

Supplementary Materials

Expression, purification and characterization of a new alginate lyase from *Psychromonas* sp. SP041 through metagenomics analysis of rotten kelp

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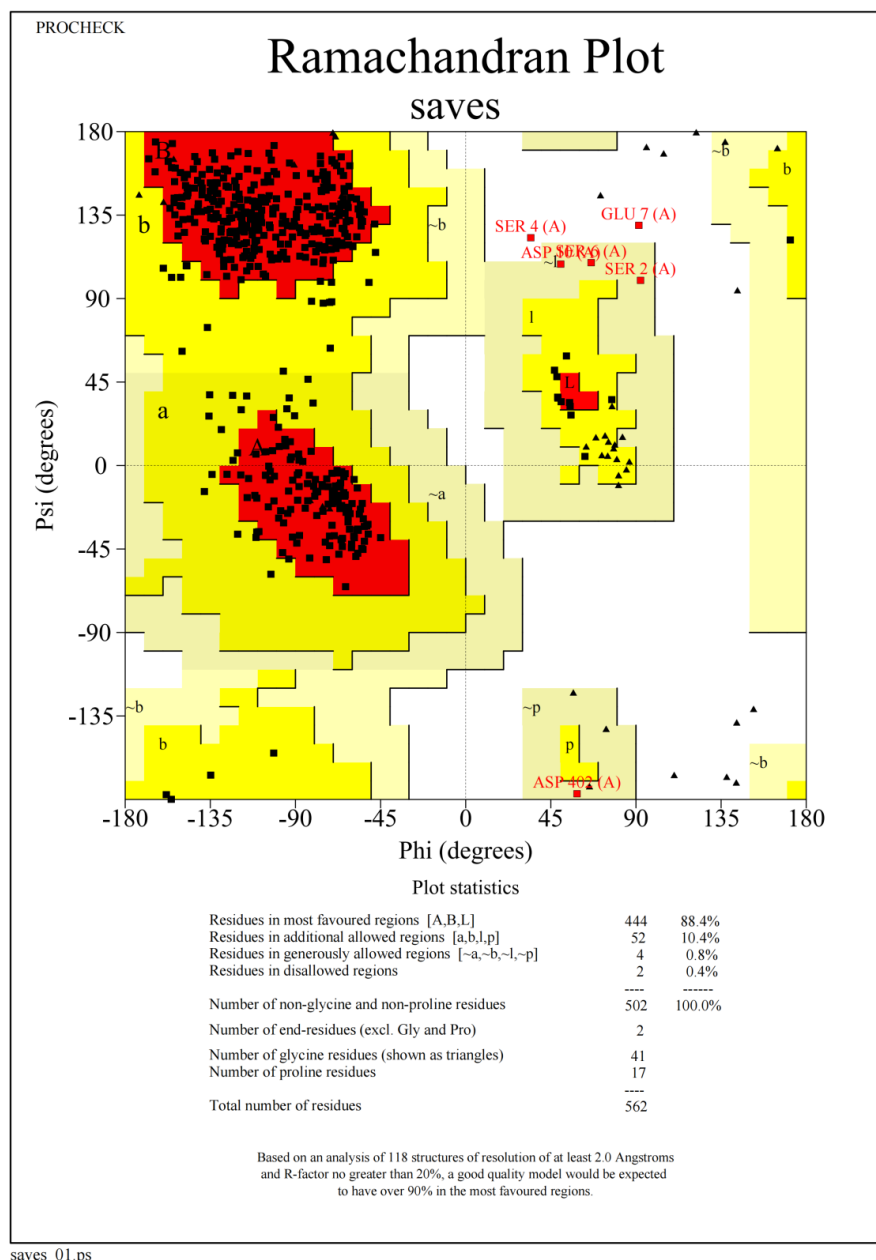
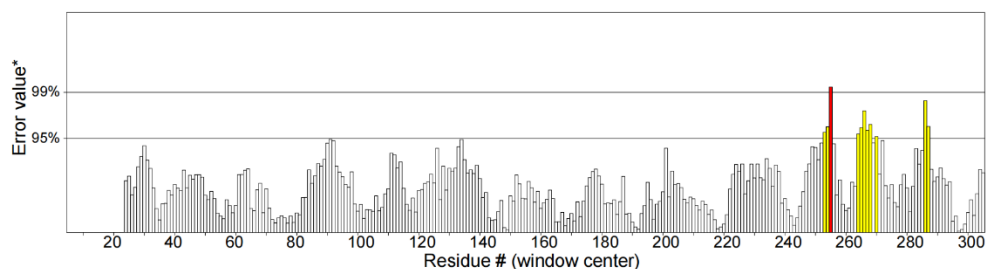


