



FlorapophageTM

Laboratory Report

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Disclaimer: This information is provided for educational purposes and is intended to be a resource for determining whether the product(s) are appropriate for one's needs. The products tested with Floraphage were selected based on their popularity with a large national retailer. The product(s) as well as the information discussed in this report has not been evaluated by the FDA. The product(s) are not intended to diagnose, treat, cure, or prevent any disease or illness.

ABSTRACT

Non-beneficial strains of bacteria constantly compete with good bacteria in the digestive tract for nutrients and space. Such strains typically grow and consume nutrients more rapidly than good bacteria, thereby causing small intestinal bacterial overgrowth which decreases the ability of good bacteria to prevent sickness and disease. Floraphage was designed to support the proliferation of beneficial bacteria throughout the gastrointestinal tract in order to promote optimal digestive and immune health. Floraphage was tested in conjunction with four popular probiotic supplements to determine its ability to increase the growth rate for each respective product. The average increase in CFU activity, the measurement of probiotic bacteria growth, for the four products was 2400%, versus control (growth without the use of Floraphage). Floraphage is an excellent product to take in conjunction with a probiotic to maximize the benefits of supplemented beneficial bacteria. It is also helpful for those that do not take probiotics in order to maximize indigenous bacteria growth.



1. INTRODUCTION

The digestive tract contains trillions of microorganisms that constantly compete for space and nutrients. It is also highly susceptible to attacks from bacteria, which result in a weakened immune system. Therefore, it is important for beneficial bacteria to out-compete non-beneficial bacteria in order to maintain a proper balance of intestinal microflora and overall good health. Certain aggressive strains of bacteria often outgrow and consume more resources than beneficial bacteria. This results in an imbalance of intestinal microflora and small intestinal bacterial overgrowth, which is associated with poor health, abdominal pain and discomfort, and bacterial infections such as urinary tract infections (UTIs) and bacterial vaginosis.

Prebiotics such as Floraphage help beneficial bacteria, known as probiotics, grow faster than these aggressive and non-beneficial bacteria. Floraphage is a bacteriophage formulation that is intended to act as a two-phase super prebiotic. Bacteriophages are abundant in nature and are consumed every day in common foods. Therefore, the body is used to consuming them. Furthermore, the safety of consuming bacteriophages for therapeutic purposes has been repeatedly demonstrated through human safety trials with no report of adverse effects.

2. MATERIALS AND METHODS

Probiotic bacteria from four probiotic products selected based on popularity with a large national retail chain (Jarro-Dophilus EPS, Syntol AMD, PB8, and Dr. Ohhira's Probiotics) were tested with Floraphage to determine whether the product would be an effective prebiotic. Each test was performed in triplicate and then averaged to ensure accuracy.

3. RESULTS

Table 1 shows the difference between the CFUs for the probiotic bacterial strains in Jarro-Dophilus EPS, Syntol AMD, Dr. Ohhira's Probiotics, and PB8 that were incubated for 10 hours in control media (without Floraphage) or with Floraphage. The "families" of bacteria within each product were tested independent of one another to make certain that the counts were as accurate as possible.



Table 1.

Colony-forming units for the probiotic bacterial strains by family per product

JARRO-DOPHILUS EPS

BACTERIA FAMILY	CONTROL GROWTH	WITH FLORAPHAGE	% INCREASE
Lactobacillus	3,300	29,000	879%
Bifidobacterium	1,100	43,000	3,909%
Combined	4,400	72,000	1,636%

SYNTOL AMD

BACTERIA FAMILY	CONTROL GROWTH	WITH FLORAPHAGE	% INCREASE
Lactobacillus	4,100	63,000	1,537%
Bifidobacterium	900	49,000	5,444%
Bacillus	9,500	714,000	7,516%
Saccharomyces	3,000	52,000	1,733%
Combined	17,500	878,000	5,017%

DR. OHHIRA'S PROBIOTICS

BACTERIA FAMILY	CONTROL GROWTH	WITH FLORAPHAGE	% INCREASE
Lactobacillus	1,900	103,000	5,421%
Bifidobacterium	2,300	9,000	391%
Combined	4,200	112,000	2,667%

PB8

BACTERIA FAMILY	CONTROL GROWTH	WITH FLORAPHAGE	% INCREASE
Lactobacillus	3,600	8,400	233%
Bifidobacterium	1,900	9,800	516%
Combined	5,500	18,200	331%

The total percentage of probiotic growth for each product was also averaged to determine the average total growth of the experiments. The average totaled 2400%, which means that Floraphage increased the probiotic growth of the products by an average of 24 times!

