Secretome data from *Trichoderma reesei* and *Aspergillus niger* cultivated in submerged and sequential fermentation methods

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**Abstract**

The cultivation procedure and the fungal strain applied for enzyme production may influence levels and profile of the proteins produced. The proteomic analysis data presented here provide critical information to compare proteins secreted by *Trichoderma reesei* and *Aspergillus niger* when cultivated through submerged and sequential fermentation processes, using steam-explosion sugarcane bagasse as inducer for enzyme production. The proteins were organized according to the families described in CAZy database as cellulases, hemicellulases, proteases/peptidases, cell-wall-protein, lipases, others (catalase, esterase, etc.), glycoside hydrolases families, predicted and hypothetical proteins. Further detailed analysis of this data is provided in “Secretome analysis of *Trichoderma reesei* and *Aspergillus niger* cultivated by submerged and sequential fermentation process: enzyme production for sugarcane bagasse hydrolysis” C. Florencio, F.M. Cunha, A.C Badino, C.S. Farinas, E. Ximenes, M.R. Ladisch (2016) [1].

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1. Data

In Table 1, the proteins identified by proteomic analysis of enzymatic cocktails from *Trichoderma reesei* and *Aspergillus niger*, cultivated on pretreated sugarcane bagasse by either submerged or sequential fermentation processes, are presented according to the families classification from CAZy database.

The enzymatic hydrolysis of pretreated sugarcane bagasse was performed with combined extracts from *T. reesei* Rut C30 and *A. niger* A12, and the data of proteomic analysis of this combination of identified proteins is shown in Table 2. The indicated enzyme loadings were applied for steam-explosion sugarcane bagasse saccharification as described by Florencio et al. [1].

2. Experimental design, materials and methods

2.1. Fungal strains

The strains used for enzyme production were *T. reesei* Rut-C30 and *A. niger* wild type A12 obtained from Centre for Agricultural Bioscience International (CABI) culture collection (United Kingdom) and Embrapa Food Technology collection (Rio de Janeiro, Brazil), respectively. The conditions in which strains were maintained are described in Florencio et al. [1].

2.2. Cultivation conditions

Submerged and sequential fermentations carried out to obtain the enzymatic cocktails from *T. reesei* and *A. niger* are described in detail in Florencio et al. [1]. Briefly, the submerged fermentation was initiated with a 48 h pre-culture that contained a final conidia concentration of $10^7$ spores/mL in
Table 1
Major proteins identified in the secretome of *Trichoderma reesei* and *Aspergillus niger* cultivated under submerged (A) and sequential (B) fermentation methods.

