

SUPPLEMENTARY MATERIAL

Characterization of an Eukaryotic PL-7 Alginate Lyase in the Marine Red Alga *Pyropia yezoensis*

Akira Inoue, Chieco Mashino, Toshiki Uji, Naotsune Saga, Koji Mikami and Takao Ojima

Graduate School of Fisheries Sciences, Hokkaido University, 3-1-1 Minato-cho Hakodate, Hokkaido 041-8611, Japan

PA-F1		
GGGCTCGGCCCTTCGTTTCGGCATAGGAGCACACACGCAGCCCCGCCTTCCCACCAGTGC		60
AACATGATGCGCTTTGCCATAGCCGCCGCGCTGGGTGCTTTGCTGGCCGTTGCGGCCGCC		120
M M R F A I A A A L G A L L A V A A A		19

CCCGCCGCGGTGGCCGCCGCCGCGAGGCCGCCATGGGACATTGCTCGCTTCCGCCCCGCT		180
P A A V A A A R R P P W D I A R F R P A		39

CTAAGAGTTGCCAAGCTCCAGGCGCCCGACAGCGTCCAACGCAAAGATGTGCGATCCTTC		240
L R V A K L Q A P D S V Q R K D V R S F		59

CCAAACTTTCAAGCCGACCACTTTTACTCTGAGAACCGGGACATGGTGTGTTGTCATGGGT		300
P N F Q A D H F Y S E N R D M V F V M G		79

GGCGACTCACAACGGTCCGAGCTCCGCTTCCTCGACGAGTGGAGCGTCCGCACATCCAGT		360
G D S Q R S E L R F L D E W S V R T S S		99

ACCCGCCGGATGGTGGGGGTGCTGACCCTCCCCACGCCGTTGCGGGGGATGAAACACTTC		420
T R R M V G V L T L P T P L R G M K H F		119

ACGTGGATGCAGGTGCACGGGGCAGCAAGGGGAAAAAACCGCTGCTGCGCCTGTCGTGG		480
T W M Q V H G G S K G K K P L L R L S W		139

CATGACAAGCGTGAGCAGGGTGGGAAGGACCTGCGGAATACGATGCTCGCAACGGTGCGG		540
H D K R E Q G G K D L R N T M L A T V R		159

CTCAACAACAAGTCAGGCGACGCCGGGCGGTTCAAGAAGATCGTGTTGGGAACCCGCCCC		600
L N N K S G D A G R F K K I V L G T R P		179

TCTGGCCGCTTTGTTGCCGACGTACGGGTAGAGCGGTCACGGCTGACCGTCCGCCTCAAC		660
S G R F V A D V R V E R S R L T V R L N		199

GGGCGAAACTGGTAGATGAAGACGTGGGGTACTGGACTTACTCGACCAATTACTTCAAG		720
G R K L V D E D V G Y W T Y S T N Y F K		219

GCGGGGTCTACGTCCAGGAGGGCAGCCCCGATGCGAGGGTAGTGTTTCATGGTCTGACT		780
A G V Y V Q E G S P D A R V V F H G L T		239

GTGTCGTAGCTGACTATGTCCTATTTGCAGGGTGATTGCGCAGAGAGGCAAGCGCGAGGG		840
V S *		241

AAAGAGGGGATGATGGTGTCCGACAAGGGCAAGCCC	PA-R2	876

PA-R1		

Fig. (S1). Nucleotide and the deduced amino-acid sequences of PyAly cDNA. The nucleotide and the deduced amino acid sequences are represented in plain and bold letters, respectively. Dashed line shows the predicted signal peptide sequence. Arrows indicate the annealing positions of primers used in PCR.