Figure S1. Ramachandran plot of the predicted protein structure of Alg169

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 Overall quality factor**: 96.449



Program: ERRAT2
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 Chain#:A
 Overall quality factor**: 96.449

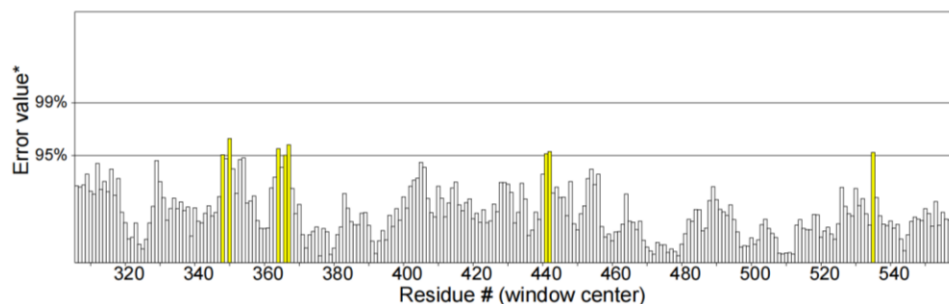


Figure S2. ERRAT detection results of Alg169 predicted protein structure

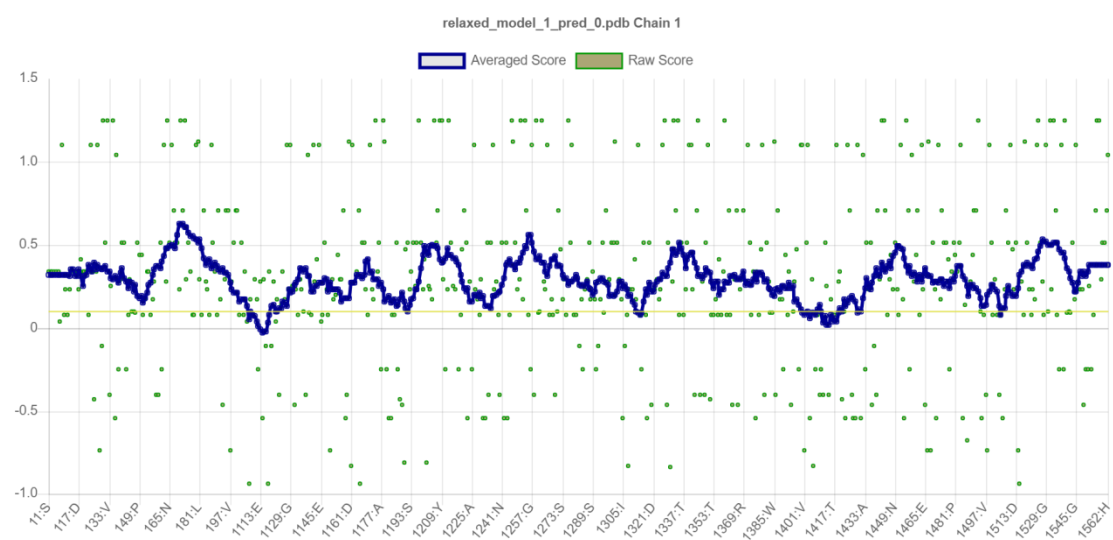


Figure S3. Verify3D detection results of Alg169 predicted protein structure

Table S1. Gene sequences of Alg169, Alg179, Alg189 and Alg136

Gene name	Gene sequence
Alg169	<p>TCAAGCAGTTCATCCTCTGAAGGAACAGATACCGACTCCTCATCCTCTGACAACA GCTCGTCGACCGGTTTCCTACTCCGGCGTTCCGTATGATTATGTGCAATACATCCA CGCCCTGAACAATGCCAAGCTGCAGCAAAACAACCCTCCGACCTCCAGCAGCAC TTCAGAGGTGGTGGATGCTGGTGAGTACAACGGCTTTGACAACGACTACTTCTAC CTGGATAGCACCACGGGTTGGCTGACCTTCGAAATGACCGGTGACTCGAAACGT AGCGAGTTGCGCTTCGTAGAAAACCTTTCGTACCAACACCTCAGAGATCAGCACG CTTAGCGCGGAAATCTTACCGATTAGCCCGGAAGAAAGCGTTGCTAGCAGCGGT GATGGGCAAGAGATGACGCTTATGCAGGTTTCATAATAAAGGTGAGAATGGTGAA ACGGATGATACCGTTCTGTACATCCGCTGCTGCGTATTGTTTGGGATGGCGAGT CTCGTATCGATGACGACACCGGTGACTCCTACTCTAACGCGTATTGGGCAATTAT TAAGACGAATGCGTACGAATGTAAAGATGACAGCAACCCGAATTATAACGATAA CTGCCCCGATAGTTACGATTTCTACTACCTGGCAGATTACGACCAGGATAACGCG ACCAAGTTCGATATCGAAGCGGGTGACAGCACTCTGATTATCAACGTGGACGGT GATGAGAAGGTGAACATTGATATTACCTATTGGGATGACCTCTATAGCTACTTCA