Plants produce silica in large quantities, up to 2-10% per dry weight, depending on growth conditions and plant species. The roots absorb monosilicic acid from the soil, and it is transported with water and distributed in nearly all plant tissues. With evapotranspiration, the silicic acid solution is concentrated, and eventually silica forms at leaf epidermis. Nonetheless, the distribution of silica deposits is not uniform within plant tissues. This suggests that there are biological processes that control the deposition of the mineral. In a recent work, the protein Siliplant1 (Slp1) was discovered to precipitate silica in plants. Slp1 is expressed in sorghum leaf epidermal cells called silica cells. Biological molecules active in silica formation typically present positive charge moieties and form some 3D aggregation pattern that allows monosilicic acid to condense into bigger organized structures. Slp1 contains a 24 amino acid N-terminal signal peptide, followed by 124 amino acid linking sequence and a 7-repeat sequence. Slp1 without the signal peptide and a short, conserved peptide appearing five times in Slp1 precipitate silica in vitro. However, the activity of other parts of Slp1 in silica precipitation remains unknown. To analyze sequence motifs that precipitate silica, we synthesized segments of the repeating sequence in Slp1, and characterized the precipitation reactions by yield and spectroscopy. Thermal gravimetric and electron microscopy analyses are planned. Preliminary results show that the most conserved region in the repeating sequence precipitates silica at a concentration range of 1-1.5 mg/mL in a 100 mM silicic acid solution. Under buffered conditions, this peptide is positively charged, precipitating silica at pH between 6 and 7. In contrast, silica-gel formed at pH 8 or 5 after overnight incubation. In comparison, the full length Slp1 (missing the signal peptide) precipitates silica at an estimated concentration of 2.9 mg/mL and pH 6-8. Peptides flanking the conserved sequence did not precipitate silica. Precipitation reactions with combinations of peptides precipitated silica only when the conserved peptide was mixed with the peptide following it at a 1:1 ratio. This part of Slp1 presents –OH moieties that may interact with silica. The reaction produced silica gel as well as silica. When the conserved region was mixed with a preceding peptide, only silica-gel formed. This region presents acidic groups that may block the positive charge on the conserved region. We conclude that the conserved peptide is the only part of the Slp1 repeating region that actively precipitates silica. The peptides flanking the conserved region are not directly involved in silica precipitation. However, they may allow silica precipitation at increased pH, as seen in the full length Slp1. Further investigation is planned to understand their roles in silica formation.