목</th><th>고정(F)
변동(V)</th><th>값</th><th>도움말</th></tr>
<tr><td>1</td><td colspan="2">사이드로포어 분석 프로토콜</td><td>F</td><td>Text</td><td>· 설명 사이드로포어 생성능을 측정하는데 사용된 프로토콜
· 예시 CAS(Chrome azurol S) 배지를 이용한 plate assay법</td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">실험균주 배양</td><td>배양배지</td><td>F</td><td>Text</td><td>· 설명 250ml의 플라스크에 50ml로 제작된 배지 종류
· 가능한 값 다음 중 택일
<table>
<tr><th>No</th><th>가능한 값</th><th>설명</th></tr>
<tr><td>1</td><td>MRSB</td><td>유산균</td></tr>
<tr><td>2</td><td>GSS</td><td>방선균</td></tr>
<tr><td>3</td><td>TSB</td><td rowspan="2">그외세균</td></tr>
<tr><td>4</td><td>R2B</td></tr>
</table></td></tr>
<tr><td>배양온도</td><td>F</td><td>Num</td><td>· 설명 실험균주 배양온도(°C)
· 예시 25</td></tr>
<tr><td>진탕배양</td><td>F</td><td>Num</td><td>· 설명 분당회전수(rpm)
· 고정값 150</td></tr>
<tr><td>배양기간</td><td>F</td><td>Num</td><td>· 설명 실험균주 배양기간(일)
· 예시 5</td></tr>
<tr><td>3</td><td colspan="2">활성분석용 배지</td><td>F</td><td>Text</td><td>· 설명 사이드로포어 생성능을 측정하기 위한 활성 분석용 배지
· 예시 CAS(Chrome azurol S)고체배지(PIPES 30.24g/L, MM9 salt solution 100ml/L, 20% glucose 10ml/L, 10% casamino acid solution 30ml/L, 1.5% agar, pH 6.0 with 6M KOH, 10% blue dye solution)
※ Blue dye solution : CAS 2mM, FeCl3-6H2O 1mM, HDTMA(CTAB) 5mM</td></tr>
<tr><td>4</td><td colspan="2">접종량</td><td>F</td><td>Num</td><td>· 설명 실험균주를 8mm paper disc 위에 접종하는 양
- 2~7일 배양한 OD_{600}=0.5 농도의 미생물배양액의 양(μl)
· 예시 30</td></tr>
<tr><td>5</td><td colspan="2">실험온도</td><td>F</td><td>Num</td><td>· 설명 실험수행 온도(°C)
· 예시 25</td></tr>
<tr><td>6</td><td colspan="2">배양기간</td><td>F</td><td>Num</td><td>· 설명 실험균주 배양기간(일)
· 예시 5</td></tr>
<tr><td>7</td><td colspan="2">반응 기간</td><td>F</td><td>Num</td><td>· 설명 사이드로포어 생성능 측정을 위한 반응 기간(일)
· 예시 5</td></tr>
<tr><td>8</td><td colspan="2">배양접시 규격</td><td>F</td><td>Num</td><td>· 설명 실험에 사용되는 plate의 직경(cm)
· 예시 9</td></tr>
</table>

No	항목	고정(F) 변동(V)	값	도움말
9	활성측정 배지 용량	F	Num	· 설명 사이드로포어생성능 측정을 위해 plate 당 사용된 배지의 양(ml) · 예시 25
10	배양접시 당 측정 개수	F	Num	· 설명 실험에 사용되는 plate당 처리하는 실험균 수 · 예시 최대 5개
11	실험균주 간 접종거리	F	Num	· 설명 실험에 사용되는 plate상에서 실험균주를 접종하는 paper disc 사이의 거리 · 예시 3cm 이상
12	사이드로포어 생성능 측정	V	Num	· 설명 사이드로포어 생성능을 정량하는 방법 · 예시 실험균주 주변에 형성된 배지변색환의 지름 측정(mm)  <산출식 설명 데이터>  <실 데이터>
13	사이드로포어 생성능 이미지파일	V	Text	· 설명 사이드로포어 생성능을 측정한 배양접시 사진을 저장한 이미지파일명 · 예시 1_FBCC-B1_SP.JPG
14	참고문헌(Reference)	F	Text	· 설명 실험방법과 관련된 참고 문헌 · 예시 Bakthavatchalu Sasirekha,a Shivakumar Srividya (2016) Siderophore production by Pseudomonas aeruginosa FP6, a biocontrol strain for Rhizoctonia solani and Colletotrichum gloeosporioides causing diseases in chilli. Agriculture and Natural Resources 50:250-256