Figure 1.

The bacterial strains contained in the probiotic supplements (e.g., Lactobacillus, Bifidobacterium, Bacillus, and Saccharomyces) are grouped and CFU counts per milliliter are represented after growth for 10 hours with and without Floraphage.

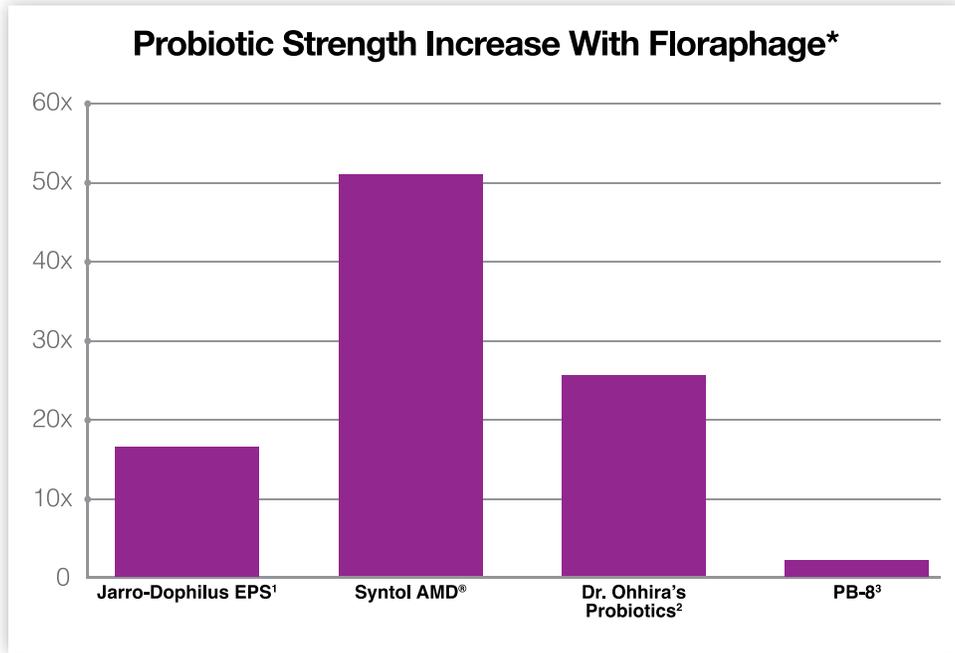
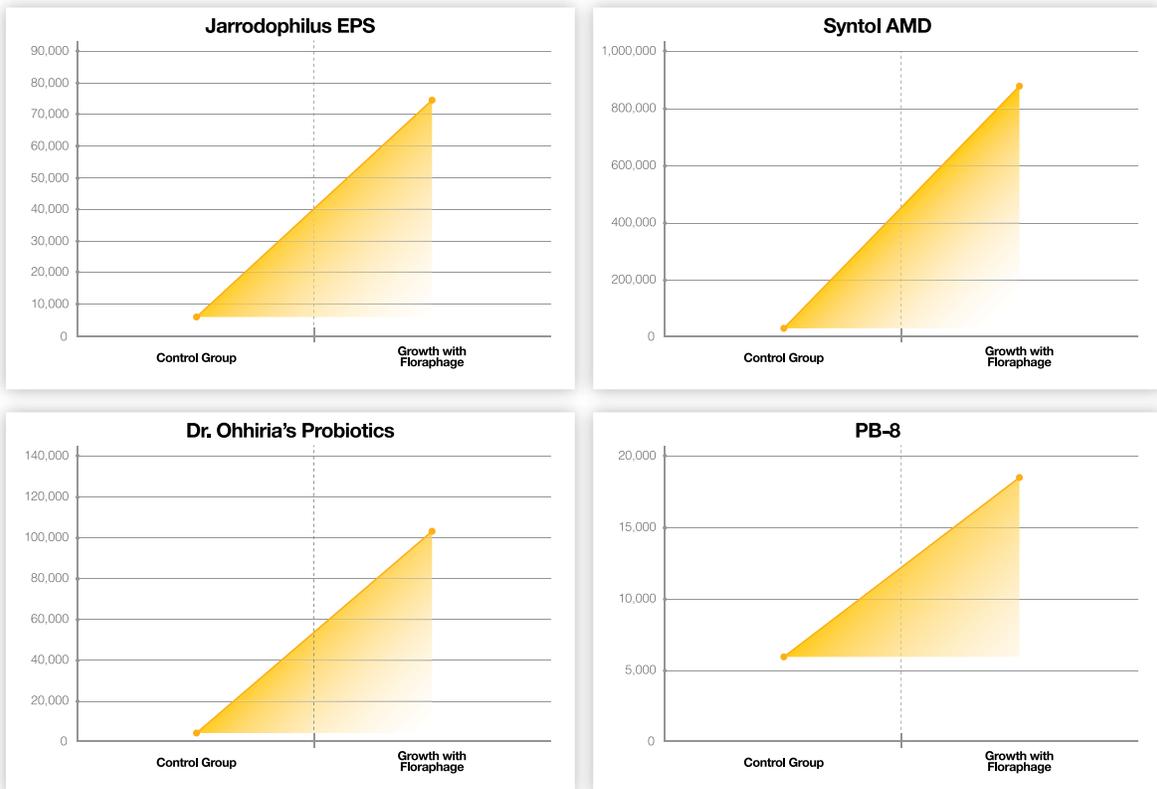


