## Additional file 2.pdf

ClustalW multiple alignment of XYL1p, XYL1.1p and XYL1.2p amino acid sequences from *Spathaspora* species and *Scheffersomyces stipitis* (XYL1p N272D). The highly conserved motif Ile-Pro-Lys-Ser (reported as the coenzyme binding site) is shown inside a rectangle box. The position site 271 (XYL1.2p) or 272 (XYL1p and XYL1.1p) is indicated by an arrow.

10 20 30 40 50 Sp. passalidarum CBS 10155<sup>T</sup> XYL1.1p MATIKLSSGHLMPLVGFGCWKVDNATAADQIYNAIKAGYRLFDGAEDYGNEKEVGDGLKR Sp. passalidarum UFMG-CM-Y469 XYL1.1p MATIKLSSGHLMPLVGFGCWKVDNATAADQIYNAIKAGYRLFDGAEDYGNEKEVGDGLKR MATIKLSSGHLMPAVDFGCWKVDKATAADQIYQAIKAGYRLFDGAEDYGNEKEVGDGLKK Sp. arborariae UFMG-CM-Y352<sup>T</sup> XYL1p Sp. brasiliensis UFMG-CM-Y353<sup>T</sup> XYL1p MATIKLSSGHLMPLVGFGCWKVDNATAADQIYNAIKAGYRLFDGAEDYGNEKEVGDGLKR Sp. xylofermentans UFMG-CM-Y478<sup>T</sup> XYL1p Sp. suhii UFMG-CM-Y475<sup>T</sup> XYL1p MATIKLSSGHLMPLVGFGCWKVDNATAADQIYNAIKAGYRLFDGAEDYGNEKEVGDGLKR MATIRLSSGHLMPLVGFGCWKVDNATAADOIYNAIKAGYRLFDGAEDYGNEKEVGDGLKR Sp. roraimanensis UFMG-CM-Y477<sup>T</sup> XYL1p MATIKLSSGHLMPAVGFGCWKVDKATAADQIYQAIKAGYRLFDGAEDYGNEKEVGDGLKR Sc. stipitis CBS6054 XYL1p (N272D) Sp. passalidarum CBS 10155<sup>T</sup> XYL1.2p MPSIKLNSGYDMPAVGFGCWKVDVDTCSEQIYRAIKTGYRLFDGAEDYANEKLVGAGVKK -MSFKLSSGYEMPKIGFGTWKMDKATIPQQIYDAIKGGIRSFDGAEDYGNEKEVGLGYKK -MSFKLSSGYEMPKIGFGTWKMDKATIPQQIYDAIKGGIRSFDGAEDYGNEKEVGLGYKK :::\*.\*\*: \*\*:: \*\*: \* :.\*\* \* :\*\*\* \* \* \* \*\*\*\*\*\*\*.\*\*\* sp. passalidarum UFMG-CM-Y469 XYL1.2p Clustal consensus 
 70
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 AIDEGLVKREELFITSKLWNNYHDPKNVETALNRTLSDLQLDYVDLFLIHFPIAFKFVPL
Sp. passalidarum CBS 10155<sup>T</sup> XYL1.1p Sp. passalidarum UFMG-CM-Y469 XYL1.1p AIDEGLVKREELFITSKLWNNYHDPKNVETALNRTLSDLQLDYVDLFLIHFPIAFKFVPL Sp. arborariae UFMG-CM-Y352<sup>T</sup> XYL1p AIDEGLVKREELFITSKLWNNYHDPKNVETALNRTLSDLQLDYVDLFLIHFPIAFKFVPL Sp. brasiliensis UFMG-CM-Y353<sup>T</sup> XYL1p AMDEGLVKREELFVTSKLWNNFHDPKNVETALNRTLSDLKLDYVDLFLIHFPIAFKFVPL Sp. xylofermentans UFMG-CM-Y478<sup>T</sup> XYL1p aidegivkreelfitsklwnnyhdpknvetalnrtlsdloldyvdlflihfpiafkfvpl