

# An Analysis of Behavior and Adherence to Three Black Raspberry Functional Confections in Men and Women for Oral Health Promotion

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Good oral hygiene practices as well as other modifiable behaviors have been identified as having a relevant impact on oral health and overall health. Enhancing a diet by adding fruits and vegetables in the form of a functional confection is one strategy to promote oral health. Therefore the working hypothesis of this project is that those with poor modifiable behaviors (i.e. poor diet, poor dental hygiene practices, and smoking) will likely have poor adherence to a dietary intervention with black raspberry (BRB) functional confections. The two objectives of these investigations was to determine the impact of modifiable behaviors on adherence to functional confection intervention as measured by health and lifestyle questionnaires, and to identify the BRB confection matrix (starch based, pectin based, or hard confections) having the best compliance using self-reported daily diaries, and by HPLC analysis of total urolithins excreted in the urine. A four week, randomized, phase I clinical trial involving 3 amorphous forms of BRB confection, each at two different doses (4 and 8 grams of BRB), was investigated in 62 healthy women and men ( $33 \pm 11$  years old). In our cohort, 75% regularly consumed alcohol (3.25 servings/week) and 11% were past smokers (0.5pack/5.5 years) as well 44% followed a regular vitamin regimen, however 96% of the cohort reported themselves as never smokers. Self-reported diaries showed excellent compliance regardless of dose with starch gummies having the best compliance at  $96.4\% \pm 12.3\%$  followed by pectin gummies at  $93.9\% \pm 12.8\%$ , and hard candies at  $93.2\% \pm 15.0\%$ . However, total urolithins (metabolites of BRB in urine) from 24 hour urine collections was greatest after hard candy intervention ( $4,695 \pm 9161$  nmol/24 hr.) followed by starch gummies  $3,826 \pm 4,745$  nmol/24hr, and pectin gummies  $3,289 \pm 5038$  nmol/24hr. In conclusion, functional confections are an excellent strategy for delivery of BRB compounds having excellent compliance in future long-term clinical trials.