

Table S1. Primers for PCR and qPCR

Primer type	Gene	Sequence
PCR for gene cloning	<i>PITLP1</i>	F: TTGGAGTCGTCTTTAAGCAAT R: AGTATGCTAACCGCAGAAGA
	<i>PITLP2</i>	F: TGCTGTACTACTGGTCCC R: TCAACGAGGACAGAAGGTG
	<i>PITLP3</i>	F: TGTTTGACTTGCTGGCTG R: ATTGTTGTGGTATGGGGA
	<i>PITLP4</i>	F: ACATACACCCACTTGTCGCG R: AATCCAGAAGGCTCTCCCC
	<i>PITLP1</i>	F: GTTGCTGAAATGTCAAGGCTACG R: GGAGTTGGAGGGAGTTATGGAGA
	<i>PITLP2</i>	F: AAGGGTCATTACGATGGGTATTTG R: TAAGACGCCGTGGAAGGAGG
	<i>PITLP3</i>	F: ACTGTGGCGGCTTGCTGAA R: GGAGTTACGGAAAGAGGGAGATTG
	<i>PITLP4</i>	F: TGCCGACTATACCATTACCTTCTG R: TTGGGATGCACTGGCCTCA
qPCR	<i>EF1-α</i>	F: AACTGGAGAAGGAACCCAAG R: AACGACCCAATGGAGGATAC
	<i>TIF5A</i>	F: TCACATAAAGATAATGGCAA R: GAATCTTGGGCAACTCTC
	<i>PITLP1</i>	F: <u>CGGAATTC</u> GCAACATTCGTAGTGA, <i>EcoR</i> I is underlined R: CCG <u>CTCGAG</u> CTAACCGCAGAAGAC, <i>Xho</i> I is underlined
PCR for protein expression	<i>PITLP2</i>	F: <u>CGGAATTC</u> GAGTCGCCTATGGCTTAC, <i>EcoR</i> I is underlined R: CCG <u>CTCGAG</u> TCAACGAGGACAGAAGGT, <i>Xho</i> I is underlined
	<i>PITLP3</i>	F: <u>CGGAATTC</u> GCTACAATGACCGTCAAGAA, <i>EcoR</i> I is underlined R: CCG <u>CTCGAG</u> TTAACCGCAGAAGACTACGT, <i>Xho</i> I is underlined
	<i>PITLP4</i>	F: <u>CGGAATTC</u> AGGTCTTTCATTATTGCAAACAA, <i>EcoR</i> I is underlined R: CCG <u>CTCGAG</u> TCAATTGCTGCATCTGCTGT, <i>Xho</i> I is underlined

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1      TTGGAGTCGTCTTTAAGCAATGGGGGGCCGAAATAGTTTATCAGGTTCCATTGATCAC
1            M G G R N S L S G S I W I T      
61     AGCGACAGTAACATTATTAGCCATTCATGTTTATCTGCAAGGTGCCGAAGGTGCAACATT
15           A T V T L L A I H V Y L Q G A E G A T F      
121    CGTAGTGAAGAACCAGTGTCCATACACAGTTTGGGCCGCTGCAAGTCCTGGTGGCGGTAA
35     V V K N Q C P Y T V W A A A S P G G G K
181    AGCATTGGGACAGCGCCAAACGTGGTCTTTTAACGTTGCCGAGGAACAAAACAAGCGAG
55     A L G Q R Q T W S F N V A A G T K Q A R
241    AATCTGGGGTCGTACTGGCTGCTCCTTCGACGCGAGCGGGCGAGGCAGGTGCAAACTGG
75     I W G R T G C S F D A S G R G R C K T G
301    TGACTGCGGCGGGTTGCTGAAATGTCAAGGCTACGGTAGCGTTCCTGCAACACTTTTGA
95     D C G G L L K C Q G Y G S V P A T L F E
361    ATATGCTCTCAATCAGTACAACAATCTGGACTTCCTTGATATCTCTCTCGTTGATGGATT
115    Y A L N Q Y N N L D F L D I S L V D G F
421    CAATATCCCTCTCTCCATAACTCCCTCCAACCTCAATTGCAAAAAAATAGGATGCAACAG
135    N I P L S I T P S N S N C K K I G C N S
481    CAACATAAATGCCATCTGCCCTTCAGAGTTGAAAGTAACCGATGGATGCAAAAGTGCTTG
155    N I N A I C P S E L K V T D G C K S A C
541    TGCTGCTTTCAATAAGCCTCAATACTGCTGCACAGGCGCCTACCTCAACACCTGCTCTCC
175    A A F N K P Q Y C C T G A Y L N T C S P
601    CACGAATTATTCGAAGTTCTTCAAGAAGCAGTGCCACAGGCGTACAGCTATGCCAAGGA
195    T N Y S K F F K K Q C P Q A Y S Y A K D
661    TGATAGTTCCAGCACCTTCACTTGCCCAGCAGGTGCTAATTACAACATCGTCTTCTGCGG
215    D S S S T F T C P A G A N Y N I V F C G
721    TTAGCATACT
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Figure S1. Nucleotide sequence and the deduced amino acid sequence of the *PITLP1* gene. The start codon is shown by bold font. The stop codon is indicated by an asterisk. The signal peptide sequences are underlined. The thaumatin family signature (G-x-[GF]-x-C-x-T-[GA]-D-C-x(1,2)-[GQ]-x(2,3)-C) is shaded in gray.