| Gene ID | Enzyme | Family | T. reesei | A | B | A | B |
|---------|--------|--------|-----------|---|---|---|---|
| 21842121 | Cellulases | Endoglucanase | GH12 | x | x | | |
| 3757552 | Endoglucanase | GH12 | x | x | | |
| 145235569 | Endo-beta-1,4-glucanase | GH12 | x | | | |
| 145228915 | Endo-beta-1,4-glucanase | GH12 | x | | | |
| 2833231 | Endoglucanase I | GH7 | x | | | |
| 121794 | Endoglucanase II | GH5 | x | | | |
| 201066457 | Endoglucanase IV (AA9) | GH61 | x | x | | |
| 145235523 | Glucan endo-1,3-beta-glucosidase | – | – | x | x | | |
| 320592482 | Beta-glucanase | – | – | x | | | |
| 403314396 | Endoglucanase VI | GH61 | x | | | |
| 145229195 | Endo-1,3(4)-beta-glucanase | GH16 | x | x | | |
| 202072834 | Cellobiohydrolase I | GH7 | x | x | | |
| 95115828 | Cellobiohydrolase II | GH6 | x | x | | |
| 74698499 | 1,4-beta-D-glucan cellobiohydrolase | GH7 | x | x | | |
| 201066459 | Glucosidase | GH3 | x | | | | |
| 126046487 | beta-glucosidase | GH3 | x | x | | |
| 145242946 | beta-glucosidase M 4 | GH3 | x | | | |
| 145255120 | Glucan 1,3-beta-glucosidase A | GH5 | x | x | | |
| 400602153 | Glucan 1,3-beta-glucosidase | GH17 | x | | | |
| 257187 | Alpha-glucosidase P2 subunit 5 | GH31 | x | | | |
| 317035725 | Hemicellulases | Endo-arabinase | GH43 | x | | | |
| 145234699 | Alpha-L-arabinofuranosidase axhA | GH62 | x | x | | |
| 358375978 | Arabinoxylan arabinofuranohydrolase | GH62 | x | x | | |
| 145233623 | Endo-1,5-alpha-L-arabinosidase C | GH43 | x | x | | |
| 145250511 | Alpha-N-arabinofuranosidase B | – | – | x | x | | |
| 78101601 | Anfaea-ferulic Acid Complex | – | – | x | | |
| 23821545 | Feruloyl esterase B | – | – | x | | |
| 145246174 | Feruloyl esterase C | – | – | x | | |
| 48425840 | Ferulic acid esterase | – | – | x | | |
| 145247672 | Feruloyl esterase B-1 | – | – | x | | |
| 145230716 | Beta-galactosidase E | GH35 | x | x | | |
| 350630290 | Alpha-galactosidase extracellular | – | – | x | | |
| 74626383 | Alpha-galactosidase B | – | – | x | x | | |
| 317034650 | Alpha-galactosidase D | – | – | x | | |
| 307776646 | Beta-mannanase | GH5 | x | x | | |
| 358367813 | Alpha-mannosidase | GH38 | x | | | | |
| 145233855 | Alpha-mannosidase | GH38 | x | | | | |
| 572273984 | Beta-mannosidase A | GH2 | x | | | | |
| 572273001 | Putative beta-mannosidase A | GH2 | x | x | | |
| 37032967 | Beta-mannosidase A | GH2 | x | x | | |
| 358369379 | Beta-mannosidase (MndA) | GH2 | x | | | |
| 145230794 | Alpha-1,2-mannosidase 1B | GH47 | x | x | | |
| 145256261 | Pectate lyase plyB | – | – | x | | |
| 572728177 | Pectin lyase-like protein | – | – | x | x | | |
| 165906534 | Enodoxylanase | GH10 | x | x | | |
| 11513450 | Acetyl Xylan Esterase | – | – | x | x | | |
| 292495278 | Endo-1,4-beta-xylanase C | GH10 | x | x | | |
| 549461 | Hemicellulases | Endo-1,4-beta-xylanase 2 | GH11 | x | x | | |
| 145250044 | Endo-1,4-beta-xylanase 5 | GH11 | x | x | | |
| 157488002 | Swollenin | CBM1 | x | x | | |
| 9858848 | Xylanase | GH11 | x | | | | |
| 42716406 | Xylanase | GH11 | x | x | | |
| 13242071 | Xylanase | GH11 | x | | | | |
| 26514830 | Xylanase | GH11 | x | | | | |
| 83638302 | Xylanase | GH11 | x | | | | |
| 380293098 | Xylanase II | GH11 | x | x | | | |
| Gene ID     | Enzyme                          | Family | T. reesei | A. niger |
|------------|---------------------------------|--------|-----------|---------|
| 145242002  | Alpha-xylosidase                | GH31   | x         | x       |
| 145230215  | Exo-1,4-beta-xylosidase xlnD    | GH3    | x         | x       |
| 145243586  | Xylosidase/arabinosidase        | –      | x         | x       |
| 145228611  | Proteases/ Peptidases           | Aorsin | –         | x       |
| 530795     | Pepsinogen                      | –      | x         | x       |
| 589101183  | Aminopeptidase                  | –      | x         |         |
| 145257498  | Aminopeptidase 2                | –      | x         |         |
| 145242728  | Vacuolar aspartyl aminopeptidase Lap4 | – | x         | x       |
| 145583569  | Aspartic endopeptidase          | –      | x         |         |
| 145254317  | Aspartic-type endopeptidase opsB| –      | x         | x       |
| 145248205  | Aspartic-type endopeptidase opsB| –      | x         | x       |
| 145256471  | Dipeptidyl peptidase III        | –      | x         |         |
| 145249068  | Tripeptidyl-peptidase sed2      | –      | x         |         |
| 629887989  | Tripeptidyl peptidase precursor | –      | x         |         |
| 145246882  | Extracellular serine carboxypeptidase | – | x         |         |
| 1093596    | Ser carboxypeptidase             | –      | x         |         |
| 145235505  | Serine carboxypeptidase          | –      | x         | x       |
