Novel Complementary and Alternative Medicines to Mollify Long COVID and Post-COVID Conditions Studied Using Controlled Environment Agriculture

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Despite a surge in sales and consumption of natural supplements in the last 3 years, the science supporting the safety and bioavailability of simultaneous intake of natural supplements against Long COVID (LC) and Post-COVID Conditions (PCC) is still poorly studied. In this project, the COCONUT database was used to identify natural molecules that help with LC-PCC. The molecules were then prioritized based on a criterion of probability of activity (PA) = 0.8 using the PASS database. Twenty-four water and ethanol extracts were then statistically assessed for their Immune enhancing (antioxidation & peroxidation) and anti-inflammatory (protein denaturation, and proteinase inhibition) properties using a homemade spectrophotometer. Turmeric (Curcumin), green tea (EGCG), and cayenne pepper (Capsaicin) were identified as the best performers. The synergy and antagonism between them were further studied using various dose combinations (N=125) prepared using statistical DoE using JMP software. The response data was analyzed and visualized using Synergy Finder tool. The data generated revealed varying degrees of synergy and antagonism which was then studied for dynamic in vitro digestibility wherein time-dependent change in concentrations of actives was studied between four compartments. Protein binding with actives was studied using a lab-on-chip mounted on a spectroscope; a bathochromic shift from wavelength maxima was observed. Finally, plant based ADME was done using Vigna radiata grown in a controlled environment. Non-compartmental kinetic parameters, studied by PK solver, demonstrated distinct ADME trends. The identified mix of the top extracts was further characterized using TLC and LC-MS. Overall, the queries about taking multiple supplements were experimentally answered.

Awards Won:

Third Award of $1,000

National Anti-Vivisection Society: Awards of $3,000