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## Improvement of Defecation in Voluntary Trail by Synbiotics Supplement

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### ABSTRACT

Probiotics are live microorganisms beneficially affect the host by improving the properties of the indigenous microbial balance when ingested in certain numbers. Synbiotics are the combination of probiotics and prebiotics. They are able to alter the composition of human gut flora towards a predomination of probiotics benefitting human physical and mental health. Defecation situation is able to authentically reflect gut health. The aim of the present study was to investigate the effect of daily ingestion of synbiotics for 20 days on the defecation of female and male volunteers in different ages. Results revealed that, after 20 days-supplementation of synbiotics, 61.67% volunteers' defecation discipline was improved. 56.67% volunteers found gut significantly relaxed. Volunteers' stool smell, color, frequency and diarrhea symptoms were modified to various extents. Synbiotics tended to have greater impact on the defecation of elderly and female volunteers.

**Key words:** Probiotics, synbiotics, defecation, voluntary trail, multistrains

### INTRODUCTION

In the human gastrointestinal tract, there exists enormous variability in bacterial numbers and populations among the stomach, small intestine and colon. The bacterial flora form a complex and delicately balanced ecosystem, that is the most intimate part of our biological environment and mediates many interactions with chemical environment (Fooks *et al.*, 1999). Among the vast microorganisms, probiotics are live cultures when ingested in certain number beneficially affect the host by improving the properties of the indigenous microbial balance. Probiotics play an essential role in maintaining human physical and mental health. A number of benefits of the probiotics supplementation have been reported, including alleviating lactose malabsorption (De Vrese *et al.*, 2001), diarrhea (McFarland, 2006), constipation (Ouwehand *et al.*, 2001), indigestion, allergy, suppression of cancer, coronary heart disease and urinary tract infections (Reid *et al.*, 2001). They can be protective via a number of mechanisms including mucosal adherence, competitive inhibition, production of inhibitory substances (organic acids, volatile fatty acids, hydrogen peroxide, bacteriocins and other compounds), immunostimulation and suppression of toxin production. Bifidobacteria and lactic acid bacteria are the most commonly used probiotics.

A prebiotic is a non-digestible food ingredient that beneficially affects the host by selectively stimulating the growth and/or activity of one or a limited number of bacteria in the colon towards a predomination of bifidobacteria that can improve host health (Gibson and Roberfroid, 1995). Probiotics and prebiotics simultaneously present in a product are called synbiotics which combine the advantages of both the probiotic and prebiotic approach for the modulation of the gut microflora towards a healthier and balanced composition. The use of diet to fortify synbiotics is a popular current among the aspect of functional food sciences (Weese, 2002).

The purpose of the present study was to investigate the effect of daily supplementation of synbiotics for 20 days on the defecation of female and male volunteers in different ages.

## MATERIALS AND METHODS

**Synbiotics:** A bar of synbiotics powders weighed  $2\pm 0.1$  g containing 40% inulin, 25% xylooligosaccharides, 14% blueberry, 10% erythritol, 2.5% *Lactobacillus plantarum*, 2% *Lactobacillus casei*, 2% *Lactobacillus rhamnosus* and 1.5% *Lactobacillus acidophilus*, 1.5% *Bifidobacteria lactis* and 1.5% *Bifidobacteria breve*, providing a total of  $2.0\times 10^{10}$  Colony Forming Units (CFU)/bar. All the probiotic lyophilized powders were produced by Jiangsu Wecare Bio-Technique Co. Ltd., China.

**Volunteers:** All the volunteers were employees from Jiangsu Wecare Bio-Technique Co. Ltd. There were 30 females and 30 males. Half were before her/his age of 35 and half were over 35 years old.

**Supplementation trial:** Every volunteer was administrated to eat a bar of synbiotics provided after working lunch approximately around 12:30 pm and accurately recorded their defecation every day. The supplementation trial lasted 20 days. They also had to finish a questionnaire according to their defecation at the end of supplementation. Any other probiotics or synbiotics foods were forbidden during the test.

## RESULTS

**Effects of synbiotics on the defecation improvement of volunteers:** Defecation situation was closely related to human health. After 20 days-supplementation, 61.67% volunteers' defecation discipline was improved as shown in Fig. 1. The 56.67% volunteers significantly felt gut relaxed. The 38.33 and 36.67% volunteers found stool smell and color were modified. Both 16.67% volunteers discovered their diarrhea problems alleviated and defecation frequency increased. According to the results, female volunteers accounted for the larger portion that found defecation discipline, frequency and stool smell, color were modified after supplied synbiotics for 20 days. While more male volunteers discovered their diarrhea problems declined and gut became relaxed.

Compared to male, the discriminations in female physical structure resulted in their longer passing through and weaker strength of defecation, so women were more likely to have constipation than men. People got defecation problems owing to weak in gastrointestinal motility, enormous physical and mental pressure, disorders in gut flora balance and so on (Dukas *et al.*, 2003).