Figure 2.

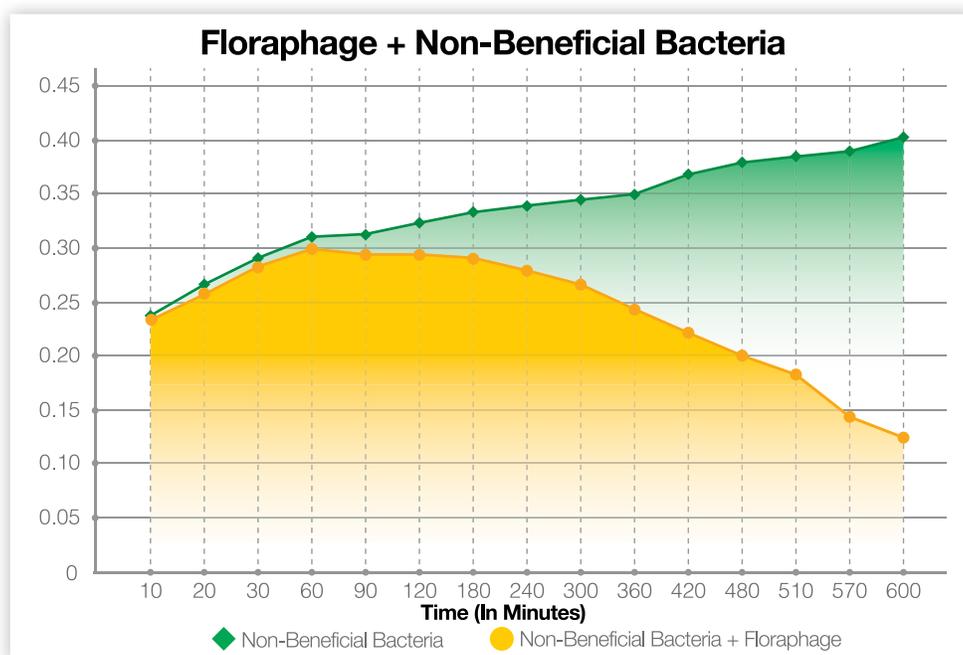
The individual comparison of growth after 10 hours for the control bacterial strains and the probiotic bacterial strains that were incubated with Floraphage.