PA-F1

GGGCTCGGCCCTTCGTTTCGGCATAGGAGCACACACGCAGCCCGCCTCCCACCAGTGC 60
AACATGATGCGCTTTGCCATAGCCGCCGCGCTGGGTGCTTTGCTGGCCGTTGCGGCCGCC 120
M M R F A I A A A L G A L L A V A A A 19
CCCCGCCGGTGGCCGCCGCCGAGCCGCCATGGGACATTGCTCGCTTCCGCCCGCT 180
P A A V A A A R R P P W D I A R F R P A 39
CTAAGAGTTGCCAAGCTCCAGgtgcgccgggggaggtgactgacgaggttgagaagg 240
L R V A K L Q 46
gatgctccaacagaggaggccgtgcccgggggtttggctcttgcgcccaggct 300
gttggaacaccagttgccccaccagcgtgaacaccgcgctcgaggagaagaaggaccgc 360
tgacacccgattgctggtggtggtgcatccttgttatcctgttctggtcgctgtgactcc 420
cctatgttcctctcttgcgccctccccctccgccctccgccagGCGCCCGACAGCGT 480
A P D S V 51
CCAACGCAAAGATGTGCGATCCTTCCCAAACCTTCAAGCCGACCACTTTACTCTGAGAA 540
Q R K D V R S F P N F Q A D H F Y S E N 71
CCGGGACATGGTGTGTCATGGGTGGCGACTCACAACGGTCCGAGCTCCGCTTCCTCGA 600
R D M V F V M G G D S Q R S E L R F L D 91
CGAGTGGAGCGTCCGCACATCCAGTACCCGCCGGATGGTGGGGGTGCTGACCCTCCCAC 660
E W S V R T S S T R R M V G V L T L P T 111
GCCGTTGCGGGGGATGAAACACTTCACGTGGATGCAGGTGCACGGGGGAGCAAGGGGAA 720
P L R G M K H F T W M Q V H G G S K G K 131
AAAACCGCTGCTGCGCCTGTCGTGGCATGACAAGCGTGAGCAGGGTGGGAAGGACCTGCG 780
K P L L R L S W H D K R E Q G G K D L R 151
GAATACGATGCTCGCAACGGTGGCGCTCAACAACAAGTCAGgtacgctgaggagatggg 840
N T M L A T V R L N N K S 164
ggggggaggggagtggggaagggggcgaggagagtgcgccgggggcttgcgggcctccaa 900
gcgtctgtcagagtttgaggagcagacctcgatgacgacggcgccccgacgggtccc 960
catcagcctggtgcggcgcgactgatcaccaaggcgacgcgtcctttcccatcttttac 1020
gtcttggcgtatgttttctgtctttccctcccgttgtcgttattggtacgcggtgcg 1080
ccccgcagGCGACGCCGGCGGTTCAAGAAGATCGTGTGGGAACCCGCCCTCTGGCC 1140
G D A G R F K K I V L G T R P S G 181
GCTTTGTTGCCGACGTACGGGTAGAGCGGTACGGCTGACCGTCCGCCTCAACGGGCGCA 1200
R F V A D V R V E R S R L T V R L N G R 201
AACTGGTAGATGAAGACGTGGGGTACTGGACTTACTCGACCAATTACTCAAGGCGGGGG 1260
K L V D E D V G Y W T Y S T N Y F K A G 221
gtatgttcggttgcgagcctcctcgatgtcacggcgctgtcgactgcctgcctgtg 1320
tgttccttcggggggaagccgtctctttgcctcccctcgcccctggcagaggatgcg 1380
cctggggcgccaccgaccggtcgcgccagacgacctcgccagcgagtggttgccag 1440
gcacttactgcccgtcccgtgcgctttgacaatcgtcattctttccctctttcctcgtc 1500
gcttccccgctggccattgacgcaettgctgggcgacgctgctccccacccccgctcccc 1560
cccgccccccacacggcagTCTACGTCCAGGAGGGCAGCCCCGATGCGAGGGTAGTGTTT 1620
V Y V Q E G S P D A R V V F 235
CATGGTCTGACTGTGTCGTAGCTGACTATGTCTATTTGCAGGGTGATTGCGCAGAGAGG 1680
H G L T V S * 241
CAAGCGCGAGGAAAGAGGG 1700

PA-R2

Fig. (S2). Genomic DNA sequence of PyAly. Nucleotide and deduced amino acid sequences are each represented in plain and bold letters. Exon and intron regions are written in capital and small letters, respectively. Arrows indicate the annealing positions of primers used in PCR.