Characterization of Rhizobium Growth

Calculated doubling times were used to predict when cells are at mid-log growth, the phase where cells are healthy and replicating. Cell growth is sinosoidal and it occurs in phases: in the lag phase, cells adapt to growth conditions and mature; in the log phase, cells are healthy, thriving, and dividing; in the stationary phase, the depletion of nutrients limit population growth, and cell division matches cell death; finally in the death phase, cells completely use up nutrients and produce toxic metabolites that inhibit division. Transformation efficiency is highest when cells are at log phase growth because cells are vigorously undergoing DNA replication. The optical density of each strain culture was tracked over the course of 36 hours to determine the doubling time and mid-log growth. In Figure 1, mid-log growth was around OD_{600} 0.5 for *R. tropici CIAT 899* and around 0.6 for *S. meliloti* strains. According to Table 1, *R. tropici CIAT 899* had the longer doubling time of 2.5 hours, while the *S. meliloti 1021* derivatives had doubling times of 1.5 hours.

Table 1: Doubling times of Rhizobium strains

Strain	***Doubling Time***
R. tropici CIAT 899	2.5 hours
S. meliloti 356	1.5 hours
S . meliloti 370	1.5 hours
S. meliloti 371	1.5 hours

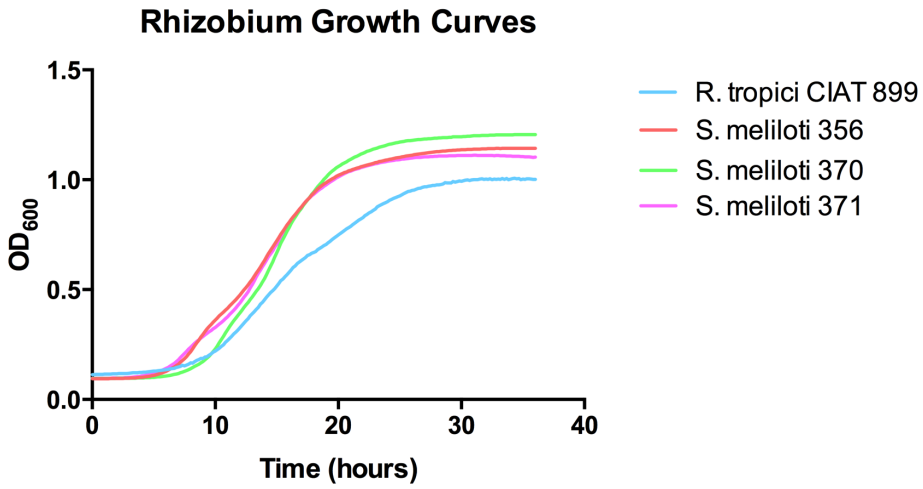

Figure 1: Optical density at 600nm (OD_{600}) of each Rhizobium strain, measured every 10 minutes for 36 hours