BRENDA
The Comprehensive Enzyme Information System

Information on EC 6.2.1.12 - 4-coumarate-CoA ligase

PROTEIN VARIANTS	ORGANISM	UNIPROT	COMMENTARY	LITERATURE
C403A	Arabidopsis thaliana	-	activity reduced to 45% of wild-type level, no effect on Km values for ATP and caffeate	651262
E401Q	Arabidopsis thaliana	-	activity reduced to 21% of wild-type level, no effect on Km values for ATP and caffeate	651262
K211S	Arabidopsis thaliana	-	activity reduced to 2.7% of wild-type level	651262
K320A	Arabidopsis thaliana	Q9S725	new substrate specificity, accepts ferulate as substrate	652146
K320L	Arabidopsis thaliana	Q9S725	new substrate specificity, accepts ferulate as substrate	652146
K445T	Arabidopsis thaliana	-	activity reduced to 0.2% of wild-type level	651262
K457S	Arabidopsis thaliana	-	activity reduced to 4% of wild-type level	651262
K540N	Arabidopsis thaliana	-	no activity	651262
L356A	Arabidopsis thaliana	-	only little effect on activity	653597
M293A	Arabidopsis thaliana	Q9S725	new substrate specificity, accepts ferulate as substrate	652146
M293A/V294L	Arabidopsis thaliana	Q9S725	substitution of valine decreases Km for ferulate 2-3fold compared to single methionine substitution mutant	652146
M293F	Arabidopsis thaliana	Q9S725	no reaction with ferulate, increases Km for caffeate	652146
M293P	Arabidopsis thaliana	Q9S725	new substrate specificity, accepts ferulate as substrate	652146
M293P/K320L	⊞ 2 entries			
M293P/V294M	Arabidopsis thaliana	Q9S725	substitution of valine decreases Km for ferulate 2-3fold compared to single methionine substitution mutant	652146
M293W	Arabidopsis thaliana	Q9S725	no reaction with ferulate	652146
M293Y	Arabidopsis thaliana	Q9S725	no reaction with ferulate, increases Km for caffeate	652146

N256A/M293P/K320L	Arabidopsis thaliana	-	effectively uses ferulate and cinnamate as substrates, 10fold reduced activity with caffeate	653597
R449Q	Arabidopsis thaliana	-	activity reduced to 3% of wild-type level, Km values significantly increased	651262
V294L	Arabidopsis thaliana	Q9S725	slightly reduced activity with caffeate, no activity with ferulate	652146
V294M	Arabidopsis thaliana	Q9S725	slightly reduced activity with caffeate, no activity with ferulate	652146
V355A	Arabidopsis thaliana	-	strongly reduced activity	653597
V355A/L356A	Arabidopsis thaliana	-	strongly reduced activity	653597
E340A	Glycine max	-	4CL1-mutant, activity almost completely abolished	652422
G333A	Glycine max	-	4CL1-mutant, activity almost completely abolished	652422
G337A	Glycine max	-	4CL1-mutant, activity almost completely abolished	652422
G342A	Glycine max	-	4CL1-mutant, activity almost completely abolished	652422
I346A	Glycine max	-	4CL1-mutant, very low activity with all substrates	652422
L344A	Glycine max	-	4CL1-mutant, activity almost completely abolished	652422
M338A	Glycine max	-	4CL1-mutant, activity almost completely abolished	652422
M348A	Glycine max	-	4CL1-mutant, activity almost completely abolished	652422
P285A	Glycine max	-	4CL1-mutant, very low activity with all substrates	652422
P286A	Glycine max	-	4CL1-mutant, minor changes in activity	652422
P343A	Glycine max	-	4CL1-mutant, very low activity with all substrates	652422
Q334A	Glycine max	-	4CL1-mutant, very low activity with all substrates	652422
T331A	Glycine max	-	4CL1-mutant, minor changes in activity	652422
T339A	Glycine max	-	4CL1-mutant, activity almost completely abolished	652422
V284A	Glycine max	-	4CL1-mutant, minor changes in activity	652422
Y336A	Glycine max	-	4CL1-mutant, activity almost completely abolished	652422
H237A	Nicotiana tabacum	O24146	the mutant shows reduced activity compared to the wild type enzyme	746513

