

## S1 Data: Nucleotide and protein sequence of chitinases ChiA and ChiB

DNA sequence *chiA* (GenBank accession number F8UN15)

atgaaaaattcaaaattaaacaaatcctaataacatttctacaattacattaacttcaagctatcttgaacatcatcaaactcctatagaaca  
aaagctaaagaaaaatttaaaacaacaaaaattaaaaattcatctgaacttaatagaagctagtcggatattttccagaatgggcatattcta  
gtgaagcacaaggatattttaatgtaacagattacaatgggattcattaacacatatacaaatctcttggctatggtagatccatctacaata  
aaattactttaagtaataacatgctgcaattgaagaagattttcggaattgatttaactacaacgggaagaaaatagaattagatccttctt  
taccttataaaggacacttcaacgttttacaactatgaaaaaaattatccagatgtatcattattaatttctgttgagggtggacaggaaca  
gatgtttctacactatgattgacactgataatagaataaacatttgcagattcatgtgtgattttatcagaaaataggattgat**ggagtaga**  
**cattgatttgaat**atccttcatcccaagccaatcaggaatccagacgattttgatctttcagaaccaagaaggacaaaacttaacgaaagat  
ataatatttaataaaaactttaagagaaaaatagatatggcatctaaagaagatggaaaagaatatttataacagctgctgttactgcttctc  
cttgggttttaggcggaatatcggataatacttatgcaaagtagatttcttaagcataatgtcatatgactaccacggtgggttgaatgaata  
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aacggagattacggataaatccgaattatgtagaaggttcaataagataaatgaaggtaaatatactttggagatacattaacgaaaagat  
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caaagtctgctgtatttaatcatcatggggaggccacatatagttacagacaatgggtgactttaatacaataacattaactcaggagcttggc  
aaaatatagcgcctaactcaacaataacagttcaaggtatgattggattatgcttctctggaataagaaatgtcactttcaatggaatgaatcca  
attggtaatgataaata

⇒ Target region Clostron mutagenesis in bold

⇒ Proton donor region underlined

Protein sequence ChiA

MKNSKLNKQILITFLTITLSSYLVTSSNPIETKAKKFKTTKIKNSSELNRKLVGYFPEWAYSSEAQGYFNVTDLQWDSL  
THIQYSFAMVDPSTNKITLSNKHAAIEEDFSEFDLNYNGKKIELDPSLPYKGFHFNVLQTMKKNYPDVSLLISVGGWT  
GTRCFYTMIDTDNRINTFADSCVDFIRKYGFDGVDIDFEYPSSTSQSGNPDDFDLSEPRRTKLNERYNILIKTLREKID  
MASKEDGKEYLLTAAVTASPWVLGGISDNTYAKYLDFLSIMSYDYHGGWNEYVEHLAGIYPNKEDIETVTQIMPTL  
CMDWAYRYRGLVPAEKILMGIPYYTRGWENVQGGINGLHGSSKTPASGKYNILGDDLNDGVLEPAGANPLW  
HVLNLMEQDPNLKVYWDEISKVPYVWQNDKKVFSFENEKSIDARLEYIQNKNLGGALIWVMNGDYGLNPNYVE  
GSNKINEGKYTFGDTLTKRLSQGLKMGVCNKTPDDLNISLEPINVDVKFNGKYDHPNNTYSIDITNYTDKEIKGGW  
NVSFDLPKSAVFKSSWGGTYSVTDNGDFNTITLTSQAWQNIAPNSTITVQGMIGLCFSGIRNVTFNGMNPIGNDK

⇒ Domains:

Blue	Predicted signal peptide
Orange	Glycosyl hydrolase 18 domain
Green	Carbohydrate binding domain ChiC

⇒ Active site DIDFE (underlined)

= Substitution of E196 to Q reduces the activity of the enzyme.

DNA sequence *chiB* (GenBank accession number F8UNI4)

gtgaatacaatctctgtaaggctatgagtaaactttctgatacaactgaaattacttctcaatctactactaagttacgaaatgtaatgtattatg  
gtgattggctatttgggggtggacaaggtaactttatcctaagatattccagcagataaattaacgcacttaaatttgcattcatggatttcaa  
ctcatctggtgaattaatttattgcgataaagatgctgcaataggacatccattaggaatttgggagtaacctatggagatgtaatggtggaat  
attaaatgcttttcaagttttaaactgaaaatcctaattaaagataggagtatcttaggtggatggtcaaagtctggcgatttttcaacaata  
gccgcaactccttcaataagagctaaattttagaaaacgttatgaaattcattaataataccaatatggactttgtgatattgattgggaatat  
**cctggagattacagagaacctgataaaactgacaataaataatgatgaaggaacaccaaagcaagtgcaggagataaagaaaattatattctt**  
attattacaagatttaaaggaggctttaaataaacaaggaaaagaattaggaaaagttagagctatccgtggcattgccagctggcgtatca  
aaaatagaaaaaggaatagacgttgacaagttatataatagtagattttgctaataataatgacatatgatattggctggagcttggagtacaac  
aagtggacatcaaactgccttatacactaacctaatgctcctgaagaataaagggactttctgtagatgaaagtgttaaataattatcaca  
agggtcagaaaagagaaaaatagttgtaggagcagcatattatcccgtaggaggggaacaagtttcagataaaggtacagatccaaataatcc  
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tagatttggtaagatatcagatggaagctaatgaaagcaggaataacctttacttttgattaaatcttgataaagcaattgaagatactaata  
atattataagcattgaagtatctcaagaatgtatcaaacatctcctgaattcaatagacaaacaatttgggaaaatacaaatcatag

⇒ Target region Clostron mutagenesis in bold

⇒ Proton donor region underlined

Protein sequence ChiB

MNTISVKAMSKSSDTEITSQSTTKLRNVMYYGDWSIWGGQGNFYKPKDIPADKLHLNFAFMDFNSSGELIYCDK  
DAAIGHPLGNLGVTYGDVNGGILNAFQVLKSENPNLKIGVSLGGWSKSGDFSTIAATPSIRAKFVENVMKFIKYTN  
MDFVDIDWEYPGDYREPKTDNINDEGTPNASAGDKENYILLQLKEALNKQKELGKVYELSVALPAGVSKIEK  
GIDVDKLFNIVDFANIMTYDMAGAWSTTSGHQALYTNPNAPPEYKGLSVDESVKYIISQGAEREKIVVGAAYYTR  
GWEQVSDKGTDPNNPGLFGEAAVVNKDADLSPTPGALNEAPMKNNGEGGRAGGVWGYNALDKLKSXYTGLKEY  
WDDSAKAPYLYNSETGAFFTYDNIRSIQEKAKYVKENNLGGIIGWMASQDATTNSTKRDELTTATKESLFGKEDLPK  
YEIKYTENDITCTVTPVKQSWGSGGVLKMSITNNEKLDESSEVLSTVETSAKTVKNMKVYIKTDGIAITGSQYPAGP  
VTKEGDYVIDFGKISDGKLMKAGITFFDLNLDKAIEDTNNIISIEVSQRMYQTSPEFNRQTIWENTNS

⇒ Domains:

Orange Glycosyl hydrolase 18 domain

Green Carbohydrate binding domain

⇒ Active site DIDWE (underlined)

= Substitution of E160 to D reduces the activity of the enzyme.