| 317026828  | Serine-type carboxypeptidase     | –      | x         | x       |
| 134077081  | Endoprotease Endo-Pro-A. niger  | –      | x         | x       |
| 62002221   | Subtilase protease              | –      | x         |         |
| 115111226  | Subtilisin-like protease         | –      | x         | x       |
| 589111601  | Serine protease                 | –      | x         |         |
| 29421423   | Extracellular serine protease    | –      | x         |         |
| 124290701  | SprT - serine protease          | –      | x         | x       |
| 4644359    | Subtilisin-like serine protease  | –      | x         | x       |
| 589099267  | Trypsin-like serine protease     | –      | x         | x       |
| 193735605  | Vacuolar protease A             | –      | x         |         |
| 387772861  | Aspartic proteinase             | –      | x         | x       |
| 38256986   | Cell-wall protein               | Cell wall protein | – | x       |
| 47028077   | Cell-wall protein - CwpA         | –      | x         |         |
| 145252266  | GPI anchored cell wall protein  | GH64   | x         | x       |
| 589106641  | Ceramidase family protein       | –      | x         |         |
| 145255556  | Alkaline nonsyosomal ceramidase | –      | x         |         |
| 387772865  | Cerato-platinan                 | –      | x         | x       |
| 270708616  | Chitinase                       | –      | x         | x       |
| 145232927  | Endochitinase 1                 | GH18   | x         | x       |
| 1839391    | Exochitinase                    | GH20   | x         |         |
| 145256696  | Protein ecm33                   | –      | x         | x       |
| 145241592  | Lipases                         | Lysophospholipase 1 | – | x       |
| 145234164  | Lysophospholipase 1             | –      | x         |         |
| 145231236  | Phospholipase C PLC-C           | –      | x         |         |
| 109677003  | Triacylglycerol lipase precursor | – | x         | x       |
| 110431975  | Triacylglycerol lipase B        | –      | x         |         |
| 589114715  | Others                          | Amidase | – | x         |
| 145239143  | Aminotransferase, class V       | –      | x         |         |
| 145241960  | Alpha-amyrase                   | –      | x         |         |
| 350631148  | Alpha-amyrase A                 | CBM20  | x         |         |
| 145243632  | Alpha-amyase a type-1/2         | –      | x         | x       |
| 224027     | Glucoamylase G1                 | GH15   | x         | x       |
| 14524784   | N-acetylglucosaminidase         | GH20   | x         |         |
| 113206519  | Acetyl esterase                 | –      | x         |         |
| 589089125  | Carbohydrate esterase           | –      | x         | x       |
| 358388255  | Carbohydrate esterase family 15 protein | CBM15 | x | x       |
| 572279065  | Carboxylesterase                | –      | x         |         |
| 145233451  | Cholinesterase                  | –      | x         | x       |
| 1705640    | Catalase R                      | –      | x         |         |
| 589115621  | Catalase/peroxidase             | –      | x         |         |
| Gene ID   | Enzyme                                      | Family        | T. reesei | A  | B  | A  | B  |
|----------|---------------------------------------------|---------------|-----------|----|----|----|----|
| 145228625 | Catalase R                                  |               |           | x  |    |    |    |
| 119474019 | Mycelial catalase Cat1                      |               |           | x  |    |    |    |
| 404312830 | Cellulose Induced Protein, CIP1             |               | x x       |    |    |    |    |
| 589107171 | Oxalate decarboxylase                       |               |           | x  |    |    |    |
| 380482942 | Oxalate decarboxylase family bicupin        |               |           | x  |    |    |    |
| 1169291   | Aldehyde dehydrogenase                     |               |           | x  |    |    |    |
| 572279542 | Dihydrolipoyl dehydrogenase                |               |           | x  |    |    |    |
| 350631179 | FAD/FMN-containing dehydrogenase           |               |           | x  |    |    |    |
| 589113573 | Malate dehydrogenase                       |               |           | x  |    |    |    |
| 19702487  | Malate dehydrogenase                       |               |           | x  |    |    |    |
| 145257405 | Short-chain dehydrogenase                  |               |           | x  |    |    |    |
| 145230419 | Glycosidase crf1                            |               |           | x  |    |    |    |
| 145256130 | 1,3-beta-glucanosyltransferase gel1        | GH72          |           | x  |    |    |    |
