



Abstract #M123

Section: [Dairy Foods \(posters\)](#)

Session: [Dairy Foods II: Microbiology](#)

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Rapid method for measuring the effect of prebiotics on probiotic bacterial growth.

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Prebiotics are used to stimulate probiotic bacterial growth in the gut to optimize their health benefits. A rapid method was developed to evaluate growth enhancement by prebiotics on probiotic bacteria using a programmable spectrophotometer, microtiter plates, and commercial media, with results ready in 12 h. *Lactobacillus* strains were grown in MRS broth while *Bifidobacterium* strains were grown in MRS broth with L-cysteine. Cultures were back diluted to an OD₆₀₀ of 0.1 and then inoculated into wells (48-well plate) containing individual prebiotics. Plates were placed in a Tecan Infinite M200 spectrophotometer and incubated at 37°C with A₆₀₀ readings taken for 12 h. Growth curves were done in triplicate with results compared with controls to determine extent of prebiotic growth enhancement. To optimize the method, MRS concentrations of 20, 35, 50, and 100% were tested at selected pH values (7.0, 5.5, 5.0, 4.5, and 4.0) using 5 probiotic cultures. Addition of the bio-catalytic oxygen-reducing reagent, oxyrase, to the test wells significantly enhanced *Bifidobacterium* species and *Lb. acidophilus* growth. Results indicated a 25% MRS broth at pH 5.0 with 2% oxyrase optimized prebiotic growth enhancement comparisons. Using this method, the stimulatory effect of prebiotics (2% vol/vol) FOS, GOS, and XOS were determined for *B. infantis* M-63, *B. longum* BB536, and *B. lactis* BL-04, *Lb. rhamnosus* LR-32, and *Lb. acidophilus* NCFM. A one-sided *t*-test was used to determine significance ($P < 0.05$) between treatments and the control (no added prebiotic). All 3 significantly improved growth of M-63 (12 h OD₆₀₀ for GOS-.85, FOS-.68, XOS-.64, and control-.60), but only FOS significantly increased growth of BL-04 (12 h OD₆₀₀ for FOS-.67, GOS-.60, XOS-.57, and control-.60). For BB536, just GOS (12 h OD₆₀₀ for

GOS-.75, FOS-.70, XOS-.68, and control-.70) significantly enhanced growth. GOS and FOS slightly improved growth of NCFM whereas no oligosaccharides enhanced growth of LR-32. This method allows rapid testing of inoculum levels, prebiotic concentrations, media pHs, and prebiotic combinations for any probiotic strain including *Bifidobacterium*. With multiple samples run concurrently, comparisons can readily be made to determine optimum enhancement by individual prebiotics or prebiotic combinations for any probiotic strain.

Key Words: prebiotic, probiotic bacteria

