Galactooligosaccharide with intestinal health improvement effect

NeoGOS

NeoGOS is a high purity galactooligo-saccharide: (GOS), well-known for its excellent physiological activities such as intestinal regulation and immune enhancement, etc. NeoGOS is a prebiotics that has a proven intestinal health improvement effect through animal testing and human application as well as having the unique physiological activities of galacto-oligosaccharide.

Characteristics of NeoGOS

- High purity galactooligosaccharide
- Soft sweetness similar to milk
- Intestinal health improvement effect verified through animal testing and human clinical tests
- Liquid/powder type applicable to various formulations

Intestinal health improvement effect of the NeoGOS (Animal testing).

【Beneficial bacteria growth effect *(In vivo)* :Change in beneficial bacteria confirmed through meta-analysis】

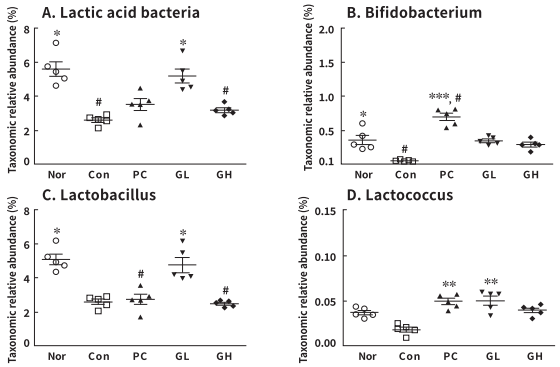

Figure 1. Relative distribution ratio of lactic acid bacteria in constipation-induced animal models using loperamide

Nor : Saline Without loperamide,Con : Saline after loperamide ,PC : Positive Control(Phenolphthalein 70mg after leperamide) , GL: GOS 100mg after loperamide),GH: GOS 200mg after loperamide

As a result of metagenomics analysis of intestinal fungi in constipation-induced animal models, GL group (GOS 100 mg) and GH group (GOS 200 mg), who ingested NeoGOS, showed significant increases in Lactic acid bacteria (p<0.05), Lactobacillus (p<0.05), and Lactococcus (p<0.01) compared to the control group. (Source: *J. Per. Med.* 2020, 10, 161)

【Improved production of Short-chain Fatty Acids (SCFAs) of beneficial bacteria *(In vivo)*】

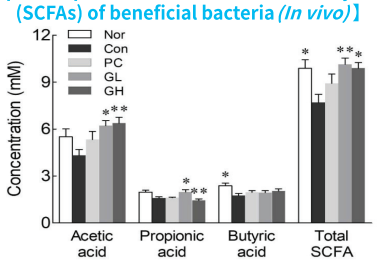

Figure 2. Effects of NeoGOS on the production of short-chain fatty acids in constipation-induced animal models

Nor : Saline Without loperamide,Con : Saline after loperamide,PC : Positive Control(Phenolphthalein 70mg after leperamide), GL: GOS 100mg after loperamide),GH: GOS 200mg after loperamide

As a result of measuring changes in the production of short-chain fatty acids (SCFAs) in intestinal beneficial bacteria after oral administration of NeoGOS for 16 days into a constipation-induced animal models using loperamide, GL group (GOS 100mg) and GH group (GOS 200mg), who ingested NeoGOS, showed a significant increase in production of total SCFAs (GL: p<0.01, GH: p<0.05) compared to the control group, as well as in propionic acid (GL: p<0.01, GH: p<0.05). (Source: *J. Per. Med.* 2020, 10, 161)

【Intestinal movement improvement effect confirmed: Results of histological analysis of the intestinal mucosa *(In vivo)*】

