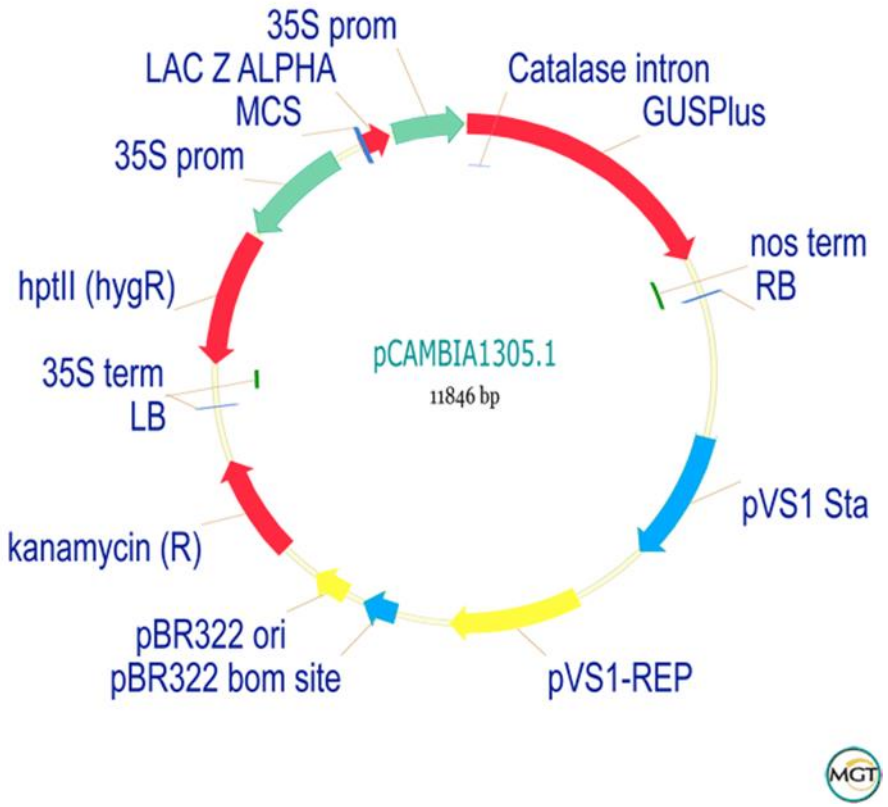
Supplementary table 1

Oligo name	Orientation	Sequence (5'-3')	PCR fragment size
pGly_prom_SacI	Forward	AG**GAGCTC**GTACGTAAGTACGTACT	2669bp
pGly_UTR_KpnI	Reverse	AGA**GGTACC**TAAGTCATGAAGAACCTG	
pGly_Eco	Forward	CTG**GAATTT**GTACGTACTCAAAAT GCCAA	661bp
pGly_Nco	Reverse	ATC**CCATGG**TTAAGGACCAATGGAGAGAA	
*Lf*KCS3_Fw	Forward	CATTAAGAGTTTCAATCTTGGTGGAATGG	338bp
*Lf*KCS3_Rv	Reverse	GGAAGAGGATGAAATGGGTAAAGTTGGAG	
GusPlus_Fw	Forward	CCGCACACTATCCGTACTC	161bp
GusPlus_Rv	Reverse	GTACCTGGGAGAAGATTCGG	