Sp. suhii UFMG-CM-Y475<sup>T</sup> XYL1p AIDEGLVKREELFITSKLWNNYHDPKNVETALNRTLSDLOLDYVDLFLIHFPIAFKFVPL Sp. roraimanensis UFMG-CM-Y477<sup>T</sup> XYL1p AIDEGLVKREELFITSKLWNNYHDPKNVETALNRTLSDLQLDYVDLFLIHFPIAFKFVPL sc. stipitis CBS6054 XYL1p (N272D) Sp. passalidarum CBS 10155<sup>T</sup> XYL1.2p Sp. passalidarum UFMG-CM-Y469 XYL1.2p AIDEGIVKREDLFLTSKLWNNYHHPDNVEKALNRTLSDLOVDYVDLFLIHFPVTFKFVPL AIEDGLVKREDLFITSKLWNNFHDPKNVEKALDRTLADLQLDYVDLFLIHFPIAFKFVPL AIEDGLVKRGDLFITSKLWNNFHDPKNVEKALDRTLADLQLDYVDLFLIHFPIAFKFVPL Clustal consensus 180 Sp. passalidarum CBS 10155<sup>T</sup> XYL1.1p Sp. passalidarum UFMG-CM-Y469 XYL1.1p EEKYPPGFYCGDGNNFHYENVPLLDTWKALEKLVQAGKIKSIGISNFPGALIYDLVRGAT EEKY PPGFYCGDGDNFHYENVPLLDTWKALEKLVEAGKIKS IGI SNFPGALIYDLVRGAT Sp. arborariae UFMG-CM-Y352<sup>T</sup> XYL1p EEKYPPGFYCGDGDNFHYESVPLLDTWKALEKLVHAGKIKSIGISNFPGALIYDLCRGAT Sp. brasiliensis UFMG-CM-Y353<sup>™</sup> XYL1p **EEKYPPGFYCGDGNNFHYENVPLLDTWKALEKLVQAGKIKSIGISNFPGALIYDLVRGAT** *Sp. xylofermentans* UFMG-CM-Y478<sup>T</sup> XYL1p EEKYPPGFYCGDGNNFHYENVPLLDTWKALEKLVQAGKIKSIGISNFPGALIYDLVRGAT Sp. suhii UFMG-CM-Y475<sup>T</sup> XYL1p EEKYPPGFYCGDGNNFHYENVPLLDTWKALEKLVQAGKIKSIGISNFPGALIYDLVRGAT Sp. roraimanensis UFMG-CM-Y477<sup>T</sup> XYL1p EEKYPPGFYCGDGDNFHYESVPLLDTWKALEKLVHAGKIKSIGISNFPGALIYDLCRGAT sc. stipitis CBS6054 XYL1p (N272D) Sp. passalidarum CBS 10155<sup>T</sup> XYL1.2p EEKYPPGFYCGKGDNFDYEDVPILETWKALEKLVKAGKIRSIGVSNFPGALLLDLLRGAT EERYPPCFYCGDGDNFHYEDVPLLETWKALEALVKKGKIRSLGVSNFTGALLLDLLRGST EERYPPCFYCGDGDNFHYEDVPLLETWKALEALVKKGKIRSLGVSNFTGALLLDLLRGAT *sp. passalidarum* UFMG-CM-Y469 XYL1.2p Clustal consensus Sp. passalidarum CBS 10155<sup>T</sup> XYL1.1p Sp. passalidarum UFMG-CM-Y469 XYL1.1p IKPAVLQIEHHPYLQQPKLIEYVQKQGIAITAYSSFGPQSFLELNQNRALNTPTLFEHDT Sp. arborariae UFMG-CM-Y352<sup>T</sup> XYL1p IKPAVLQIEHHPYLQQPKLIEYVQKQGIAVTAYSSFGPQSFIELNQNRALNTPTLFEHDT Sp. brasiliensis UFMG-CM-Y353<sup>T</sup> XYL1p IKPAVLQIEHHPYLQOPKLIEYVOKOGIAVTGYSSFGPOSFLELNONRALNAPTLFEHET Sp. xylofermentans UFMG-CM-Y478<sup>T</sup> XYL1p IKPAVLQIEHHPYLQQPKLIEYVQKQGIAITAYSSFGPQSFLELNQNRALNTPTLFEHDT Sp. suhii UFMG-CM-Y475<sup>T</sup> XYL1p