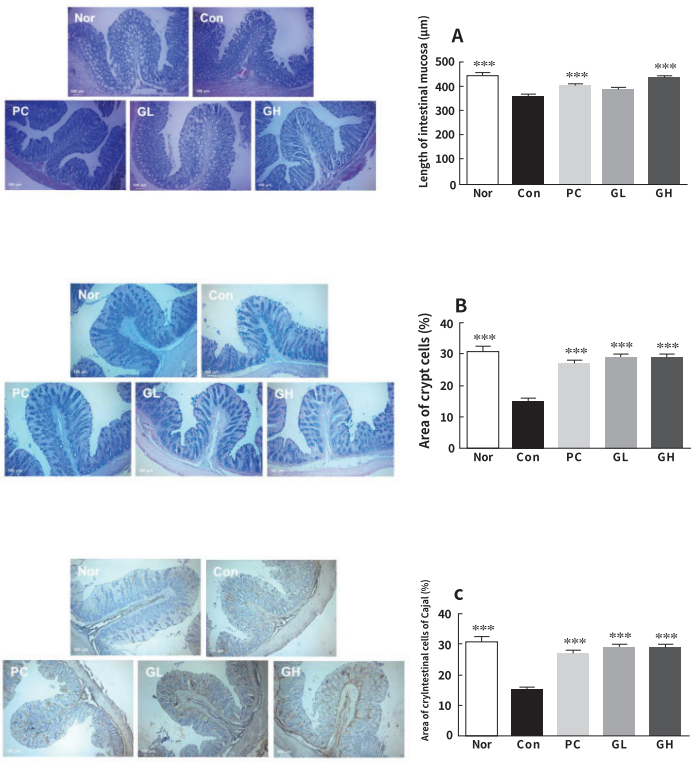

Figure 3. Effect of galactooligosaccharide (NeoGOS) administration on the length

Nor : Saline Without loperamide,Con : Saline after loperamide ,PC : Positive Control(Phenolphthalein 70mg after leperamide) , GL: GOS 100mg after loperamide),GH: GOS 200mg after loperamide

The histological data of the digestive tract related to intestinal health is used to demonstrate significant changes in the small intestine of constipation-induced animal models, and if constipation is induced by loperamide, the thickness of the large intestinal mucosa decreases and the movement of contents in the large intestinal is delayed. As shown in the figure above, the thickness of the intestinal mucosa was observed to confirm the effect of NeoGOS on improving constipation. As a result of the test, the test groups that ingested NeoGOS among the constipation-induced animal models (SD-rat) by loperamide showed a significant increase in the length of the intestinal mucosa (GH: p<0.05) and the area of crypto cell (GL : p<0.001, GH : p<0.001) compared to the control group. In addition, there was a significant increase (GL: p<0.001, GH: p<0.001) in the area of ICC (intestinal cells of Cajal). **NeoGOS was found to help the intestinal interlocking movement by restoring mucus secretion in the intestinal mucosa reduced by constipation and increasing the ICC distribution reduced by constipation.** (Source: *J. Per. Med.* 2020, 10, 161)

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【Intestinal movement improvement effect confirmed: Changes in the fecal water content confirmed *(In vivo)*】

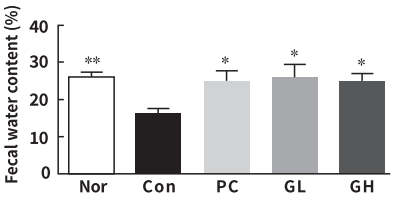

Figure 4. Changes in the fecal water content of constipation-induced rat animal models who ingested galactooligosaccharide (NeoGOS)

Nor : Saline Without loperamide,Con : Saline after loperamide ,PC : Positive Control (Phenolphthalein 70mg after leperamide) , GL: GOS 100mg after loperamide),GH: GOS 200mg after loperamide

As a result of measuring changes in the fecal water content of constipation-induced animal models (rat), the fecal water content of the test groups (GL group : 100 mg Galactooligosaccharide; GH group: 200 mg Galactooligosaccharide) who ingested NeoGOS showed a significant increase compared to the control group who ingested only saline solution. (p<0.05) (Source: *J. Per. Med.* 2020, 10, 161)

【Intestinal movement improvement effect confirmed: Changes in the gastrointestinal passage ratio confirmed *(In vivo)*】

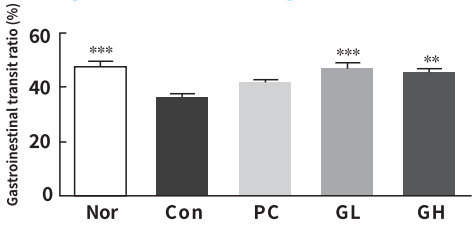

Figure 5. Gastrointestinal passage ratio of constipation-induced animal models by oral administration of galactooligosaccharide (NeoGOS)

*Nor : Saline Without loperamide,Con : Saline after loperamide ,PC : Positive Control (Phenolphthalein 70mg after leperamide), GL: GOS 100mg after loperamide),GH: OS 200mg after loperamide

The effect of improving bowel movement was confirmed by changes in the gastrointestinal passage ratio. As a result of measuring the gastrointestinal passage ratio (%) after oral administration in constipation-induced animal models (rat), it was confirmed that the gastrointestinal passage ratio significantly increased compared to the control group (p<0.05).
(Source: *J. Per. Med.* 2020, 10, 161)

Intestinal health improvement effect of NeoGOS (human clinical test)

Among 63 adult men and women aged 19 to 75 years old, who fell under 2 or more of the functional constipation diagnosis criteria under Rome Standards IV, some consumed dextrin (placebo group) for 4 weeks while others consumed NeoGOS (test group. They were asked to take twice a day, 1.0g each in the morning and evening, 2.0g a day in total, and then surveyed to check the number of defecations, changes in defecation habits, fecal forms, changes in intestinal microbial flora, and constipation discomfort (PAC QoL).