1	TGCTGTTACTACTGGTCCCAAAAAAATGGT
1	<u>M V F F G S R S S H P T</u>
61	CGCAGGGACAGCTATGTTTCTTGTTACATTTGTGTGTTTCTCTATCTGGGCGCTGCAGA
13	<u>A G T A M F L V T F V C F L Y L G A A E</u>
121	GTCGCCTATGGCTTACAAGACAATAAGGGTGGAGACAATTGCGCATTTCCTGTGTGGCC
33	S P M A Y K T I R V E N N C A F P V W P
181	TGCGATTGTGGGGTCGACCGATCTTCCTCCCCCTCAGTTGAGAAAATTGAGAGCAGGAGA
53	A I V G S T D L P P P Q L R K L R A G E
241	ATCGTATTCATGGAAGGCGGATCCATTCTGGTCGGGATCCGTTTGGGGGAGGACTGGTTG
73	S Y S W K A D P F W S G S V W G R T G C
301	CGTGTTCATTCCCAAGGGCTGGGAGGCTGCGATTCCGGTGACTGTGGAGGAAATTTACA
93	V F N S Q G L G G C D S G D C G G N L Q
361	GTGCGAAGACGATGAGCGTACTGCAGATATAATGGCAATCACAAAAGCCGAGTTCGAACT
113	C E D D E R T A D I M A I T K A E F E L
421	TCTGGGAGGAATAGCGAAGCCTGACACGTATTCCGTTACCTTGGAGAAGGGTTACAATCT
133	L G G I A K P D T Y S V T L E K G Y N L
481	TCCAATGTGCGTGTTCCAAGCTATGCCGCCAATAATATCAGTATCAGCCGCCCTGCGA
153	P M S V V P S Y A A N N I S I S R P C E
541	GTCCATGGCGTGACAGCCGACGCGAATGCGGTTTGTCCCAAAAAATTGCAAGAGAAGAA
173	S M A C T A D A N A V C P K K L Q E K K
601	GAAAGGGAGTGTGGTTACTGTGTGCAAGGGTCATTACGATGGGTATTTGCCCAGGTCGCC
193	K G S V V T V C K G H Y D G Y L P R S P
661	CGCTTTCAGCAAGGCATTTCAGAAGGCCTGTCCTCGTGCTTCCCCTACCGAAGCGGCAC
213	A F S K A F Q K A C P R A F P Y R S G T
721	CTTATGCCCTCCTCCACGGCGTCTTACACCCTCACCTTCTGTCCTCGTTGA
233	L C P P S T A S Y T L T F C P R *

Figure S2. Nucleotide sequence and the deduced amino acid sequence of the *PITLP2* gene. The start codon is shown by bold font. The stop codon is indicated by an asterisk. The signal peptide sequences are underlined.

