

The influence of combined buckwheat D-fagomine and fish omega-3 PUFAs on beneficial gut bacteria in rats

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INTRODUCTION:

Some functional food components may help maintain homeostasis by promoting balanced gut microbiota.

OBJECTIVE:

To explore the possible complementary effects of D-fagomine and ω -3 PUFAs (EPA/DHA 1:1) on putatively beneficial gut bacterial strains associated with inflammatory processes and cardiovascular health.

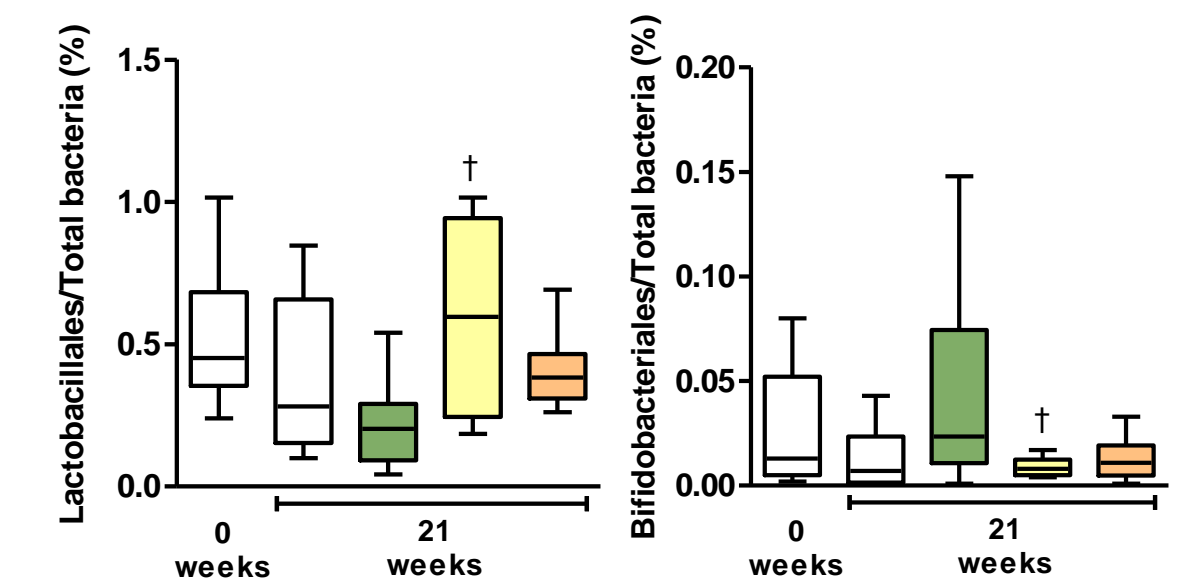
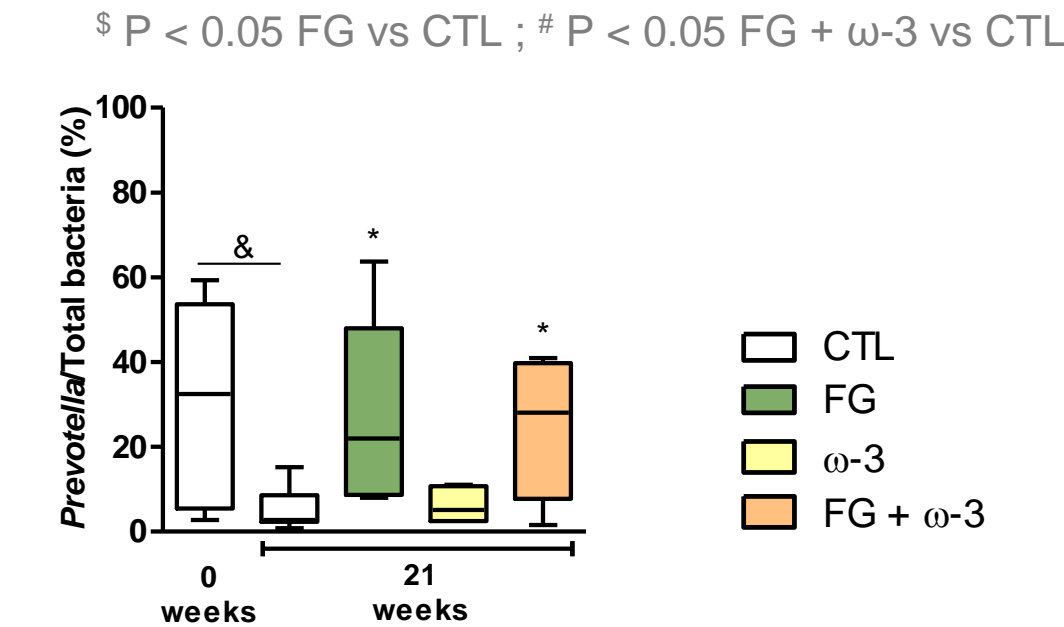
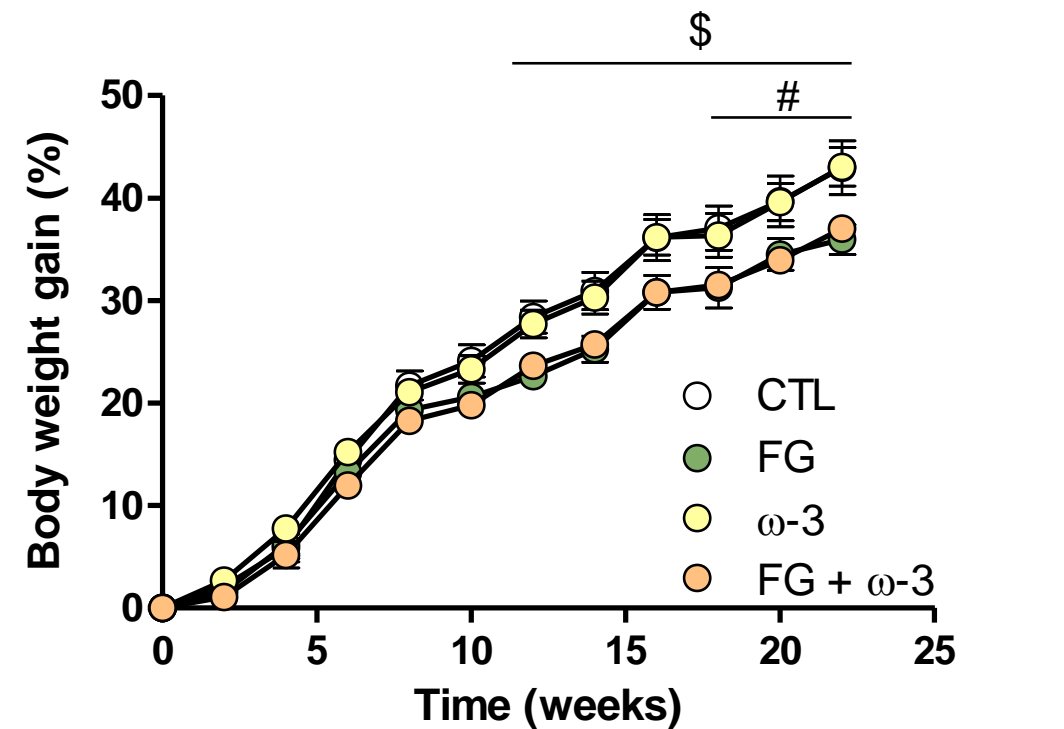
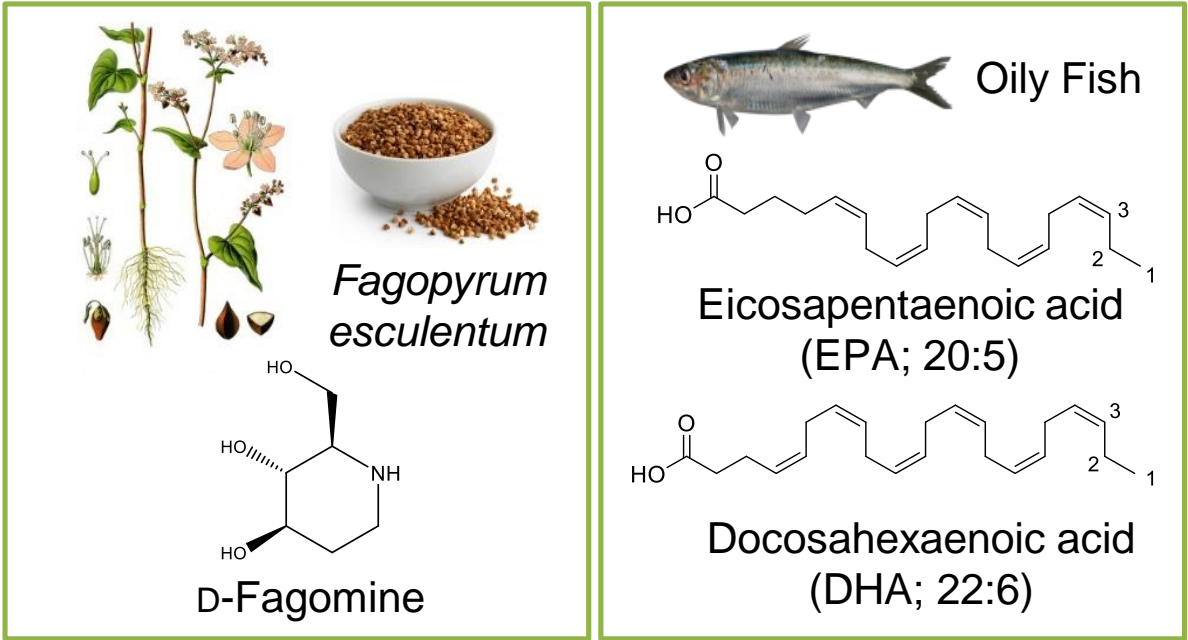
MATERIALS & METHODS:

Rats (n = 36) were supplemented with D-fagomine, ω -3 PUFAs, or both, for 21 weeks. Bacterial subgroups were evaluated in fecal DNA by qRT-PCR and short-chain fatty acids were determined by gas chromatography (GC-FID). Pro-inflammatory arachidonic acid (ARA)-derived metabolites (HETEs) were determined by liquid chromatography (LC-MS/MS).

RESULTS:

■ The animals supplemented with D-fagomine gained less weight. The populations of the genus *Prevotella* remained stable over time in animals supplemented with D-fagomine. D-Fagomine also maintained the relative populations of Bifidobacteriales, while ω -3 PUFAs mainly affected Lactobacilliales.

■ ω -3 PUFAs reduced the amount of the SCFAs in feces. The plasma levels of HETEs, triglycerides and cholesterol were lower in groups supplemented with ω -3 PUFAs.



	CTL		FG		ω-3		FG + ω-3	
	Mean	SEM	Mean	SEM	Mean	SEM	Mean	SEM
SCFAs (mmol/Kg)	152	9	158	19	48***	11	49***	7
HETEs (ppb)	107	52	75	25	43***	11	45***	14
Triglycerides (mmol/L)	0.7	0.02	0.6*	0.02	0.6***†	0.01	0.5***	0.02
Cholesterol (mmol/L)	3.6	0.04	3.3**	0.03	3.3***	0.08	3.2***	0.06

* P < 0.05, ** P < 0.01, *** P < 0.001 vs CTL; † P < 0.05 vs FG

CONCLUSIONS:

The combination between D-fagomine and ω -3 PUFAs provided the functional benefits of each supplement. Notably, it helped stabilize populations of *Prevotella* in the rat intestinal tract while reducing weight gain and providing the anti-inflammatory and cardiovascular benefits of ω -3 PUFAs.