The individual comparison of each product’s growth after 10 hours for the control bacterial strains (without the inclusion of Floraphage) and the probiotic bacterial strains that were incubated with Floraphage are illustrated above. In general, grouping the probiotic bacterial strains indicated that the combination of Syntol AMD and Floraphage yielded the highest percentage of overall probiotic growth but there were also significant gains in both Jarrodophilus and Dr Ohira’s Probiotics and a marginal increase with PB8. These tests were performed to demonstrate efficacy with several off the shelf probiotic formulas, not to demonstrate any one supplements superiority over the other. Further tests below (Figures 4, 5, and 6) demonstrate efficacy with individual strains of probiotic bacteria that are commonly found in many other formulations.

Figure 3.

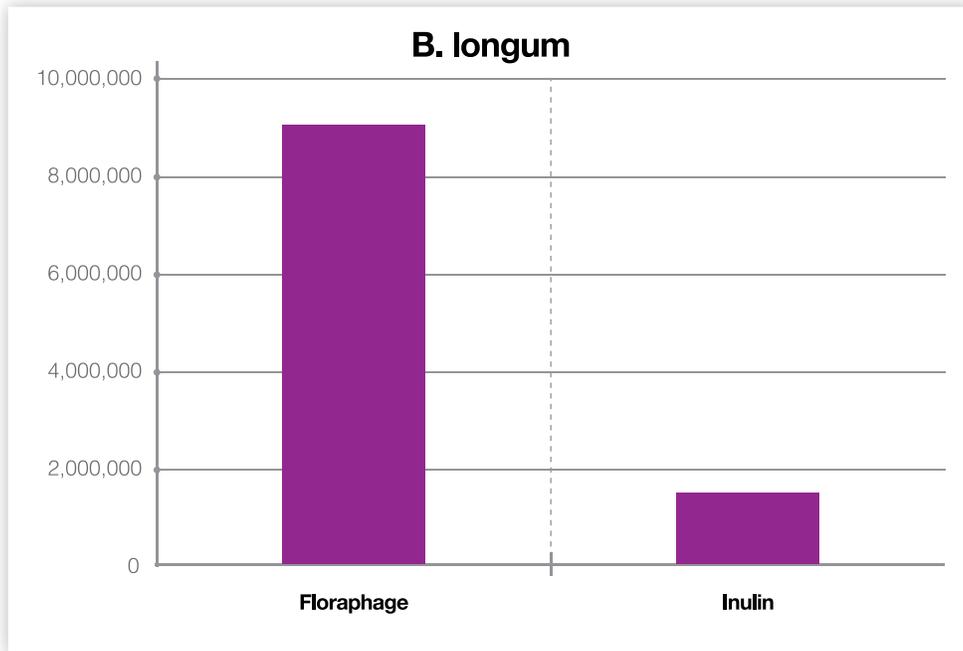
Non-beneficial bacteria growth with the prebiotic Floraphage [in light blue] and without Floraphage [in dark blue] over a 10-hour incubation period.



The results of incubation experiments in which the non-beneficial bacteria were allowed to grow for 10 hours (600 minutes) with and without Floraphage are shown in Figure 3. In the absence of Floraphage, the CFU activity (measured by optical density) of the non-beneficial bacteria gradually increased over the 10-hour incubation period. However, when these same bacteria were incubated along with Floraphage, the optical density of the bacteria began to decrease after 60 minutes and continued to gradually decrease over the 10-hour incubation period. These results indicated that Floraphage was effectively preventing the further growth of these non-beneficial bacterial cells.

Figure 4.