Figure 1



Map of pCAMBIA 1305.1 vector

Figure 2

Sequences of *Lesquerella fedleri* KCS, original and codon-optimized (modified).

```
                         10        20        30        40        50        60
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  ATGACATCTCTAAACATAAAGCTCCTTTACCATTACATCCTAACCAACCTTTTCAACCTC
LfKCS3 modified  ATGACCTCTCTTAACATCAAACTTCTTTATCACTACATCCTTACTAATCTTTTCAACTTG
                 ***** ***** ***** ** ** ***** ** ******** ** ** ********* *

                         70        80        90       100       110       120
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  TGTCTCTTCCCTTTAACAGCATTTCTCGCCGGAAAAGCTTCTCACTTAACCAAATCCGAT
LfKCS3 modified  TGTCTTTTCCCACTTACTGCTTTTCTTGCTGGTAAAGCAAGTCATCTTACTAAGTCTGAT
                 ***** *****  * ** ** ***** ** ** *****   ***  * ** ** ** ***

                        130       140       150       160       170       180
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  CTCCTCATGTTCTTATCTCATCTCCAAGACAATCTTATAACTGTCATTGTACTCTTTACT
LfKCS3 modified  CTTTTGATGTTCTTGTCTCACCTTCAAGATAATTTGATCACAGTTATAGTGCTTTTTACC
                 **  * ******** ***** ** ***** *** * ** ** ** ** ** ** *****

                        190       200       210       220       230       240
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  TTCACTATCTTCTGTTTGGTTCTTTACATTGTAACCAAACCTAAACAGATTTATCTTGTG
LfKCS3 modified  TTCACTATCTTCTGCCTTGTTTTGTATATTGTGACTAAGCCAAAGCAGATATACCTTGTT
                 **************  * *** * ** ***** ** ** ** ** ***** ** *****

                        250       260       270       280       290       300
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  GATTACTCTTGTTACCTTCCACCAGATCATCTTAAAGTTAGTATATCAAGTGTCATGGAT
LfKCS3 modified  GATTACTCATGTTACTTGCCACCTGATCATCTTAAAGTTAGTATTTCTTCAGTGATGGAT
                 ******** ****** * ***** ******************** **    ** ******

                        310       320       330       340       350       360
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  ATTTTCTATGAGTTGAGAAAAGTTGATCCTTTGTGTGAGGTGGGTTGTGATGATTCTTCT
LfKCS3 modified  ATTTTCTATGAGTTGAGAAAGGTTGATCCACTTTGCGAAGTGGGTTGTGATGATAGTTCT
                 ******************** ********  * ** ** ***************  ****

                        370       380       390       400       410       420
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  CTTGAGTTTATGAGGAAGGTTTTAGAACGTTCAGGTTTAGGTGATGAGACTTATGTTCCA
LfKCS3 modified  CTTGAGTTTATGAGAAAGGTTTTGGAGAGATCAGGTCTTGGAGATGAAACTTACGTTCCT
                 ************** ******** **  * ****** * ** ***** ***** *****

                        430       440       450       460       470       480
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  CTTGGACTCCATCAAGTGCCACCTCAAAAGACTTTTGCAGCGATAAAGGACGAGACAGAG
LfKCS3 modified  CTTGGATTGCACCAAGTGCCACCTCAGAAAACTTTTGCTGCAATTAAGGATGAAACAGAG
                 ****** * ** ************** ** ******** ** ** ***** ** ******

                        490       500       510       520       530       540
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  CAGGTAATCAAAGGTGCACTTGAGAATCTATTCGAGAACACAAAAGTAAACCCTAGAGAG
LfKCS3 modified  CAAGTTATTAAGGGTGCATTGGAAAATCTTTTCGAGAACACAAAGGTTAATCCTAGAGAG
                 ** ** ** ** ****** * ** ***** ************** ** ** *********

                        550       560       570       580       590       600
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  ATTGGTATACTTGTGATAAACTCAAGCATGTTTAATCCAACACCTTCTCTATCAGCCATG
```

