

**Project title: Turmeric and curcumin enriched beverages for reducing the risk for oxidation linked chronic diseases**

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**Project summary:**

Our initial results strongly suggest that the functionality of fruit extracts can be significantly increased by creating novel synergies with turmeric. We were able to show that antioxidant activity of these synergies was significantly higher than the pure extracts alone. This increase in antioxidant activity could be due to the ability of these extracts to function synergistically as a result of their increased ability to quench and delocalize electrons from the ABTS radical. We also investigated the antimicrobial properties of these extracts against important human health pathogens *E. coli* O111:B4 and *P. aeruginosa*. We observed that some phytochemical treatments not only killed the bacteria but were also able to reduce the cell density dependent growth. Further investigations suggest that sub-inhibitory concentrations (8-10 µg) of these phytochemicals from turmeric and their synergies were able to effect the processes related to quorum sensing including swarming motility and biofilm formation. These concentrations of phenolics are more representative of the physiological levels possible after the consumption of these foods. According to our knowledge, the ability of phytochemicals to inhibit quorum sensing related bacteria communication has never been demonstrated. The observation that phytochemicals from foods can inhibit QS related processes opens up an exciting new strategy for antimicrobial chemotherapy and can lead to the discovery of novel compounds and development of more effective strategies in preventing and managing microbial infections. This mechanism of action could probably explain the ability of dietary phytochemicals for bacterial infections in humans and lead to development of novel antimicrobial therapeutics.

**Publications:**

Robert J.C. McLean\*, Sandra A. Bryant, and Dhiraj A. Vattem. "In Vitro Methods Used To Identify Quorum Signal Inhibitors", In "Control of Biofilm Infections by Signal Manipulation" (2007) Ed. Naomi Balaban. Springer-Verlag GmbH, Heidelberg, Germany

**Presentations:**

1) D. Vattem, K. Mihalik, S. Crixell, R. McLean (2006). Quorum sensing inhibition by dietary bioactive phytochemicals. IFT Annual Meeting-Orlando, FL.

2) Vattem D.A. (April 2006) "Functional Foods and Nutraceuticals: State of the Art, Opportunities and Challenges". Texas Dietetic Association 2006 Food & Nutrition Conference & Exhibition. Houston.

3) D. Vattem, K. Mihalik, S. Crixell, R. McLean (2006). Quorum Sensing Inhibitors of *Pseudomonas aeruginosa* from *Camellia sinensis*. ASM General Meeting, Orlando, FL

4) Mihalik, K, Crixell, S.C., Vattem, D. A (2005) Antioxidant synergies of common fruits with turmeric (*Curcuma longa*) for antimutagenic and DNA-protection functions. Society for Free Radical Biology and Medicine Annual Meeting, Austin.