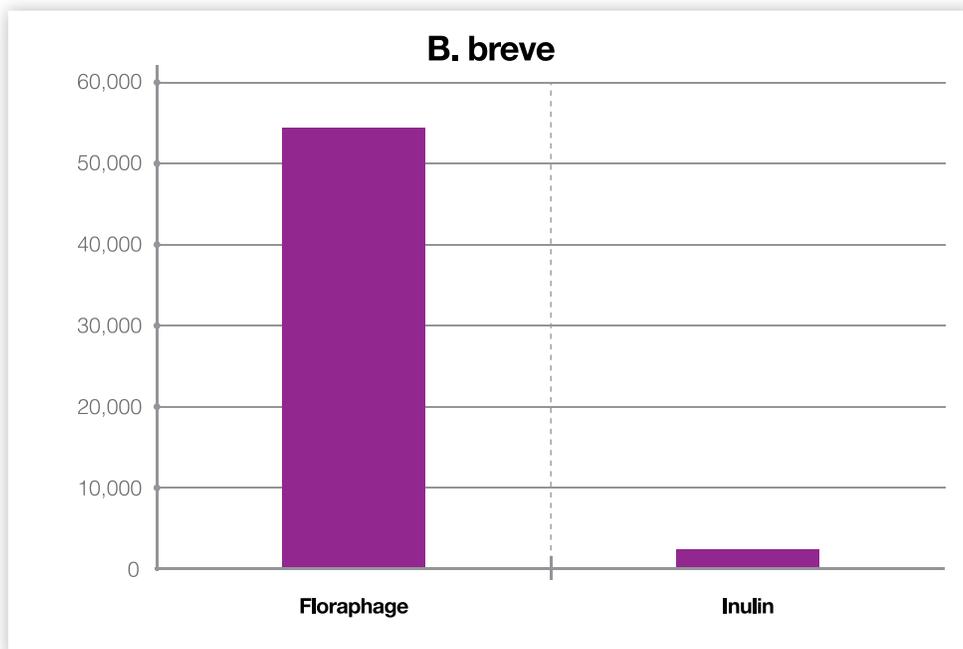
Competing experiment with non-beneficial bacteria, *Bifidobacterium longum*, and Floraphage versus non-beneficial bacteria, *Bifidobacterium longum*, and Inulin (a notable prebiotic) after 48 hours.



The results of the first of three competition experiments are shown in Figure 4 above. Incubating the non-beneficial bacteria, *Bifidobacterium longum*, and the prebiotic Inulin, in the absence of Floraphage resulted in the poor growth of *B. longum* (18,000 CFUs), while adding Floraphage to the mixture in the place of the prebiotic inulin resulted in approximately 9 million CFUs of *B. longum* after 48 hours, a 500x increase!

Figure 5.

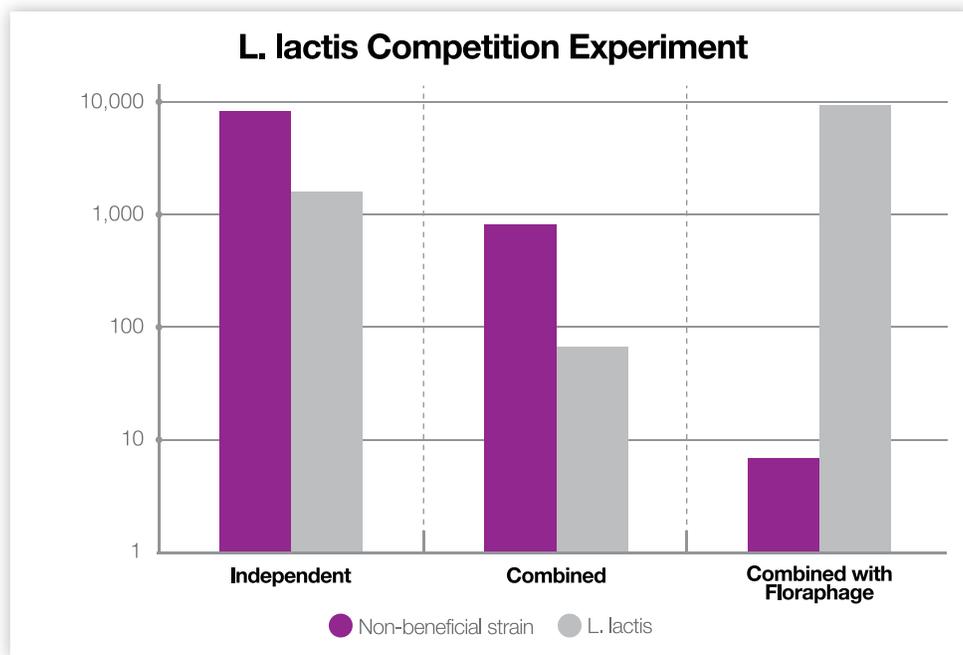
Competing experiment with non-beneficial bacteria and *Bifidobacterium breve* without Floraphage (control) and with Floraphage after 5 hours.