AGGCAGGCGTGTATAACCAGTACGAAGATGGTACCAGCACCGTTCAATTTAAGA GCCTGACGTACAACGGCACCAACCTGCCGTCCGCGGACCTCGACTCTTCTTCTGC GCCATCGGATAACTTCGAGTTGAATGATTGGAATCTGTCTATCCCGACGGACGAC GACAACCTCCGGTACCGCTGACACTATCGACGAGGATGACTTGAGTGACGGCTAC GAAGACTTCGAATATTTCTATACCAATACCGACGACGGCGGCATGGTTTTTTACG TGGAAGTCGACGGCTACAAAACCAGCACTAATACGAGCTATACCCGTACCGAGC TGCGCGAGATGCTGAGAGAAGGTGACACCTCGATTAGCACTAAGGGTGTCAATG AAAACAACCTGGGTCTTCAGCAGTGCCCCGACTTCCGAGCAGGAGAAGGCGGGCG GTGTGGACGGTATCCTGGACGCGACCGTTGCTGTGAATCAGGTGAGCACGACCG GCGAGAGCTATCAAATCGGCCGTGTTATCATTGGCCAAATCCACGCTAATGACG ACGAGCCGGTTTCGCTTGTATTACCGCAAACCTGCCGGACAACGATAAAGGTAGCA TCTATTTTCGCGCACGAACCGCGTACCGGCGATGAGGTCTGGGTGATATGATCGG TAGCCGTGATAATAACGCGTCCAACCCGAGCGACGGTATCGCGCTGGATGAGCC ATTTTTTTATCAAATTAAGTGTTGGTAATACTTTGACCGTGACCATTATGCGT GATGGCAAAGATGATGTTATTGAAACCTGGGACATGACGGATTCCGGCTATGAT GAGACAGGCCAGTACATGTATTTAAGGCGGGTGCCTACAACCAGAATAACAGC GGTGAAGACGATGAAGCGGCACAGGCTACCTTTTATTACTTGAATAACCGCCAT</p>
Alg179	<p>CACGCTGATTATTTTTACCTAGACGATGAAGACCACCTGGTTTTTGTACCCCGAA CAAGGCGTTTACCACCCCGAACAGCTCTAATGCGCGTACGGAACTGCGTCAGATG TTGCGCGGCACTGACACCTCCATTGGTACGCATGATCCGCAGAATAACTTCGCCTT GGCGAGCCATAAACACGCAGACCAATACGCGCAGGTTGGCGGTTTTCTGGAAGCT ACCCTCCGCGTCGAGCACGTGGCGGAACGTAGCCGTAAGCCGGACCGCAAGTCC GCGTATTCGGTGGTGGTTGGTCAAATTCACGCCGGTAAAGATAAAGCTCTGATGG AAGAGGACGAGGGCTTCGGCCATGGCAACGAGCCGCTGAAAATCTTCTACAAA AGCTTCCGGATCAAGATACCGGTAGCGTGTTCTGGAATTATGAGAAGAACCTGGC</p>