IKPAVLQIEHHPYLQQPKLIEYVQKQGIAITAYSSFGPQSFLELNQNRALNTPTLFEHDT Sp. roraimanensis UFMG-CM-Y477<sup>T</sup> XYL1p IKPAVLQIEHHPYLQQPKLIEYVQKQGIAVTAYSSFGPQSFIELNQNRALNTPTLFEHDT Sc. stipitis CBS6054 XYL1p (N272D) Sp. passalidarum CBS 10155<sup>T</sup> XYL1.2p IKPSVLQVEHHPYLQQPRLIEFAQSRGIAVTAYSSFGPQSFVELNQGRALNTSPLFENET IKPAVLQVEHHPYLQQPRLIEFAQKQGLVVTAYSSFGPQSFTELNQNRANNTPRLFDHEV Sp. passalidarum UFMG-CM-Y469 XYL1.2p IKPAVLQVEHHPYLQQPRLIEFAQKQGIVVTAYSSFGPQSFTELNQNRANNTPRLFDHEV Clustal consensus 250 260 270 280 290 300 300 Sp. passalidarum CBS 10155<sup>T</sup> XYL1.1p Sp. passalidarum UFMG-CM-Y469 XYL1.1p IKSISTRLNKTPÄQVLLRWATORNIAVIPKSNNPARLÄQNLDVTSPDLTEEDFNTISALD IKSIASRLNKSPÄQVLLRWASORGIAVIPKSNSPARLÄENLDVTSFDLTDADFEAISKLD Sp. arborariae UFMG-CM-Y352<sup>T</sup> XYL1p Sp. brasiliensis UFMG-CM-Y353<sup>T</sup> XYL1p IKSISTRLNKTPAQVLLRWATQRNIAVIPKSSNPARLAQNLDVTSFDLTEADFEAISALD Sp. xylofermentans UFMG-CM-Y478<sup>T</sup> XYL1p IKSISTRLNKTPAQVLLRWATQRNIAVIPKSNNPARLAQNLDVTSFDLTEEDFNAISALD IKSISTRLNKTPAQVLLRWATQRNIAVIPKSNNPARLAQNLDVTSFDLTEEDFNAISALD Sp. suhii UFMG-CM-Y475<sup>T</sup> XYL1p IKSIASRINKSPAQVILRWASQRGIAVI PKSDYARADAY ISPULEDA PRA ISKID IKAIAAKHGKSPAQVILRWSSQRGIAVI PKSDYARADAY IKAIAAKHGKSPAQVILRWSSQRGIAII PKSDYAPRILENKDVNSPDLDEQDFADIAKLD *sp. roraimanensis* UFMG-CM-Y477<sup>™</sup> XYL1p Sc. stipitis CBS6054 XYL1p (N272D) Sp. passalidarum CBS 10155<sup>T</sup> XYL1.2p Sp. passalidarum UFMG-CM-Y469 XYL1.2p Clustal consensus 310 Sp. passalidarum CBS 10155<sup>T</sup> XYL1.1p INLRFNDPWDWDNIPIFV Sp. passalidarum UFMG-CM-Y469 XYL1.1p INLRFNDPWDWDNIPIFV Sp. arborariae UFMG-CM-Y352<sup>T</sup> XYL1p INLRFNDPWDWDNIPIFV Sp. brasiliensis UFMG-CM-Y353<sup>T</sup> XYL1p INLRENDPWDWDNIPIEV Sp. xylofermentans UFMG-CM-Y478<sup>T</sup> XYL1p INLRFNDFWDWDNIFIFV Sp. suhii UFMG-CM-Y475<sup>T</sup> XYL1p INLRFNDFWDWDNIFIFV Sp. roraimanensis UFMG-CM-Y477<sup>T</sup> XYL1p INLRENDEWDWDNIEIFV Sc. stipitis CBS6054 XYL1p (N272D) Sp. passalidarum CBS 10155<sup>T</sup> XYL1.2p INLRFNDPWDWDKIPIFV ANLRFNDPWDWDHIPIFV Sp. passalidarum UFMG-CM-Y469 XYL1.2p ANLRFNDPWDWDHIPIFV Clustal consensus \*\*\*\*\*\*\*\*\*\*