**Supplementary file 5**: Identified essential non-homologous proteins along with predicted GO using CELLO2GO and GO\_FEAT

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| **Protein ID** | **CELLO2GO** | **GO\_FEAT** |
| **Molecular Functions** | **Biological Process** | **Cellular Component** |
| WP\_002888808.1 |   |   |   |   |
| WP\_004222859.1 | Peptidase activity; Hydrolase activity | Catabolic process; Cell wall organization or biogenesis |  cell; plasma membrane; extracellular region; cell wall; external encapsulating structure |
| WP\_002890061.1 |   |   |  cell; external encapsulating structure | GO:0030288 - outer membrane-bounded periplasmic space; GO:0071555 - cell wall organization |
| WP\_002890284.1 |   |   |   | GO:0004731 - purine-nucleoside phosphorylase activity; GO:0004850 - uridine phosphorylase activity; GO:0009032 - thymidine phosphorylase activity; GO:0016154 - pyrimidine-nucleoside phosphorylase activity; GO:0047975 - guanosine phosphorylase activity |
| WP\_004151327.1 |   |   |   |   |
| WP\_012068456.1 |   |   | cell; plasma membrane |
| WP\_004176857.1 | isomerase activity; enzyme regulator activity; ion binding | Protein folding; Cellular protein modification process; Cell differentiation; anatomical structure formation involved in morphogenesis; anatomical structure development | cell; plasma membrane |
| WP\_023288894.1 |   |   |   |   |
| WP\_073549749.1 |  | Transport; Cellular nitrogen compound metabolic process; small molecule metabolic process; response to stress | GO:0005886 - plasma membrane; GO:0016021 - integral component of membrane; GO:0022857 - transmembrane transporter activity; GO:0071705 - nitrogen compound transport |
| WP\_002898708.1 |   |   |   |   |
| WP\_004150795.1 |   |   |   |   |
| WP\_041937616.1 |   |   |   |   |
| WP\_004143718.1 |   |   |   |   |
| WP\_002911528.1 |   |   |   | GO:0004751 - ribose-5-phosphate isomerase activity; GO:0005975 - carbohydrate metabolic process |
| WP\_002914983.1 | Transmembrane transporter activity; Kinase activity; ion binding | Transport |  intracellular; cell; cytoplasm | GO:0008982 - protein-N(PI)-phosphohistidine-sugar phosphotransferase activity; GO:0009401 - phosphoenolpyruvate-dependent sugar phosphotransferase system; GO:0046872 - metal ion binding; GO:0103111 - D-glucosamine PTS permease activity |
| WP\_002918629.1 |   |   |   |   |
| WP\_015959101.1 |   |   |   | GO:0016021 - integral component of membrane |