K197A	Nicotiana tabacum	O24146	the mutant shows reduced activity compared to the wild type enzyme	746513
K441A	Nicotiana tabacum	O24146	inactive	746513
K443A	Nicotiana tabacum	O24146	the mutant shows reduced activity compared to the wild type enzyme	746513
K526A	Nicotiana tabacum	O24146	inactive	746513
M344A	Nicotiana tabacum	O24146	the mutant shows reduced activity compared to the wild type enzyme	746513
R435A	Nicotiana tabacum	O24146	the mutant shows reduced activity compared to the wild type enzyme	746513
T193A	Nicotiana tabacum	O24146	the mutant shows reduced activity compared to the wild type enzyme	746513
T336A	Nicotiana tabacum	O24146	the mutant shows reduced activity compared to the wild type enzyme	746513
Y239A	Nicotiana tabacum	O24146	the mutant shows reduced activity compared to the wild type enzyme	746513
Y239F	Nicotiana tabacum	O24146	the mutant shows reduced activity compared to the wild type enzyme	746513
A251S	Plagiochasma appendiculatum	A0A0D4C3L0	the mutant enzyme shows a lower binding affinity and catalytic efficiency than the wild type enzyme	746000
A251S/M247Y	Plagiochasma appendiculatum	A0A0D4C3L0	the mutant enzyme shows a lower binding affinity and catalytic efficiency than the wild type enzyme	746000
M247Y	Plagiochasma appendiculatum	A0A0D4C3L0	the catalytic efficiency of, 4-coumaric, caffeic and dihydro-4-coumaric acids are higher in the mutant than in the wild type enzyme	746000
V388del	Populus tomentosa	H9AZ21, H9AZ22, H9AZ23, H9AZ24, Q941M3	deletion of V338 residues in isoform 4CL1 results in activity towards sinapate	746098
Y236F	Populus tomentosa	H9AZ21, H9AZ22, H9AZ23, H9AZ24, Q941M3	the mutant of isoform 4CL2 exhibits high substrate catalytic efficiency for 4-coumarate but very low substrate affinities and specificities for caffeate and ferulate	746098
F239A	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces more naringenin chalcone compared to the wild-type	728481
F239N	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces more	728481

			naringenin chalcone compared to the wild-type	
F239R	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces more naringenin chalcone compared to the wild-type	728481
F239S	Solanum lycopersicum	-	site-directed mutagenesis, the mutant shows increased activity in vivo, and in vitro with coumaric acid, but reduced activity with ferulic acid compared to the wild-type enzyme. The mutant strain produces more naringenin chalcone compared to the wild-type	728481
F269G	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces less naringenin chalcone compared to the wild-type	728481
F269I	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces less naringenin chalcone compared to the wild-type	728481
F269L	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces more naringenin chalcone compared to the wild-type, loss of feedback inhibition by naringenin	728481
F269L/K415T	Solanum lycopersicum	-	site-directed mutagenesis, the mutant shows increased activity in vivo, and in vitro with coumaric acid, but reduced activity with ferulic acid compared to the wild-type enzyme	728481
F269V	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces less naringenin chalcone compared to the wild-type	728481
Q274D	⊞ 2 entries			
Q274E	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces less naringenin chalcone compared to the wild-type	728481
Q274G	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces more naringenin chalcone compared to the wild-type	728481
Q274H	Solanum lycopersicum	-	site-directed mutagenesis, the mutant shows increased activity in vivo, and in vitro with coumaric acid, but reduced activity with ferulic acid compared to the wild-type enzyme, loss of feedback	728481

			inhibition by naringenin, the mutant strain produces more naringenin chalcone compared to the wild-type	
Q274S	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces less naringenin chalcone compared to the wild-type	728481
V186A	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces more naringenin chalcone compared to the wild-type	728481
V186G	Solanum lycopersicum	-	site-directed mutagenesis, the mutant shows highly increased activity in vivo, and in vitro with coumaric acid, but reduced activity with ferulic acid compared to the wild-type enzyme. The mutant strain produces highly increased naringenin chalcone content compared to the wild-type	728481
V186I	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces highly increased naringenin chalcone content compared to the wild-type	728481
V186I/V187L	Solanum lycopersicum	-	site-directed mutagenesis, the mutant shows increased activity in vivo, and in vitro with coumaric acid compared to the wild-type enzyme, but no activity with ferulic acid	728481
V186L	Solanum lycopersicum	-	site-directed mutagenesis, the mutant strain produces more naringenin chalcone compared to the wild-type	728481
V235M/A325G	Solanum lycopersicum	-	site-directed mutagenesis, highly unstable inactive mutant	728481
additional information	⊞ 11 entries			