Nutraceuticals for cancer and neurodegenerative disease prevention: synthesis and analytical evaluation of extract of *Curcuma longa*

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Extracts from the rhizome of *Curcuma longa* (Tumeric), has been used for treatment and prevention of certain patologies, in Chinese medicine, due to its numerous biological activities including antioxidant, anti-inflammatory, anticancer, antigrowth, anti-arthritis, anti-atherosclerotic, antidepressant, anti-aging, antidiabetic, antimicrobial, and memory-enhancing activities. One component of tumeric, orange dried powder, is curcumin, which has been extensively studied both in preclinical and clinical research over the past two decades. Aim of the research is to further investigate on the epigenetic mechanism modulation and neurodegenerative disease implications related to curcumin and curcuminoids (demethoxycurcumin, bisdemethoxycurcumin, cyclocurcumin) and hydrogenated metabolites (tetrahydrocurcumin - Hexahydrocurcumin - Octahydrocurcumin). HPLC percentage composition analysis of extract of *Curcuma longa* powder and isolation of each curcuminoid and NMR characterization has been achieved. Therefore, further microwave assisted methodology for the synthesis of cyclocurcumin and metal-catalyzed hydrogenation of curcumin for hydrogenated metabolites has been provided. Each curcuminoid and related metabolites are being screened for beta amiloyd fibrillation states inhibition and will be tested as HDAC inhibitors in order to investigate on the epigenetic mechanism of nutraceuticals.