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1      TGT TTGACTTGCTGGCTGGCAATTTGCAATGGGGGGAAGACCGTTATCAGCTTCCGTTTG
1      M G G R P L S A S V W
61     GATCACAGCAACAGTAACTTTATTAGCAGTTTATGTCTATCTGCAAGGTGTGGAAGGAGC
12     I T A T V T L L A V Y V Y L Q G V E G A
121    TACAATGACCGTCAAGAACCAGTGCTCATACACAGTTTGGGCGGCGGGCAGTCCTGGTGG
32     T M T V K N Q C S Y T V W A A G S P G G
181    AGGGAAGCAATTGGGACAGGGCGAAACGTGGACTTTTGATGTTGCCGCGGAACAACAGG
52     G K Q L G Q G E T W T F D V A A G T T G
241    AGGCAGAATCTGGGGCCGAACCGGCTGCTCCTTCGACGCGGGTAGCGGTCAAGGCAGCTG
72     G R I W G R T G C S F D A G S G Q G S C
301    CAAAAGTGGTGACTGTGGCGGCTTGCTGAATTGTCAAGGCTATGGAAGCGTCCCTGCAAC
92     K T G D C G G L L N C Q G Y G S V P A T
361    GCTTTTGAATACGGTCTCAATAAGTACCAGAATCAAGACTTCTATGATATCTCTTGT
112    L F E Y G L N K Y Q N Q D F Y D I S L V
421    CGATGGCTTCAATCTCCCTCTTCCGTAACCTCCCTCGAACACTGACTGCAAAGTGATAGG
132    D G F N L P L S V T P S N T D C K V I G
481    TTGCACCAGCGATATAAATGCCGTCTGCCCCGAGAATTGAAAGTAACTGATGGATGCAA
152    C T S D I N A V C P A E L K V T D G C K
541    GAGTGCTTGTGCGGAGTTCAATACCCCTCAATACTGCTGCACGGGGGATTACCTGAACAA
172    S A C A E F N T P Q Y C C T G D Y L N N
601    CTGCAATCCCACTAATACTATCCCAATTCTTCAAGCAGCAGTGCCCACAGGCCTACAGCTA
192    C N P T N Y S Q F F K Q Q C P Q A Y S Y
661    TGCCAAGGACGATGCCACTAGCACCTTCACCTGCCCTTCTGGTGCTAATTACAACGTAGT
212    A K D D A T S T F T C P S G A N Y N V V
721    CTTCTGCGGTAAACATAATCAGGATGTTTACGTAATATCTTCCTACTAAGTATAATAAAT
232    F C G *
781    TCAATCCCCATACCACAACAAT

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Figure S3. Nucleotide sequence and the deduced amino acid sequence of the *PITLP3* gene. The start codon is shown by bold font. The stop codon is indicated by an asterisk. The signal peptide sequences are underlined. The thaumatin family signature (G-x-[GF]-x-C-x-T-[GA]-D-C-x(1,2)-[GQ]-x(2,3)-C) is shaded in gray.

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1      ACATACACCCACTTGTCCGCGTGTGTGTGTTGGGTGGGAGAATATCGTTCAACGTTTAAA
61     GAGTTGTGAGCAGAGGCGCTGTAGCTTGTAGGTATTCATGGCTATTAACAAGCTCATCGT
1      M A I N K L I V
121    CATACTTGTGTTAGCTCTCCTAAACCGAGTGTGCTCAAGGTCTTTCATTATTGCAAACAA
9      I L V L A L L N R V C S R S F I I A N N
181    CTGCAAATACAATGTGTGGCCTGGGTTTCTCTCTAATGCAGGCATAACGCCTCTGTCTAC
29     C K Y N V W P G F L S N A G I T P L S T
241    CACCGGCTTCCAGCTTCTTCCAGGCGGGACTCGAACCGTTGACCTACCTGCGGGTTGGTC
49     T G F Q L L P G G T R T V D L P A G W S
301    CGGGCGTCTCTGGGGACGCACGGGCTGCACCTTTGATTCTACCGGTAAGGGCAACTGCTC
69     G R L W G R T G C T F D S T G K G N C S
361    CACCGCTGATTGTGGCGGTGCCCTCGAATGCAATGGTGCAGGAGCGAAGCCTCCCGCTTC
89     T A D C G G A L E C N G A G A K P P A S
421    CCTTGGCGAGTTCACGCTTGGGCAAGGCCAAGCCCTGGACTTTTATGACGTGAGCCTCGT
109    L A E F T L G Q G Q A L D F Y D V S L V
481    TGATGGCTACAATCTCCCTATGCTGGTCACCGCGCAAGGAGGCAACGGTGCTTGTACCTC
129    D G Y N L P M L V T A Q G G N G A C T S
541    AACAGGCTGCATCACGATCTCAATCTTAGCTGCCCTAAGGAGCTCCAGGTCGACGATGG
149    T G C I T D L N L S C P K E L Q V D D G
601    TATCGGAGCGAGCAACGTTTTGGCCCTGCAGGAGCGCCTGCGAGGCCTTTGGAGATCCTGC
169    I G A S N V L A C R S A C E A F G D P A
661    GTATTGCTGCAGCGGGGCCTATGGGAATCCCAACACGTGCAAGCCTAGCGCTTACTCGGA
189    Y C C S G A Y G N P N T C K P S A Y S E
721    GCTCTTCAAGGCAGCGTGCCCCAGGGCCTATAGCTACGCTTATGATGACTCCACTAGCAC
209    L F K A A C P R A Y S Y A Y D D S T S T
781    CTTCACTTGCAATGGTGGCGACTATACCATTACCTTCTGCCCCACCCTCGCCATGGCCAG
229    F T C N G A D Y T I T F C P T L A M A S
841    CACTGAGAGGAAGTCTAATAGTCCTCCCTCCGCCGATAGCCCGATAAGCAGCAGCAGCAG
249    T E R K S N S P P S A D S P I S S S S S
901    CAACAATAATAATACAAATCCCCTGTTTGAGGCCAGTGCATCCCAAGGAACCTTCTCGTC
269    N N N N T N P L F E A S A S Q G T S S S
961    ATACATGGATTTCAGCAGCCTCCCGGCCGCTCACAATCTCTTGTGGTCTTTCATTAATGAT
289    Y M D S A A S R P L T I S C G L S L M I
1021   TGTTTTCATAGTGACGATAATCATCAACAGCAGATGCAGCAATTGAAGCCTGCCAACCTA
309    V F I V T I I I N S R C S N *
1081   GCAGGTGGACCCACTCACACCAAGTCTCTCTTGCAAACCTCGACGGGGAGAGCCTTCTG
1141   GATT