| 145240407 | 1,3-beta-glucanosyltransferase gel2        | GH72          |           | x  |    |    |    |
| 145241490 | 1,3-beta-glucanosyltransferase gel3        | GH72          |           | x  |    |    |    |
| 145234720 | Glutaminase GtaA                           |               |           | x  |    |    |    |
| 145242650 | Nucleoside diphosphate kinase               |               |           | x  |    |    |    |
| 589102565 | Acid phosphatase-like protein               |               |           | x  |    |    |    |
| 130734    | Phosphate-repressible acid phosphatase     |               |           | x  |    |    |    |
| 145232002 | Phosphatidylglycerol                       |               |           | x  |    |    |    |
| 145251519 | Phosphoglycerate mutase family protein      |               |           | x  |    |    |    |
| 572278887 | Glycosidases families                       | Glycosidase Hydrolase (GH) | GH |     | x  |    |    |
| 572279560 | GH, partial                                |               |           |   |    |    |    |
| 358381827 | GH family 2 protein                        | GH2           |           | x  |    |    |    |
| 589104015 | GH family 3                                | GH3           |           | x  |    |    |    |
| 358388254 | GH family 5 protein                        | GH5           |           |    |    |    |    |
| 589100793 | GH family 10                               | GH10          |           | x  |    |    |    |
| 261825113 | GH family 15 protein (glucoamylase)        | GH15          |           | x  |    |    |    |
| 589113453 | GH family 16                               | GH16          |           |    |    |    |    |
| 358382969 | GH family 16 protein                       | GH17          |           |    |    |    |    |
| 589111611 | GH family 17                               | GH17          |           |    |    |    |    |
| 589113629 | GH 18 protein (chitinase)                  | GH18          |           |    |    |    |    |
| 317028062 | GH, family 18                              | GH18          |           |    |    |    |    |
| 589109851 | GH family 28                               | GH28          |           | x  |    |    |    |
| 358389063 | GH family 28 protein                       | GH28          |           | x  |    |    |    |
| 572273805 | Family 31 GH                               | GH31          |           | x  |    |    |    |
| 589103027 | GH family 38 protein                       | GH38          |           |    |    |    |    |
| 358387943 | GH family 43 protein                       | GH43          |           |    |    |    |    |
| 589101105 | GH family 47                               | GH47          |           | x  |    |    |    |
| 631371154 | GH family 47 protein                       | GH47          |           |    |    |    |    |
| 589100379 | GH family 54 (lignin-degrading)            | GH57          |           |    |    |    |    |
| 589115645 | GH family 55                               | GH55          |           |    |    |    |    |
| 589114155 | GH family 67                               | GH67          |           |    |    |    |    |
| 358384989 | GH family 71 protein                       | GH71          |           |    |    |    |    |
| 589103161 | GH family 71 protein                       | GH71          |           |    |    |    |    |
| 589109155 | GH family 71 protein                       | GH71          |           |    |    |    |    |
| 589111135 | GH family 72 (lignin-degrading)            | GH72          |           |    |    |    |    |
| 589108435 | GH 74                                     | GH74          |           |    |    |    |    |
| 358380926 | GH family 74 protein                       | GH74          |           |    |    |    |    |
| 589098631 | GH 92                                     | GH92          |           |    |    |    |    |
| 589100807 | GH family 92                              | GH92          |           |    |    |    |    |
| 255722211 | Predicted proteins                         |               |           | x  |    |    |    |
| 589105897 | Predicted protein                          |               |           |    |    |    |    |
| 589101909 | Predicted protein                          |               |           |    |    |    |    |
| 589110563 | Predicted protein                          |               |           |    |    |    |    |
| 589113917 | Predicted protein                          |               |           |    |    |    |    |
| 589105949 | Predicted protein                          |               |           |    |    |    |    |
| Gene ID   | Enzyme                        | Family        | T. reesei | A. niger |
