SWACSM Abstract

Acute Beetroot Juice Ingestion Increases Nitric Oxide Bioavailability Without Changing Oral Microbial Composition in Healthy Young Women.

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ABSTRACT

Dietary nitrate supplementation can elicit beneficial health and exercise performance effects. Oral microbiota are critical for the metabolism of exogenously consumed nitrate; however, limited data are available on the influence of dietary nitrate ingestion on bacterial taxa and in women. **PURPOSE**: To investigate if acute dietary nitrate ingestion alters the oral microbiota in young healthy women compared to a nitrate-depleted placebo. **METHODS**: In a randomized double-blinded crossover design, fifteen recreationally active women (mean ± SD: age 20 ± 1 years; body mass 63 ± 10 kg; height 1.68 ± 0.1 m) participated in two conditions to ingest nitrate-rich beetroot juice (BR; 12 mmol of nitrate) and nitrate-depleted beetroot juice (PL, negligible nitrate), 2.5 hours prior to a resting blood draw and buccal swab sample. Plasma [nitrate] and [nitrite] were analyzed using gas phase chemiluminescence. Buccal swab samples were used for DNA extraction and isolation. DNA was amplified using polymerase chain reaction targeting the V3 - V4 region of the 16S rRNA gene. Following index PCR, amplicons were pooled and sequenced using the iSeq Illumina NGS sequencer. Reads were clustered into amplicon sequence variants and analyzed for alpha and beta diversity and relative abundance. **RESULTS**: BR increased plasma [nitrate] (PL: 52 ± 14 µM vs. BR: 629 ± 132 µM, $P < 0.001$) and plasma [nitrite] (PL: 276 ± 286 nM vs. BR: 703 ± 391 nM, $P < 0.001$). One sample had insufficient DNA and thus, a subset of samples was analyzed for oral microbial composition ($n = 14$). Alpha (i.e., species richness or evenness) and beta diversity was not different between PL and BR ($P > 0.05$). The relative abundance of the phylum and genus were not influenced by BR ($P > 0.05$). **CONCLUSION**: Acute nitrate ingestion did not improve or worsen the composition of global or lower taxonomic levels of bacteria in young recreationally active women. These data indicate that acute nitrate ingestion is an intervention to rapidly increase nitric oxide bioavailability in young recreationally active women, which is an effect that did not require changes to the oral microbial community. Further research is required to understand the impact of dosing regimen and population on oral bacterial taxa and the efficacy of nitrate on nitrate-induced effects.