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Figure S4. Nucleotide sequence and the deduced amino acid sequence of the *PITLP4* gene. The start codon is shown by bold font. The stop codon is indicated by an asterisk. The signal peptide sequences are underlined. The thaumatin family signature (G-x-[GF]-x-C-x-T-[GA]-D-C-x(1,2)-[GQ]-x(2,3)-C) is shaded in gray.

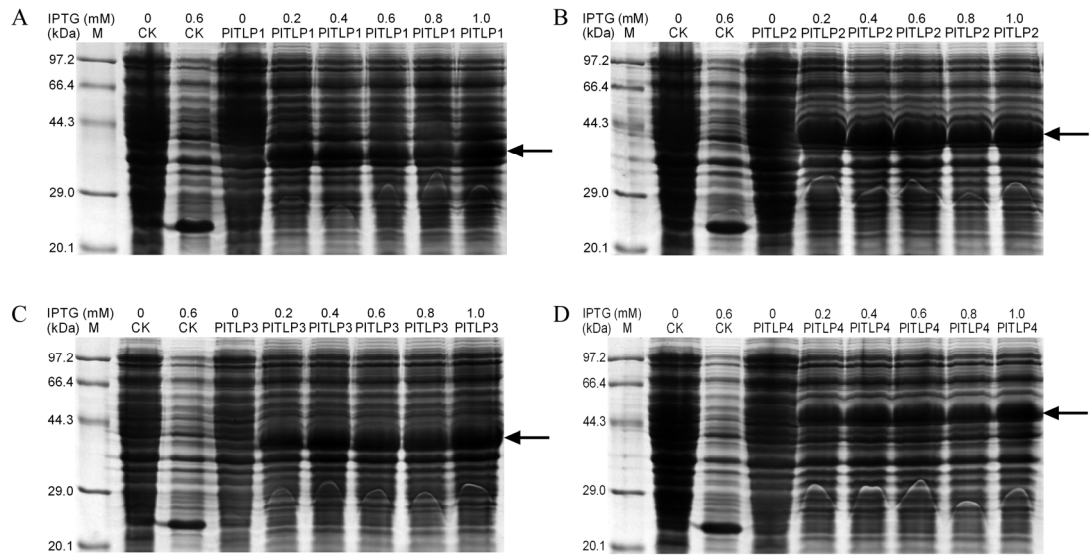
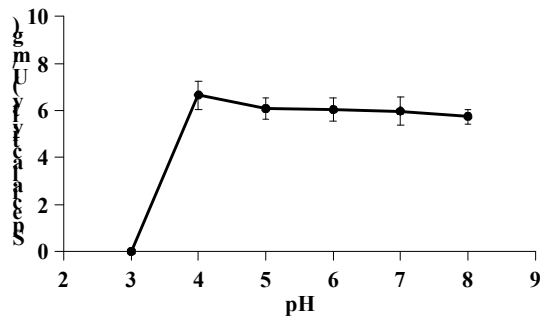
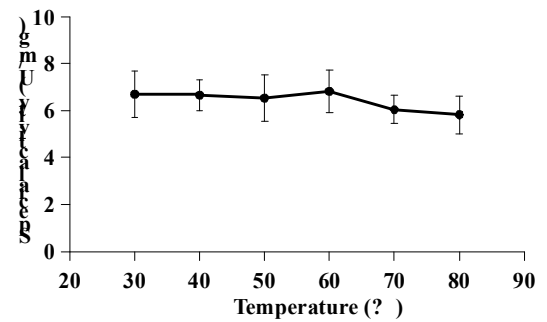


Figure S5. SDS-PAGE analysis of recombinant PITLP proteins induced with different concentrations of IPTG (0, 0.2, 0.4, 0.6, 0.8 and 1.0 mM). A: recombinant PITLP1. B: recombinant PITLP2. C: recombinant PITLP3. D: recombinant PITLP4. M: protein marker. CK: pET-32a in *E. coli* BL21(DE3). Arrows indicate the recombinant PITLP proteins.

