Fluorescent imaging of plant cell wall with azido fucose and acetylene naphthalimide using click chemistry

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Biomass is a potential source of fuel and highly valuable organic compounds typically derived from oil. In order to restructure and break down the complex network of cellulose, hemicellulose, and lignin in plant cell walls, it is important to understand how the plant synthesizes its rigid cell wall. By using the model organism Arabidopsis and specially tagged sugars, it is possible to incorporate visual markers into the branched xyloglucan of the cell wall via the salvage pathway. Masaaki Sawa and coworkers have used a click chemistry reaction to react azido fucose and an acetylene modified 4-amino-1,8-naphthalimde in vivo. This easy and specific reaction forms an inert triazole that also has fluorescent properties not present in the individual precursors. The click induced fluorescence offers a specific marker with minimal background noise. Conditions will be optimized for clicking together the non-fluorescent precursors and for the incorporation of the sugar into the Arabidopsis cell wall.