Similar to the results demonstrated in Figure 4, in the absence of a prebiotic, *Bifidobacterium breve* growth was extremely low (400 CFUs); indicating a substantial inhibition of growth due to the non-beneficial bacterial cells. Adding Floraphage to the mixture resulted in a dramatic increase in CFUs (53,000) after 5 hours (Figure 5), an increase of 132.5x!

Figure 6.

An additional competition experiment showing the CFUs of *Lactobacillus lactis* and non-beneficial bacteria alone, *Lactobacillus lactis* and non-beneficial bacteria combined, and *Lactobacillus lactis* and non-beneficial bacteria combined along with Floraphage after 5 hours.



An additional competition experiment illustrated using Figure 6 above with *Lactobacillus lactis* and non-beneficial bacteria initially showed that when each bacterial cell line was incubated separately they grew at comparable rates (Independent). However, the non-beneficial strain rapidly outgrew the *L. lactis* strain when the cells lines were combined (Combined); indicating that the non-beneficial bacteria were diminishing both the space and nutrients the beneficial bacteria needed to survive. When Floraphage was added to the mixture, the number of CFUs for *L. lactis* was much higher than that of the non-beneficial cells. These results suggested that Floraphage effectively reversed the growth pattern, allowing the beneficial *L. lactis* bacteria to substantially outgrow the other bacteria.

4. DISCUSSION

Floraphage is a bacteriophage formulation that effectively supports the growth of beneficial bacteria. Floraphage increases the viability and ratio of beneficial to non-beneficial bacteria by decreasing the latter's viability and growth as well as its ability to consume essential nutrients. The cell lysis (breaking up the cell) and subsequent destruction of this non-beneficial bacteria provides the needed space and nutrients for beneficial bacteria to thrive in the digestive tract and prevents bacterial infections by maintaining the proper balance of intestinal microflora in both the small and large intestines. Floraphage also dramatically enhanced the ability of probiotic formulations to promote exponential probiotic growth.

Both beneficial and harmful bacteria compete for nutrients such as glucose, fatty acids, and amino acids and as demonstrated through the competition studies (Figures 3-6), non-beneficial bacteria have the ability to rapidly outgrow beneficial bacteria and consume nutrients. Furthermore, the competition studies implicated the important role that prebiotic supplementation with Floraphage plays in maintaining a healthy balance of intestinal microflora for the effective growth of beneficial bacteria.

The findings of this study demonstrated that Floraphage can be taken alone or in combination with a probiotic supplement in order to enhance the growth of beneficial bacteria. This prebiotic formulation functioned substantially better than most current prebiotics (e.g., Inulin), and Floraphage promoted exponential probiotic growth in a short amount of time (approximately 60 minutes).

In addition, Floraphage has clinical implications that make it especially beneficial towards promoting good health in comparison to current prebiotics (e.g., Inulin). Prebiotics that are currently used often cause abdominal discomfort (e.g., gas or bloating), are limited to activity in the large intestine, which can increase the growth of harmful bacteria in the digestive tract, and they require large doses in order to be effective. Floraphage effectively promotes beneficial bacterial growth in the small and large intestines without causing abdominal problems. Current prebiotics also require a prolonged period of time before taking effect, while Floraphage begins to work after approximately 60 minutes. Furthermore, the activity of current prebiotics depends on the environmental composition of the digestive tract (e.g., presence of existing microflora), while Floraphage supplementation effectively supports the balance of healthy microflora irrespective of the environmental composition.

In conclusion, evidence shows that bacteriophage supplementation with Floraphage safely and effectively leads to the destruction and hindered growth of non-beneficial bacteria, which releases nutrients and space for beneficial bacteria to flourish. The target-specific nature of the phages contained in Floraphage also ensures that only specific bacteria, as opposed to all bacteria, will be infected. In doing so, Floraphage may help prevent bacterial overgrowth, poor health, abdominal problems, and bacterial infections or may help contribute to restored health if an overgrowth of bacteria has developed.

5. REFERENCES

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