

Fruit juice and the gut microbiota

Key points

- New research is investigating the effects that different foods, including 100% fruit juice (FJ), can have on the gut microbiota.
- Early evidence from small randomised controlled trials suggests that FJ can modulate the composition and metabolic activity of the gut microbiota.
- The influence of FJ on the gut microbiota might be due to its rich polyphenol content, which could exert prebiotic effects.
- It is too early to tell whether this could lead to positive effects on health and more studies are needed.

The gut microbiota is an area of research which has exploded in the last couple of decades. Although still in its infancy, we are beginning to learn that a balanced, diverse microbiota is important for good health throughout life. The gut microbiota consists of an ecosystem of microbes (bacteria, yeast, viruses, archaea etc) living in our digestive tract, primarily in the large intestine. The microbiota profile is unique to each person. New research is providing a better understanding of which foods can beneficially alter the balance of microbes in our gut.

Human intervention trials

Evidence from the small number of intervention trials shows potential beneficial effects of FJ consumption. One trial with 10 healthy volunteers found that daily consumption of 300mL orange juice for 2 months increased the numbers of potentially beneficial bacterial species measured in faeces, such as *Lactobacillus* and *Bifidobacterium*, and boosted production of short chain fatty acids - bacterial metabolites linked with health effects¹.

Another study found that drinking only FJ for 3 days altered the composition of the gut microbiome. For example, researchers found a relative increase in faecal *Bacteroides* species, which has been associated with a lower body weight in humans². Similar shifts were seen in a more recent study where participants consumed 190mL of 100% orange juice twice daily for 8 weeks³. This led to a greater abundance of faecal *Bacteroides* and *Bifidobacterium* – both bacteria species with positive health associations – along with a reduction in the less favourable Firmicutes : 'spp'.

A further study in women⁴ found that daily intake of 300mL orange juice for 30 days as part of the daily diet resulted in microbiota and metabolic changes. Faecal levels of *Lactobacillus* spp., *Akkermansia* spp., and *Ruminococcus* spp., increased after the intervention with orange juice. Concurrent beneficial changes were seen for blood glucose, insulin and triglycerides, and a marker of insulin resistance was reduced. No changes were seen for body weight or fat. The comparator was the habitual diet without orange juice.

Mechanisms of action

The vast majority of polyphenols (bioactive plant compounds) consumed in food and drink reach the colon where they may exert a prebiotic effect. Certain species of bacteria can metabolise polyphenols into smaller compounds, helping to support their growth and abundance. Flavanones, a type of polyphenol found in citrus fruits, have been researched for their potential to improve gut health. One study found that flavanones can affect the makeup and activity of the gut microbiota and have been shown to help strengthen the intestinal barrier and reduce inflammation in the gut⁵.

However, we don't yet know exact mechanisms of action or how FJ affects the gut microbiota and the production of metabolites which might then be absorbed. An emerging and growing body of literature is investigating the role of polyphenols and their metabolites on the gut microbiota and how this might lead to effects on inflammation and disease risk reduction.

Conclusion

Although more research is needed to fully understand the links between our diet and the gut microbiota, early evidence suggests that FJ, particular orange juice, might have a positive impact on the balance of the microbes in our gut. This is potentially due to the polyphenol content of FJ, which may exert prebiotic effects on the gut microbiota. However, whether this translates into improved gut health is yet to be determined and further studies are recommended.

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References

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