Aggregation of the amyloid-beta protein is associated with the development of Alzheimer’s disease. Amyloid-beta aggregates to produce insoluble plaques in the brain composed of fibrils. Various polyphenolic compounds, both naturally occurring and synthetic, have been shown to interfere with amyloid-beta aggregation. To evaluate the ability of specific polyphenols to prevent amyloid-beta aggregation, this investigation utilized nordihydroguaiaretic acid, curcumin, rosmarinic acid, resveratrol, piceatannol, and diethylstilbestrol. Knowing how the structure of a polyphenol can alter the aggregation pathway of the amyloid-beta protein can have beneficial pharmaceutical impacts.

The polyphenols diethylstilbestrol, resveratrol, and piceatannol are similar with only one variation in their structure. Piceatannol was able to prevent formation of fibrils and aided in the destabilization of pre-formed fibrils. Resveratrol had similar results, but was not as efficient. Diethylstilbestrol was not able to prevent formation of fibrils and could not destabilize pre-formed fibrils. The polyphenols nordihydroguaiaretic acid, curcumin, and rosmarinic acid are similar with slight structural differences. Nordihydroguaiaretic acid and curcumin prevented the formation of fibrils, however rosmarinic acid could not. All three polyphenols were able to destabilize pre-formed fibrils efficiently.