【Changes in the number of bowel movements after intake of NeoGOS】

Changes in the number of defecations were measured after 4 weeks of NeoGOS intake. The number of defecations was measured on the first day of clinical trial (visit 1), 15th day (visit 2), and 29th day (visit 3). As a result of investigating the average number of defecations per day observed during the 7 days before the visit, the survey confirmed that the number of defecations increased significantly compared to the control group on 29th day (visit 3) after NeoGOS intake. (p<0.048).
(Source: Clinical Analysis Results Data).

【Changes in defecation habits after ingesting NeoGOS】

Changes in defecation habits were confirmed using the Bristol Stool Chart, a scale that divides fecal forms into 7 different forms. The Bristol Stool Chart was measured on the 29th day (visit 3) after 4 weeks of NeoGOS intake, and the result showed a significant improvement compared to the control group (p<0.0283). The control group had a fecal form of constipation while the test group had a normal fecal form, which confirmed that the bowel movement became smooth and the constipation improved when ingesting NeoGOS.
(Source: Clinical Analysis Results Data)

【PAC-QoL Survey (Patient Assessment Constipation Quality of life)】

The result of PAC-QoL on the effect of constipation on the quality of life in daily life, **found that the test group that ingested NeoGOS showed a significant improvement in terms of satisfaction related with constipation on the 15th day of visit (p<0.0169) and 29th day of visit (p <0.0216).**
(Source: Clinical Analysis Results Data)

【Result of intestinal microorganism analysis: RT-PCR analysis】

Table 4. Summary of the results of intestinal microbial flora analysis (quantitative analysis results)

	Group	n	Visit1	Visit3	Visit3-Visit1	Improvement rate(%)	*P-Value*[1]	*P-Value*[2]
Bifidobacterium	GOS	34	15,557,627,856	28,120,574,770	12,562,946,914	80.75	0.005	0.158
	Placebo	29	16,108,776,322	20,524,218,613	4,415,442,291	27.41	0.327	
Lactobacillus	GOS	34	889,758,970	2,157,168,161	1,267,409,191	142.44	0.019	0.021
	Placebo	29	1,436,431,586	1,347,008,572	-89,423,014	-6.23	0.878	

- *P-Value:* Two sample-test - 1) Results of intra-group comparison before & after intake - 2) Results of inter-group comparison of changes before & after intake - N/D : Not Detected

As a result of inter-group comparison in order to compare the intestinal microbial flora changes before & after intake, the beneficial bacteria, Lactobacillus, proliferated significantly (p<0.021) compared to the change in the control group. In addition, the group that ingested NeoGOS showed a significant improvement in Bifidobacterium and Lactobacillus (Bifidobacterium p =0.005, Lactobacillus p =0.019) after intake compared to before intake. (Source: Clinical Analysis Results Data)

Table 5. Intestinal microbial analysis results: NGS (Next Generation Sequencing)

	7 types of beneficial bacteria (representative)	2 types of harmful bacteria (representative)
Genus	Bifidobacterium Streptococcus Lactococcus Leuconostoc Lactobacillus Prevotella Weisella	Corynebacterium E.coli

As a result of conducting NGS analysis on fecal bacterial flora of the test group after 4 weeks of intake of NeoGOS, the ratio of 7 representative beneficial bacteria in the Genus classification increased after intake compared to before in take, and the ratio of 2 representative harmful bacteria decreased.
(Source: Clinical Analysis Results Data). **Therefore, NeoGOS intake is expected to increase the ratio of beneficial bacteria in the intestinal tract and reduce the ratio of harmful bacteria, thereby improving intestinal health by improving the intestinal environment.**

Product Information

Intem	Quality specification			
	NeoGOS -L57	NeoGOS -L70	NeoGOS -P29	NeoGOS -P70
Appearance	Liquid	Liquid	Powder	Powder
Solid content	≧ 75.0 Brix	≧ 75.0 Brix	-	-
Moisture	-	-	≦ 7.0%	≦ 7.0%
Total galactooligosaccharide content(DB)	≧ 57.0 %	≧ 70.0 %	≧ 29.0 %	≧ 70.0 %
Total plate count	≦ 1,000 CFU/g	≦ 1,000 CFU/g	≦ 1,000 CFU/g	≦ 1,000 CFU/g
Coliform group	Negative	Negative	Negative	Negative
Packing unit	20 kg / 1.2 Ton	20 kg / 1.2 Ton	10 kg / 20 kg	10 kg / 20 kg

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