|-----------|-------------------------------|---------------|-----------|----------|
|           |                               |               | A | B | A | B |
| 589108581 | Pr Predicted protein          | GH16          | x |   |   |   |
| 403411875 | Predicted protein             | –             | x |   |   |   |
| 589105505 | Predicted protein             | –             | x |   |   |   |
| 589107107 | Predicted protein             | – x x         |   |   |   |   |
| 589100041 | Predicted protein             | – x x         |   |   |   |   |
| 589115849 | Predicted protein             | – x           |   |   |   |   |
| 589099057 | Predicted protein             | –             | x |   |   |   |
| 589112857 | Predicted protein             | –             | x |   |   |   |
| 589116001 | Predicted protein             | –             | x |   |   |   |
| 589113291 | Predicted protein             | –             | x |   |   |   |
| 589115927 | Predicted protein             | –             | x |   |   |   |
| 154322591 | Predicted protein             | –             | x |   |   |   |
| 358390109 | Hypothetical proteins         |               |   |   |   |   |
| 358386311 | Hypothetical protein          | TRIATDRAFT_129231 | – | x |   |   |
| 358390537 | Hypothetical protein          | M419DRAFT_97005 | – |   |   |   |
| 572280833 | Hypothetical protein          | TRIVDRAFT_179276 | – |   |   |   |
| 116199677 | Conserved hypothetical protein |               |   |   |   |   |
| 589112113 | Hypothetical protein          | M419DRAFT_125562 | – | x |   |   |
| 380490319 | Hypothetical protein          | CH063_07742   |   |   |   |   |
| 358394718 | Hypothetical protein          |               |   |   |   |   |
| 345562011 | Hypothetical protein          | AOL_s00173g184 | CBM1 | x |   |   |
| 440640361 | Hypothetical protein          | TRIVDRAFT_49497 | – |   |   |   |
| 358381656 | Hypothetical protein          | TRIVDRAFT_60255 | – |   |   |   |
| 358388440 | Hypothetical protein          | TRIVDRAFT_141673 | – |   |   |   |
| 358381654 | Hypothetical protein          | TRIVDRAFT_4609 | – |   |   |   |
| 46127631  | Hypothetical protein          | FG08193.1     |   |   |   |   |
| 3010800235| Hypothetical protein          | GLRG_10272    |   |   |   |   |
| 598027367 | Hypothetical protein          |               |   |   |   |   |
| 646290693 | Hypothetical protein          |               |   |   |   |   |
| 598062595 | Hypothetical protein          | SPAPADRAFT_57777 | – | x |   |   |
| 350636308 | Hypothetical protein          | ASPNIDRAFT_182100 | GH3 | x |   |   |
| 350629486 | Hypothetical protein          | ASPNIDRAFT_47677 | GH3 | x |   |   |
| 350632025 | Hypothetical protein          | ASPNIDRAFT_128537 | – | x x |   |   |
| 14524196  | Hypothetical protein          | ANL_1_1560104 | – | x |   |   |
| 350635020 | Hypothetical protein          | ASPNIDRAFT_197780 | – |   |   |   |
| 568447829 | Hypothetical protein          | AGABIDRAFT_199975 | GH3 | x | x |   |
| 350631594 | Hypothetical protein          | ASPNIDRAFT_53033 | GH72 | x | x |   |
| 46122475  | Hypothetical protein          | FG05615.1     | – |   |   |   |
| 134082115 | Hypothetical protein          | An15g00620    | – |   |   |   |
| 350637823 | Hypothetical protein          | ASPNIDRAFT_52061 | GH75 | x | x |   |
| 145258972 | Hypothetical protein          | ANL_1_2174184 | – | x |   |   |
| 145254751 | Hypothetical protein          | ANL_1_1218164 | – |   |   |   |
| 145233749 | Hypothetical protein          | ANL_1_1558024 | – |   |   |   |
| 350633910 | Hypothetical protein          | ASPNIDRAFT_54865 | – | x | x |   |
| 350639816 | Hypothetical protein          | ASPNIDRAFT_124700 | – |   |   |   |
| 350638529 | Hypothetical protein          | ASPNIDRAFT_119858 | GH31 | x |   |   |
| 350638823 | Hypothetical protein          | ASPNIDRAFT_205361 | – | x |   |   |
| 350636991 | Hypothetical protein          | ASPNIDRAFT_56689 | – | x |   |   |
| 350632205 | Hypothetical protein          | ASPNIDRAFT_55058 | – | x |   |   |
| 350629866 | Hypothetical protein          | ASPNIDRAFT_126535 | – | x |   |   |
| 14524362  | Hypothetical protein          | ANL_1_1704094 | GH1 | x |   |   |
| 563290941 | Hypothetical protein          | SBOR_8115     | – |   |   |   |
| 398407925 | Hypothetical protein          | MYCGRDRAFT_30155 | – | x |   |   |
| 350636557 | Hypothetical protein          | ASPNIDRAFT_53540 | – | x |   |   |
Table 2
Major proteins identified in the submerged (A) and sequential (B) fermentation enzymatic extracts from *Trichoderma reesei + Aspergillus niger*, which were used in the hydrolysis process of the pretreated sugarcane bagasse at a 1:5 ratio, respectively.