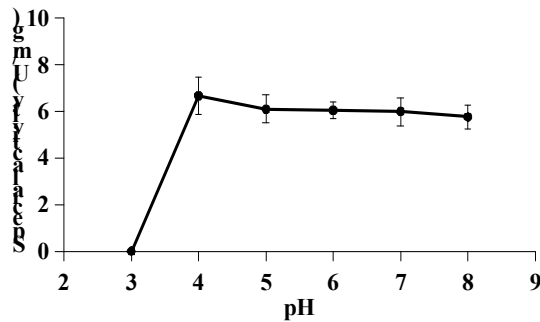
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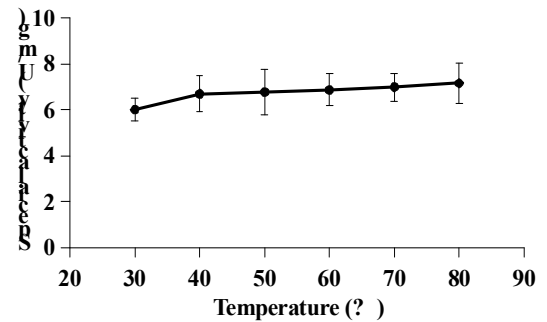
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PITLP2



PITLP2



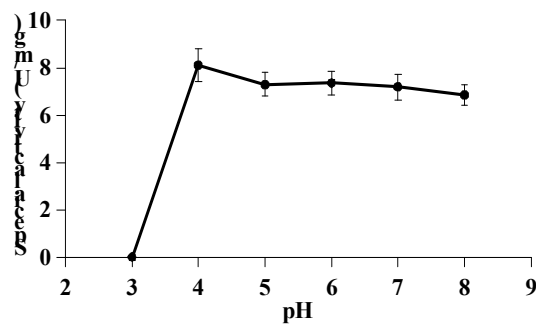
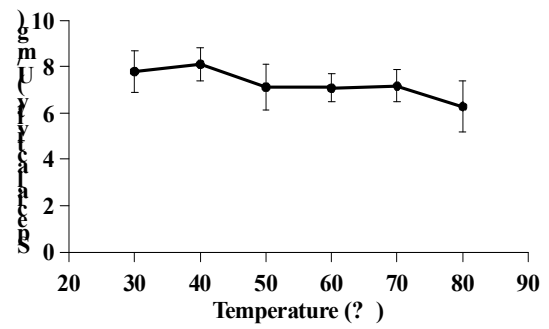
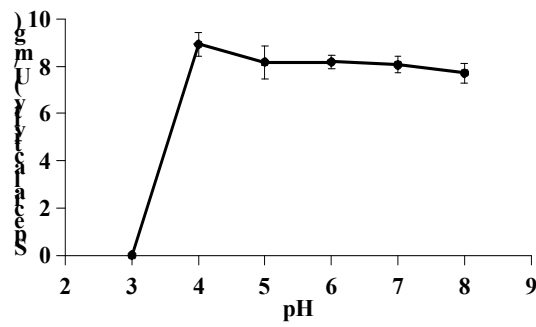
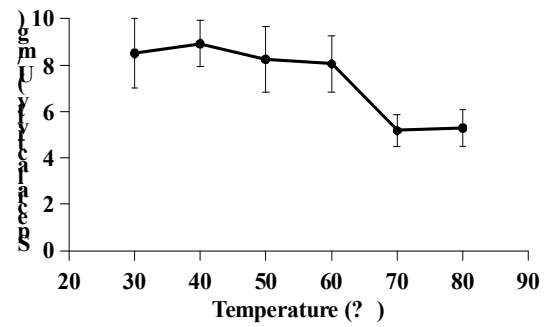
PITLP3**PITLP3****PITLP4****PITLP4**

Figure S6. Effects of pH and temperature on the β -1,3-glucanase activity of recombinant PITLP1-4. Determination of the optimal pH was measured in 50 mM sodium acetate (pH 3-6) and Tris-HCl (pH 7-9), at 40°C for 30 minutes. Determination of the optimal temperature was measured in 50 mM sodium acetate (pH 6), at 30-80°C for 30 minutes. Data represent mean values \pm SE ($n = 3$ technical replicates).