GAAAGAAGACCCACGTCGTACCGACGTGAGCTACGCAGTTTGGGGTAATGATTGG
TCATCTAACGCTGATCCGGGTGAAGAGGGCATCAGCCTG

Alg189 GCTCACTATCTACCCCCACCTGATTTTATAAGAACACCGCCGGCAGCGCGTGCGCA
GCCGGCTGACTTCACCTGCCCGGCAGCTCCGGCGCCTTTCCGTGGCGAACTGGTT
TTTCGTTCGAAATACGAGGGCTCTGACGCTGCGCGAGCGACCTTGAATAAAGAAG
CACTCGCGGGCTACCGCCAGGCAACCCGCAACATCACGGCAACCCAAAAACGTG
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TAAAACGCAAAAGCCGTGCCCTGGCATAACACGATTACGCATTGCAACCGCTGGT
GACTTTGGTGCGTTTCGCGAAAGCGAATCAGGTTCTGTCTGACGCCGGAGGAAAA
CCGCGCGTTTGCCCGTCTGGTGGCTCGTGTACGTGCTGGTAAGGCCGACCCGGCA
GCGTTTCGTGAAAAGACCGGCAGCGAACAGGAGCCGTTACCCCGAGCCCGCGT
CCCTCCCCG

Alg136 ATGCTAACAAAAAAGACGCCCAATACTGTAACCTACGAACAGTTGCAAGGTGGCA
GCGATTGCATGTAGCTTTGCCTTGCTGGGGTGCGTCTCTACGGTGGAACGATAC
CACCGTCCTGGCGAAAGCGGACAGCCCGGCGTCGCAATTTGATTTACTCGGCTGG
ACCATTTCTGTTCCGGTCGACTCCGACGGCAACGGCAAGTCCGATCAGATCAAAG
AAAAGGCTCTGGCTGCCGTTATGCTGATCCGGAATACTTCTACTTGGCGGACGA
CGGCGGCATGGTTTTTAAATCTCCGTTAAAGGCGCAAAAACGAGCAAAAACAC
CAAGTACACCAGAAGCGAGCTGCGTGAAATGATCCGCCGTGGTAATACCTCCTAC
AGCACCAAGGGCGTGGGTGGCAACAACCTGGGTTTTTCAGCACCGCACCGGCGGAA
GATCTGAAAAATGCAGGCGGCGTGACGGCACCCCTGGAAGCGACCCTTGCTGTG
AACCACGTTACCACCACTGGTGTGAATTGGCAGCAAGGTCGTGTTATTATCGGCC
AAATCCACGCCAATGATGATGAACCGATTTCGCCTGTATTACCGCAAATTGCCACAA
CATGAGAAGGGTAGCATTTACTTCGCGCATGAGCCGAACTCGGAGGCGGACGAG
CAGTGGGTAGACATCATCGGTAACAGCCTGCCAACTATTGGAATAAGGACGCTA
CACCGGCGGAGCCGGTCGACGGTATTAACTGGGTGAAAAATTCTCCTACCGTAT
CAACGTGACGGGTCACGATTTGGCGGTGACTGTGATGCGTCCGGGTAAGCCGA
CATACCAAGCACGTGGACATGAGCGAGAGCCGTTATGATGTTGGTGGTCAATATA
TGTATTTCAAAGCGGGTGTTTATAACCAGAATAAGACCGGTGATGCGAAAGATTAC
GTTTCAGGCAACCTTTTACGACCTGCAGGTTACGCAT