| Gene ID      | Enzyme                                      | Family | T. reesei + A. niger (1:5) |
|--------------|---------------------------------------------|--------|---------------------------|
|              |                                             | A      | B                         |
| 21842121     | Cellulases Endoglucanase GH12               | x      | x                         |
| 3757552      | Endoglucanase A GH12                        | x      | x                         |
| 145235569    | Endo-beta-1,4-glucanase A GH12             | x      | x                         |
| 145228915    | Endo-beta-1,4-glucanase A GH12             | x      | x                         |
| 2833231      | Endoglucanase I GH7                        | x      | x                         |
| 121794       | Endoglucanase II GH5                       | x      |                           |
| 201066457    | Endoglucanase IV (AA9) GH61                | x      | x                         |
| 145235523    | Glucan endo-1,3-beta-glucosidase eglC xx    | –      | x                         |
| 320592482    | Beta-glucanase                             | –      | x                         |
| 403314396    | Endoglucanase VI (AA9) GH61                | x      |                           |
| 145229151    | Endo-1,3(4)-beta-glucanase GH16 x x        | x      |                           |
| 202072834    | Cellobiohydrolase I GH7                    | x      |                           |
| 9515828      | Cellobiohydrolase II GH6                   | x      |                           |
| 74698499     | 1,4-beta-D-glucan cellobiohydrolase GH7    | x      |                           |
| 201066459    | Glucosidase GH3                            | x      |                           |
| 12604687     | µ-glucosidase GH3                          | x      |                           |
| 145242946    | µ-glucosidase M 4 GH3                      | x      |                           |
| 145255120    | Glucan 1,3-beta-glucosidase A GH5 x x      | x      |                           |
| 400602153    | Glucan 1,3-µ-glucosidase GH17              | x      |                           |
| 257187       | Alpha-glucosidase P2 subunit 5 GH31        | x      |                           |
| 317035725    | Hemicellulases Endo-arabinase GH43         | x      |                           |
| 145234699    | Alpha-L-arabinofuranosidase axhA GH62      | x      | x                         |
| 35837978     | Arabinoxylan arabinofuranohydrolase GH62   | x      | x                         |
| 14523623     | Endo-1,5-alpha-L-arabinofuranosidase C GH43| x      |                           |
| 145250511    | Alpha-N-arabinofuranosidase B – x x        |                           |                           |
| 78101601     | Anfaea-ferulic Acid Complex – x             |                   |                           |
| 23821545     | Feruloyl esterase B – x                    |       |                           |
| 145246174    | Feruloyl esterase C – x                    |       |                           |
| 48425840     | Ferulic acid esterase – x                  |       |                           |
| 145247672    | Feruloyl esterase B-1 – x                  |       |                           |
| 145230716    | Beta-galactosidase B-1 GH35                | x      |                           |
| 350630290    | Alpha-galactosidase extracellular – x       |       |                           |
| 74626383     | Alpha-galactosidase B – x                  |       |                           |
| 317034650    | Alpha-galactosidase D – x                  |       |                           |
| 307776646    | Beta-mannanase GH5                         | x      |                           |
| 358367813    | Alpha-mannosidase GH38                     | x      |                           |
| 145233855    | Alpha-mannosidase GH38                     | x      |                           |
| 572273984    | Beta-mannosidase A GH2                     | x      |                           |
| 572273001    | Putative beta-mannosidase A GH2            | x      |                           |
| 317032967    | Beta-mannosidase A GH2                     | x      |                           |
| 358369379    | Beta-mannosidase (MndA) GH2                | x      |                           |
| 145230794    | Alpha-1,2-mannosidase 1B GH47             | x      |                           |
| 145256261    | Pectate lyase plyB – x                     |       |                           |
| 572278177    | Pectin lyase-like protein – x               |       |                           |
| 165906534    | Endoxylanase GH10                         | x      |                           |
| 11513450     | Acetyl Xylan Esterase – x                  |       |                           |
| 292495278    | Endo-1,4-beta-xylanase C GH10              | x      |                           |
| 549461       | Endo-1,4-beta-xylanase 2 GH11              | x      |                           |
| 145250044    | Endo-1,4-beta-xylanase 5 GH11              | x      |                           |
| 157488002    | Hemicellulases Swollenin CBM1              | x      |                           |
| 9858848      | Xylanase GH11                             | x      |                           |
| 42716406     | Xylanase GH11                             | x      |                           |
| 13242071     | Xylanase GH11                             | x      |                           |
| 26514830     | Xylanase GH11                             | x      |                           |
| 83638302     | Xylanase GH11                             | x      |                           |
| Gene ID   | Enzyme                              | Family | T. reesei + A. niger |
|-----------|-------------------------------------|--------|----------------------|
| 380293098 | Xylanase II                         | GH1    | x                    |
| 145242002 | Alpha-xylosidase                    | GH3    | x                    |
| 145230215 | Exo-1,4-beta-xylosidase xlnD        | GH3    | x                    |
| 145243888 | Xylosidase/arabino-oxidase          | –      | x                    |
| 572278887 | Glycoside Hydrolases families       | GH     | x                    |
| 572275960 | GH, partial                         | GH     | x                    |
| 358381827 | GH family 2 protein                | GH2    | x                    |
| 589104105 | GH family 3                         | GH3    | x                    |
| 358388254 | GH family 5 protein                | GH5    | x                    |
| 589100793 | GH family 10                        | GH10   | x                    |
| 261825113 | GH family 15 protein (glucoamylase) | GH15   | x                    |
| 589113453 | GH family 16                        | GH16   | x                    |
| 358382969 | GH family 16 protein               | GH17   | x                    |
| 589111611 | GH family 17                        | GH17   | x                    |
| 589113629 | GH 18 protein (chitinase)           | GH18   | x                    |
| 317028062 | GH, family 18                       | GH18   | x                    |
| 589109851 | GH family 28                        | GH28   | x                    |
| 358380963 | GH family 28 protein               | GH28   | x                    |
| 572273805 | Family 31 GH                        | GH31   | x                    |
| 589103027 | GH family 38 protein               | GH38   | x                    |
| 358387943 | GH family 43 protein               | GH43   | x                    |
| 589101105 | GH family 47                        | GH47   | x                    |
| 63177154  | GH family 47 protein               | GH47   | x                    |
| 589100379 | GH family 54 (lignin-degrading)     | GH57   | x                    |
| 589115645 | GH family 55                        | GH55   | x                    |
| 589114455 | GH family 67                        | GH67   | x                    |
| 358384989 | GH family 71 protein               | GH71   | x                    |
| 589103161 | GH family 71 protein               | GH71   | x                    |
| 589109155 | GH families                         | GH71   | x                    |
| 589111135 | GH family 72 (lignin-degrading)     | GH72   | x                    |
| 589108435 | GH 74                               | GH74   | x                    |
| 358380926 | GH family 74 protein               | GH74   | x                    |
| 589098631 | GH 92                              | GH92   | x                    |
| 589100807 | GH family 92                       | GH92   | x                    |
| 255722211 | Predicted proteins                  | –      | x                    |
| 589105897 | Predicted protein                   | –      | x                    |
| 589101909 | Predicted protein                   | –      | x                    |
| 589110563 | Predicted protein                   | –      | x                    |
| 589113917 | Predicted protein                   | –      | x                    |
| 58910549  | Predicted protein                   | –      | x                    |
| 589108381 | Predicted protein                   | –      | x                    |
| 40341875  | Predicted protein                   | –      | x                    |
| 589105505 | Predicted protein                   | –      | x                    |
| 589107107 | Predicted protein                   | –      | x                    |
| 589100041 | Predicted protein                   | –      | x                    |
| 589115849 | Predicted protein                   | –      | x                    |
| 589099057 | Predicted protein                   | –      | x                    |
| 589112857 | Predicted protein                   | –      | x                    |
| 589116001 | Predicted protein                   | –      | x                    |
| 589113291 | Predicted protein                   | –      | x                    |
| 589115927 | Predicted protein                   | –      | x                    |
| 154322591 | Predicted protein                   | –      | x                    |
| 358390109 | Hypothetical proteins               | Hypothetical protein TRIATDRAFT_129231 | – | x |
| 358386311 | Hypothetical protein               | Hypothetical protein TRIVIDRAFT_45439  | – | x |
| 358390537 | Hypothetical protein               | Hypothetical protein TRIATDRAFT_302472 | – | x | x |
| 572280833 | Hypothetical protein               | Hypothetical protein M419DRAFT_97005  | – | x |
Table 2 (continued)