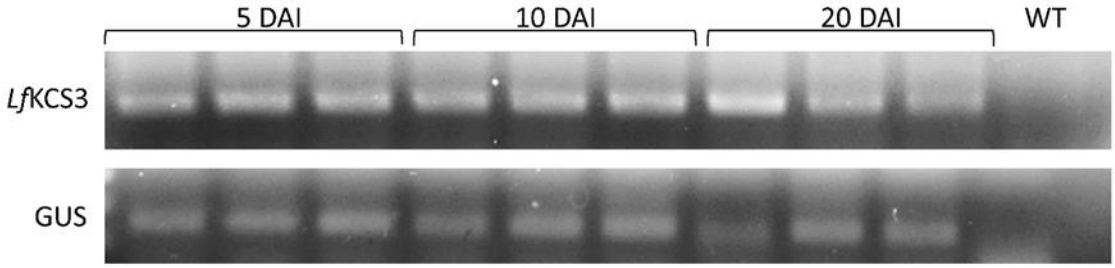
```
LfKCS3 modified  ATTGGTATTCTTGTTATTAATTCTTCTATGTTCAATCCAACACCTTCACTTAGTGCTATG
                 ******** ***** ** ** **    ***** ************** **    ** ***

                         610       620       630       640       650       660
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  GTTATTAATACTTTCAAACTCCGAAGTAACATCAAAAGCTTTAATCTTGGAGGAATGGGT
LfKCS3 modified  GTTATCAATACCTTTAAATTGAGGTCAAACATTAAGAGTTTCAATCTTGGTGGAATGGGT
                 ***** ***** ** *** *  *    ***** ** ** ** ******** *********

                         670       680       690       700       710       720
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  TGTAGTGCTGGTGTAATCGCCATTGATCTAGCTAAAGACTTGTTGCATGTTCATAAAAAC
LfKCS3 modified  TGCAGTGCTGGAGTTATCGCAATTGATTTGGCTAAAGATCTTTTGCATGTTCACAAGAAC
                 ** ******** ** ***** ****** * ********  * *********** ** ***

                         730       740       750       760       770       780
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  ACTTATGCTCTTGTAATAAGCACTGAGAACATCACCATAACCGCTTATGCTGGCGAAAAT
LfKCS3 modified  ACCTATGCTCTTGTGATTTCAACTGAGAACATCACAATCACCGCTTACGCAGGTGAAAAC
                 ** *********** **    ************** ** ******** ** ** *****

                         790       800       810       820       830       840
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  CGATCCATGAATGTTAGTAATTGCTTGTTCCGAATAGGCGGGGCCGCGATTTTGCTCTCT
LfKCS3 modified  AGATCTATGAATGTTTCAAACTGCCTTTTCAGGATCGGTGGAGCTGCAATACTTTTGAGT
                  **** *********   ** *** * *** * ** ** ** ** ** **  *  *   *

                         850       860       870       880       890       900
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  AATAAGCCAAGAGATAAGAGAAGGTCTAAGTACAAGCTAGCTCACACTGTTCGAACACAA
LfKCS3 modified  AATAAGCCAAGAGATAAGAGAAGGTCTAAGTATAAGCTTGCACATACTGTTAGAACTCAC
                 ******************************** ***** ** ** ****** **** **

                         910       920       930       940       950       960
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  ACAGGAGCTGATGACATGTCTTATAGATGTGTGCAACAAGAAGAAGATGAGATGGGTAAA
LfKCS3 modified  ACAGGAGCTGATGATATGTCTTACAGATGTGTGCAACAGGAAGAGGATGAAATGGGTAAA
                 ************** ******** ************** ***** ***** *********

                         970       980       990      1000      1010      1020
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  GTAGGAGTTCGTCTCTCAAAGGACATAACTACTGTCGCGGGCACAGCAGTTAAGAAGAAC
LfKCS3 modified  GTTGGAGTGAGGCTTTCTAAGGATATTACTACAGTTGCTGGTACTGCAGTGAAGAAAAAT
                 ** *****  * ** ** ***** ** ***** ** ** ** ** ***** ***** **

                        1030      1040      1050      1060      1070      1080
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  ATATCAACATTAGGTCCACTGATTCTTCCTTTAAGCGAAAAGCTTCTTTATTTCGTTTCC
LfKCS3 modified  ATCTCAACTCTTGGACCACTTATTTTGCCTCTTTCTGAGAAGCTTTTGTACTTCGTTTCA
                 ** *****  * ** ***** *** * *** *    ** ****** * ** ********

                        1090      1100      1110      1120      1130      1140
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  TTCATCGCGAAGAAACTTTTGAAGGAGAAGATCAAGAACTATTACGTCCCGGATCTTAAG
LfKCS3 modified  TTCATAGCTAAGAAACTTTTGAAGGAAAAAATTAAGAACTACTACGTGCCAGATTTGAAG
                 ***** ** ***************** ** ** ******** ***** ** *** * ***

                        1150      1160      1170      1180      1190      1200
                 ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original  CTAGCTATCAATCATTTTTGTATCCATGCTGGTGGAAGAGGTGTGTTAGATGTGTTGGAA
LfKCS3 modified  CTTGCTATTAATCATTTCTGCATCCACGCTGGTGGAAGAGGTGTTTTGGATGTGCTTGAG
```

```
                  ** ***** ******** ** ***** ***************** ** ****** * **

                          1210      1220      1230      1240      1250      1260
                  ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original   AAGAACTTAAGGCTATCACCAATTGATGTAGAAGCATCTAGATCGACTTTACATAGATTT
LfKCS3 modified   AAGAATTTGAGGCTTTCTCCTATTGATGTTGAAGCTTCTAGATCAACATTGCATAGGTTC
                  ***** ** ***** ** ** ******** ***** ******** ** ** ***** **

                          1270      1280      1290      1300      1310      1320
                  ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original   GGGAATACTTCTTCGAGTTCGATTTGGTATGAGTTGGCTTATATTGAAGCTAAAGGAAGG
LfKCS3 modified   GGAAACACCTCTTCAAGTTCTATATGGTATGAACTTGCATACATCGAGGCTAAGGGTAGG
                  ** ** ** ***** ***** ** ********  * ** ** ** ** ***** ** ***

                          1330      1340      1350      1360      1370      1380
                  ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original   ATGAAGAAAGGTGATAAAGCTTGGCAAATTGCTTTAGGGTCAGGGTTTAAGTGTAATAGT
LfKCS3 modified   ATGAAGAAAGGAGATAAGGCATGGCAGATTGCTTTGGGTTCAGGTTTTAAGTGTAATAGT
                  *********** ***** ** ***** ******** ** ***** ***************

                          1390      1400      1410      1420      1430      1440
                  ....|....|....|....|....|....|....|....|....|....|....|....|
LfKCS3 original   GCTGTTTGGGTTGCTTTACGTAATGTTAAAGCTTCGGCTAATAGTCCTTGGGAACATTGT
LfKCS3 modified   GCAGTTTGGGTGGCTCTTAGAAACGTTAAGGCTAGTGCAAATTCTCCTTGGGAGCATTGC
                  ** ******** *** *  * ** ***** ***   ** ***  ********* *****

                          1450      1460      1470      1480      1490
                  ....|....|....|....|....|....|....|....|....|....|.
LfKCS3 original   ATTGATAGGTATCCTGTTCCTGATACTTGTGTAGAAAATGGTAAGTCTTAG
LfKCS3 modified   ATTGATAGGTATCCAGTTCCTGATACATGTGTGGAAAACGGAAAGTCTTGA
                  ************** *********** ***** ***** ** *******
```

Figure 3

Injection of Agrobacterium in developing castor fruit

Figure 4



PCR transformation control in castor endosperm transiently transformed with *Lesquerella fedlery* KCS.