Part 5. 세균의 효소활성 평가 데이터

<table>
<tr><th>No</th><th colspan="2">항목</th><th>고정(F)
변동(V)</th><th>값</th><th>도움말</th></tr>
<tr><td>1</td><td colspan="2">효소활성 분석 프로토콜</td><td>F</td><td>Text</td><td>· 설명 효소활성을 측정하는데 사용된 프로토콜
· 예시 Insoluble chromogenic substrates(Megazyme) 등을 이용한 plate assay법</td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">실험균주 배양</td><td>배양배지</td><td>F</td><td>Text</td><td>· 설명 250ml의 플라스크에 50ml로 제작된 배지 종류
· 가능한 값 다음 중 택일
<table>
<tr><th>No</th><th>가능한 값</th><th>설명</th></tr>
<tr><td>1</td><td>MRSB</td><td>유산균</td></tr>
<tr><td>2</td><td>GSS</td><td>방선균</td></tr>
<tr><td>3</td><td>TSB</td><td rowspan="2">그외세균</td></tr>
<tr><td>4</td><td>R2B</td></tr>
</table></td></tr>
<tr><td>배양온도</td><td>F</td><td>Num</td><td>· 설명 실험균주 배양온도(°C)
· 예시 25</td></tr>
<tr><td>진탕배양</td><td>F</td><td>Num</td><td>· 설명 분당회전수(rpm)
· 고정값 150</td></tr>
<tr><td>배양기간</td><td>F</td><td>Num</td><td>· 설명 실험균주 배양기간(일)
· 예시 5</td></tr>
<tr><td>3</td><td colspan="2">활성분석용 배지</td><td>F</td><td>Text</td><td>· 설명 효소활성을 측정하기 위한 활성 분석용 배지
· 예시
<table>
<tr><th>No</th><th>가능한 값</th><th>설명</th></tr>
<tr><td>1</td><td>Insoluble chromogenic substrates 배지</td><td>Protease
α-amylase
endo-1,4-β-Xylanase</td></tr>
</table>
Insoluble chromogenic substrates 배지(Insoluble chromogenic substrates 0.5 g/L, xanthan gum 3.0 g/L,1.5% agar)
※ Insoluble chromogenic substrates
<table>
<tr><th>No</th><th>가능한 값</th><th>설명</th></tr>
<tr><td>1</td><td>AZCL-Casein</td><td>Protease</td></tr>
<tr><td>2</td><td>AZCL-Amylose</td><td>α-amylase</td></tr>
<tr><td>3</td><td>AZCL-Xylan (Beechwood)</td><td>endo-1,4-β-Xylanase</td></tr>
<tr><td>4</td><td>Esculin Iron Agar</td><td>Glycosidase</td></tr>
</table>
Esculin Iron Agar(esculin 1g/L, ferric ammonium citrate 0.5g/L, agar 20g/L)</td></tr>
<tr><td>4</td><td colspan="2">접종량</td><td>F</td><td>Num</td><td>· 설명 실험균주를 8mm paper disc 위에 접종하는 양
- 2~7일 배양한 OD_{600} = 0.5이상의 미생물 배양액의 양(μl)
· 예시 30</td></tr>
<tr><td>5</td><td colspan="2">실험온도</td><td>F</td><td>Num</td><td>· 설명 실험수행 온도(°C)
· 예시 25</td></tr>
<tr><td>6</td><td colspan="2">반응 기간</td><td>F</td><td>Num</td><td>· 설명 효소활성 측정을 위한 반응 기간(일)
· 예시 3</td></tr>
</table>

No	항목	고정(F) 변동(V)	값	도움말
7	배양접시 규격	F	Num	· 설명 실험에 사용되는 plate의 직경(cm) · 예시 9
8	활성측정 배지 용량	F	Num	· 설명 효소활성 측정을 위해 plate 당 사용된 배지의 양(ml) · 예시 25
9	배양접시 당 측정 개수	F	Num	· 설명 실험에 사용되는 plate당 처리하는 실험균 수 · 예시 최대 5개
10	실험균주 간 접종거리	F	Num	· 설명 실험에 사용되는 plate상에서 실험균주를 접종하는 paper disc사이의 거리 · 예시 3cm 이상
11	효소활성 측정	V	Num	· 설명 효소활성을 정량하는 방법 · 예시 실험균주 주변에 형성된 환의 지름(mm)  <산출식 설명 데이터>  <실 데이터>
12	효소활성 이미지파일	V	Text	· 설명 효소활성을 측정한 배양접시 사진을 저장한 이미지파일명 · 예시 1_FBCC-B1_A.JPG 1_FBCC-B1_G.JPG 1_FBCC-B1_P.JPG 1_FBCC-B1_X.JPG
13	참고문헌(Reference)	F	Text	· 설명 실험방법과 관련된 참고 문헌 · 예시 Mathlouthi, N., Saulnier, L., Quemener, B., & Larbier, M. (2002). Xylanase, β-glucanase, and other side enzymatic activities have greater effects on the viscosity of several feedstuffs than xylanase and β-glucanase used alone or in combination. Journal of agricultural and food chemistry, 50(18), 5121-5127

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국립낙동강생물자원관
Nakdonggang National Institute of Biological Resources

담수생물자원은행
FBCC
Freshwater Bioresources Culture Collection

참고문헌

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일러두기

01

수록된 각 *Bacillus*의 설명에는 자원은행번호(FBCC No.), 학명(Scientific name), 화상자료(Photograph)
분류체계(Classification), 기본정보(Information), 참고문헌(References), 염기서열(Sequence)
항진균 활성(Antifungal Activity), 식물생장촉진(Plant Growth Promotion), 효소 활성(Enzyme Activity)를 수록하였다.

02

학명과 분류체계는 LPSN(https://www.bacterio.net/), NCBI(https://www.ncbi.nlm.nih.gov/)를
참고하여 최신 학명과 분류체계(2026년 5월 기준)를 수록하였다.

03

*Bacillus*의 학명은 기탁자가 동정하여 FBCC에 등록한
학명을 기준으로 최신 분류체계를 따라 기재하였다.

04

유용성 정보는 기후에너지환경부에서 시행한 다부처 국가생명연구자원
선진화사업의 연구자료를 사용하였다.