| Gene ID    | Enzyme                               | Family | T. reesei + A. niger (1:5) | A | B |
|------------|--------------------------------------|--------|---------------------------|---|---|
| 116199677  | Conserved hypothetical protein        |        |                           |   |   |
| 589112113  | Hypothetical protein TRIEDRAFT_66935 |        |                           |   |   |
| 358386247  | Hypothetical protein TRIVIDRAFT_179276 |        |                           |   |   |
| 572280092  | Hypothetical protein M419DRAFT_62371 |        |                           |   |   |
| 572273052  | Hypothetical protein M419DRAFT_125562 |        |                           |   |   |
| 358380920  | Hypothetical protein TRIVIDRAFT_118319 |        |                           |   |   |
| 572284103  | Hypothetical protein M419DRAFT_94877 |        | GH71                      |   |   |
| 589108875  | Hypothetical protein TRIVIDRAFT_122487 |        |                           |   |   |
| 380490319  | Hypothetical protein CH063_07742      |        |                           |   |   |
| 358394718  | Hypothetical protein TRIATDRAFT_300431 |        |                           |   |   |
| 345562011  | Hypothetical protein AOL_s00173g184  |        | CBM1                      |   |   |
| 440640361  | Hypothetical protein GMDG_04666       |        |                           |   |   |
| 358381566  | Hypothetical protein TRIVIDRAFT_49497 |        |                           |   |   |
| 358383331  | Hypothetical protein TRIVIDRAFT_60255 |        |                           |   |   |
| 358384440  | Hypothetical protein TRIVIDRAFT_141673 |        |                           |   |   |
| 358381654  | Hypothetical protein TRIVIDRAFT_4609  |        |                           |   |   |
| 46127631   | Hypothetical protein FG08193.1       |        |                           |   |   |
| 310800235  | Hypothetical protein GLRG_10272       |        |                           |   |   |
| 598027367  | Hypothetical protein AURDRAFT_162084 |        |                           |   |   |
| 646290939  | Hypothetical protein BOTBODRAFT_162340 |        |                           |   |   |
| 598062595  | Hypothetical protein SPAPADRAFT_57777 |        |                           |   |   |
| 350636308  | Hypothetical protein ASPIDRAFT_182100 |        | GH43                      | x |   |
| 350629486  | Hypothetical protein ASPIDRAFT_47677  |        | GH43                      | x |   |
| 350632025  | Hypothetical protein ASPIDRAFT_128537 |        |                           |   |   |
| 145246196  | Hypothetical protein ANI_1_1560104    |        |                           |   |   |
| 350635020  | Hypothetical protein ASPIDRAFT_197780 |        |                           |   |   |
| 568447829  | Hypothetical proteins                |        | GH3                       |   |   |
| 350631594  | Hypothetical protein ASPIDRAFT_53033 |        | GH72                      |   |   |
| 46122475   | Hypothetical protein FG05615.1       |        |                           |   |   |
| 134082115  | Hypothetical protein An15g00620      |        |                           |   |   |
| 350637823  | Hypothetical protein ASPIDRAFT_52061 |        | GH75                      | x |   |
| 145258972  | Hypothetical protein ANI_1_2174184   |        |                           |   |   |
| 145254751  | Hypothetical protein ANI_1_1218164   |        |                           |   |   |
| 145233749  | Hypothetical protein ANI_1_1558024   |        |                           |   |   |
| 350633910  | Hypothetical protein ASPIDRAFT_54865  |        |                           |   |   |
| 350639816  | Hypothetical protein ASPIDRAFT_124700 |        |                           |   |   |
| 350638529  | Hypothetical protein ASPIDRAFT_119858 |        | GH31                      | x |   |
| 350638823  | Hypothetical protein ASPIDRAFT_205361 |        |                           |   |   |
| 350636991  | Hypothetical protein ASPIDRAFT_56689  |        |                           |   |   |
| 350633205  | Hypothetical protein ASPIDRAFT_55058  |        |                           |   |   |
| 350629696  | Hypothetical protein ASPIDRAFT_126535 |        |                           |   |   |
| 145243362  | Hypothetical protein ANI_1_1704094   |        | GH1                       | x |   |
| 563290941  | Hypothetical protein SBOR_8115       |        |                           |   |   |
| 398407925  | Hypothetical protein MYCGRDRAFT_30155 |        |                           |   |   |
| 350636557  | Hypothetical protein ASPIDRAFT_53540  |        |                           |   |   |