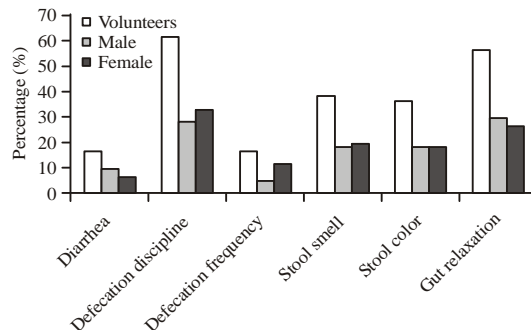


Fig. 1: Effects of synbiotics on the defecation improvement of volunteers

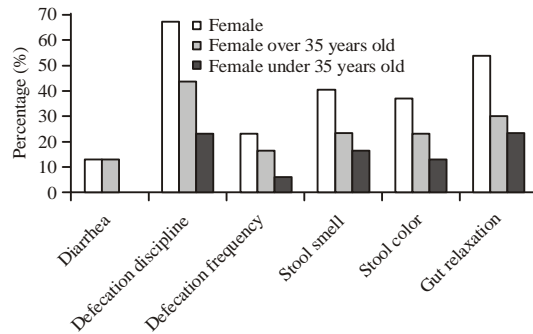


Fig. 2: Effects of synbiotics on the defecation improvement of female volunteers

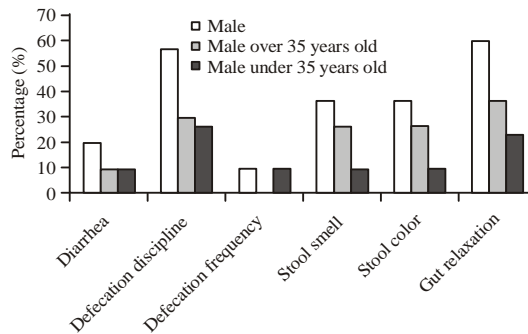


Fig. 3: Effects of synbiotics on the defecation improvement of male volunteers

Probiotics could efficiently prevent the growth of pathogenic bacteria, suppress absorption of carcinogen/procarcinogen and generate amounts of organic acids thus benefiting balanced gut flora, smooth digestion and defecation. Normal frequency, smell and color of defecation were effective sign of human gut health. As the carbon source of probiotics, inulin and xylooligosaccharides could help probiotics grow rapidly. They were also dietary fiber which could combine lots of moisture and then swell contributing to gastrointestinal motility (Harris and Ferguson, 1993).

**Effects of synbiotics on the defecation improvement of female volunteers:** In 66.67% female volunteers' defecation discipline was modified as shown in Fig. 2. The 53.33% volunteers significantly felt gut relaxed 40 and 36.67% volunteers found their stool smell and color turned better. Volunteers whose defecation frequency increased and diarrhea problems alleviated accounted for 23.32 and 13.33%, respectively. Based on the results, it's apparently synbiotics' effects on gut health were more remarkable to female volunteers over 35 years old than volunteers under 35 years old. Additionally, there were 5% volunteers reported that their skin turned brighter after supplied with synbiotics.

In elderly individuals, faecal bifidobacterial counts were thought to show a significant decrease in comparison to those of younger persons (Fooks and Gibson, 2002). As bifidobacterial numbers decreased, this might leave more chance for enteric pathogens to colonize resulting in gut and other disorders. Moreover, elderly individuals were faced with greater pressures which affected defecation. Probiotics helped rebuild gut microflora balance in female promoting defecation and gut health, thus contributed to mental and physical comforts and by creating a lactobacilli barrier in

the vagina, it was believed that fewer pathogens could ascend into bladder, there by blocking the infectious process (Zarate and Nader-Macias, 2006).

**Effects of synbiotics on the defecation improvement of male volunteers:** Sixty percent male volunteers significantly found gut became relaxed after supplementation of synbiotics as shown in Fig. 3. The 56.67% volunteers' defecation discipline was modified. The 36.67% volunteers found their stool smell and color turned better. Volunteers whose defecation frequency increased and diarrhea problems alleviated accounted for 10 and 20%, respectively. According to the results, synbiotics' effects on gut health were more apparent to male volunteers over 35 years old than volunteers less than 35 years old which was in accordance with the results of female volunteers.

## DISCUSSION

According to the 20-days' supplementation and investigation results, over 50% volunteers found their gut relaxed and defecation discipline modified indicating that synbiotics significantly benefitted human gut health. Moreover, synbiotics had greater impact on elderly volunteers. Mixtures of strains would perform better than single strains. Multistrains could in principle be targeted against different risk factors and bind to different receptors. Health benefits imparted by probiotics are strain specific. Single strain could not provide all the proposed benefits, thus multistrains would be effective against defined health conditions (Kolida *et al.*, 2000).

The complex and diverse micro ecosystem was essential in the maintenance of human health, especially in gut health (Gareau *et al.*, 2010), colonic diseases (Guarner and Malagelada, 2003), mental sickness (Bested *et al.*, 2013), facial care and so on. Disruption of probiotics would result in diseases. While antimicrobial therapy, stress, diet changes, transport and pollutions would break the inner flora balance. It's becoming a necessity to supply probiotics through diets.

## CONCLUSION

After 20 days-supplementation of synbiotics, 61.67% volunteers' defecation discipline was improved. 56.67% volunteers significantly felt gut relaxed. Additionally, volunteers' stool smell, color, frequency and diarrhea symptoms were modified. Moreover, synbiotics tended to have greater impact on the defecation of elderly and female volunteers.

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