Polarization Resolved Second Harmonic Generation (SHG) Microscopy for investigating Gamma-irradiated Starch Granules

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Abstract: Starch is one of the most abundantly found carbohydrates in cereals, roots, legumes, and fruits and is located in the amyloplasts of plants. The amorphous amylose and crystalline amylopectin regions in starch granules are susceptible to certain physical modifications, such as gamma irradiation. P-SHG microscopy in conjunction with SHG-circular dichroism was used to assess the 3D molecular order and inherent chirality of starch granules and their reaction to different dosages of gamma irradiation. The results showed that changes in the structure and orientation of long-chain amylopectin were supported by the decrease in the SHG anisotropy factor and the $\chi 22/\chi 16$ ratio.

Keywords-*Starch, Second harmonic generation, Polarization*