100 mL of nutrient medium with 30 g/L of glucose, as described initially from Mandels and Stenberg [2] and adapted by Cunha et al. [3].

In the sequential fermentation, solid state fermentation was initiated using 5 g of dry sugarcane bagasse as solid substrate, and substrate moisture was adjusted through the addition of 12 mL of nutrient medium. The inoculum was added for a final concentration of 10^7 spores/g of dry bagasse in the pre-culture, which was maintained under static conditions for 24 h. Then, the pre-culture step was continued as a submerged fermentation after the addition of 100 mL of nutrient medium enriched with 30 g/L of glucose per 5 g of dry bagasse. After 48 h for both submerged and sequential fermentation, a volume of pre-culture suspension corresponding to 10% (v/v) was transferred to
100 mL of culture medium for enzyme production, which was supplemented with 10 g/L of glucose and 1% (w/v) of steam-exploded non-washed sugarcane bagasse. All cultivation experiments were carried out in triplicate, and the averaged data presented with standard deviations.

3. Secretome analysis

3.1. Sample preparation

Sequence grade Lys–C/Trypsin (Promega) was used to enzymatically digest the samples. Acetone precipitation was performed prior to sample digestion. The protein samples were reduced with a 10 mM dithiothreitol (DTT)/25 mM ammonium bicarbonate solution at 37 °C for 1 h and alkylated at 37 °C also for 1 h using a solution of 97% acetonitrile (ACN), 2% iodoethanol, and 0.5% triethylphosphine (v/v). Samples were dried before adding Lys–C/trypsin to them in a 25:1 ratio of protease to protein. Digestions were carried out in a barocycler NEP2320 (PBI) at 50 °C and 20 kpsi for 2 h. The samples were cleaned over C18 columns (MicroSpin, Nest Group), dried and resuspended in 97% purified water/3% ACN/0.1% formic acid (FA). A volume of 1 μL was used for LC-MS/MS analysis.

3.2. LC-MS/MS analysis

A nanoLC system (1100 Series LC, Agilent Technologies, Santa Clara, CA) was used to separate the peptides for downstream MS analysis using a C18 reversed phase ZORBAX 300SB-C18 analytical column (0.75 μm × 150 mm, 3.5 μm) from Agilent. The column was directly connected to New Objective's emission tip coupled to the nano-electrospray ionization (ESI) source of the high resolution hybrid ion trap mass spectrometer LTQ-Orbitrap XL (Thermo Scientific). Elution was conducted using an ACN/0.1% FA (mobile phase B) linear gradient. The column was equilibrated initially for 5 min with 95% H2O/0.1% FA (mobile phase A) followed by the linear gradient of 5–40% B for 85 min at 0.3uL/min, then from 40–95% B for 12 min. Blank injections were performed in between experimental runs. The resulting eluents were analyzed by a data-dependent positive acquisition mode at full MS scan (30,000 resolution) where the eight most abundant molecular ions were selected and fragmented by collision induced dissociation (CID) using a normalized collision energy of 35% to acquire the data for the LTQ-Orbitrap XL.

3.3. Data analysis

Database search analyses were done using Mascot Daemon version 2.4.0 (Matrix Science) against an all fungal protein database from the NCBI database. Peptide and spectral count data were performed on the searches. For protein identification, at least two peptides detected were considered, and the false discovery rate (FDR) was set to 1%.

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Transparency document. Supplementary material

Transparency data associated with this article can be found in the online version at http://dx.doi.org/10.1016/j.dib.2016.05.080.
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