Psidion guajava, a tree known for its medicinal properties, was studied in a botanical garden in Algeria. Extracts from the tree showed high levels of total phenolics and flavonoids, resulting in strong antioxidant activity, particularly in DPPH scavenging and CUPRAC assays. Furthermore, the extracts demonstrated an inhibitory effect on the enzymes acetylcholinesterase and butyrylcholinesterase, suggesting potential therapeutic use against Alzheimer's disease. This remarkable antioxidant activity is attributed to the abundance of phenolic compounds produced by the leaves, possibly due to the tree's adaptation to abiotic stress. Extracts with higher phenolic content exhibited greater antioxidant capacity, highlighting the importance of isolating these compounds for further research. Chromatographic analysis would be essential for identifying these bioactive molecules. The study suggests that cultivating P. guajava in Algeria could provide a source of natural drugs and anti-Alzheimer remedies, although further research on toxicity is necessary for safe usage.