Table S2. Alg169 amplification and identification primers

Primer name	Primer sequence
Alg169-1	TTGTTTAACTTTAAGAAGGAGATATACATATGGCTAGCATGACTGGTGGAC AGCAAATGGGTCGCGGATCCG
Alg169-2	GAGGATGAGGAGTCGGTATCTGTTCTTCAGAGGATGAACTGCTTGAGAAT TCGGATCCGCGACCCATTTGC
Alg169-3	CCGACTCCTCATCCTCTGACAACAGCTCGTCGACCGGTTCTACTCCGGCGT TCCGTATGATTATGT
Alg169-4	GAGGGTTGTTTTGCTGCAGCTTGGCATTGTTTCAGGGCGTGGATGTATTGCAC ATAATCATACGGAAC
Alg169-5	GCAGCAAAACAACCCTCCGACCTCCAGCAGCACTTCAGAGGTGGTGGATGC TGGTGAGTACAACGGCTTTGAC
Alg169-6	CGGTCATTTCGAAGGTCAGCCAACCCGTGGTGCTATCCAGGTAGAAGTAGT CGTTGTCAAAGCCGTTGTACTCAC
Alg169-7	TGACCTTCGAAATGACCGGTGACTCGAAACGTAGCGAGTTGCGCTTCGTAG AAAACTTTCGTACCAACAC
Alg169-8	CTTCTCTCCGGGCTAATCGGTAAGATTTCCGCGCTAAGCGTGCTGATCTCTG AGGTGTTGGTACGAAAGTTTTTC
Alg169-9	TTAGCCCGGAAGAAAGCGTTGCTAGCAGCGGTGATGGGCAAGAGATGACG CTTATGCAGGTTTATAATA
Alg169-10	CAATACGCAGCAGCGGATGTGACAGAACGGTATCATCCGTTTCACCATTCT CACCTTTATTATGAACCTGCATAA
Alg169-11	ATCCGCTGCTGCGTATTGTTTGGGATGGCGAGTCTCGTATCGATGACGACAC CGGTGACTCCTACTCTAAC
Alg169-12	TCATCTTTACATTTCGTACGCATTTCGTCTTAATAATTGCCCAATACGCGTTAG AGTAGGAGTCACCGG
Alg169-13	CGTACGAATGTAAAGATGACAGCAACCCGAATTATAACGATAACTGCCCCGG ATAGTTACGATTTCTACTAC
Alg169-14	CCGCTTCGATATCGAACTTGGTCGCGTTATCCTGGTCGTAATCTGCCAGGTA GTAGAAATCGTAACTAT
Alg169-15	CAAGTTCGATATCGAAGCGGGTGACAGCACTCTGATTATCAACGTGGACGG TGATGAGAAGGTGAACATTGATA
Alg169-16	TCGTACTGGTTATACACGCCTGCCTTGAAGTAGCTATAGAGGTCATCCCAAT AGGTAATATCAATGTTTACCTT
Alg169-17	TGTATAACCAGTACGAAGATGGTACCAGCACCGTTCAATTTAAGAGCCTGA CGTACAACGGCACCACCTT
Alg169-18	ATTCAACTCGAAGTTATCCGATGGCGCAGAAGAAGAGTCGAGGTCCGCGGA CGGCAGGGTGGTGCCGTTGT
Alg169-19	TAACCTTCGAGTTGAATGATTGGAATCTGTCTATCCCGACGGACGACGACAA CTCCGGTACCGCTGACACTATCG
Alg169-20	TTGGTATAGAAATATTCGAAGTCTTCGTAGCCGTCACTCAAGTCATCCTCGT

