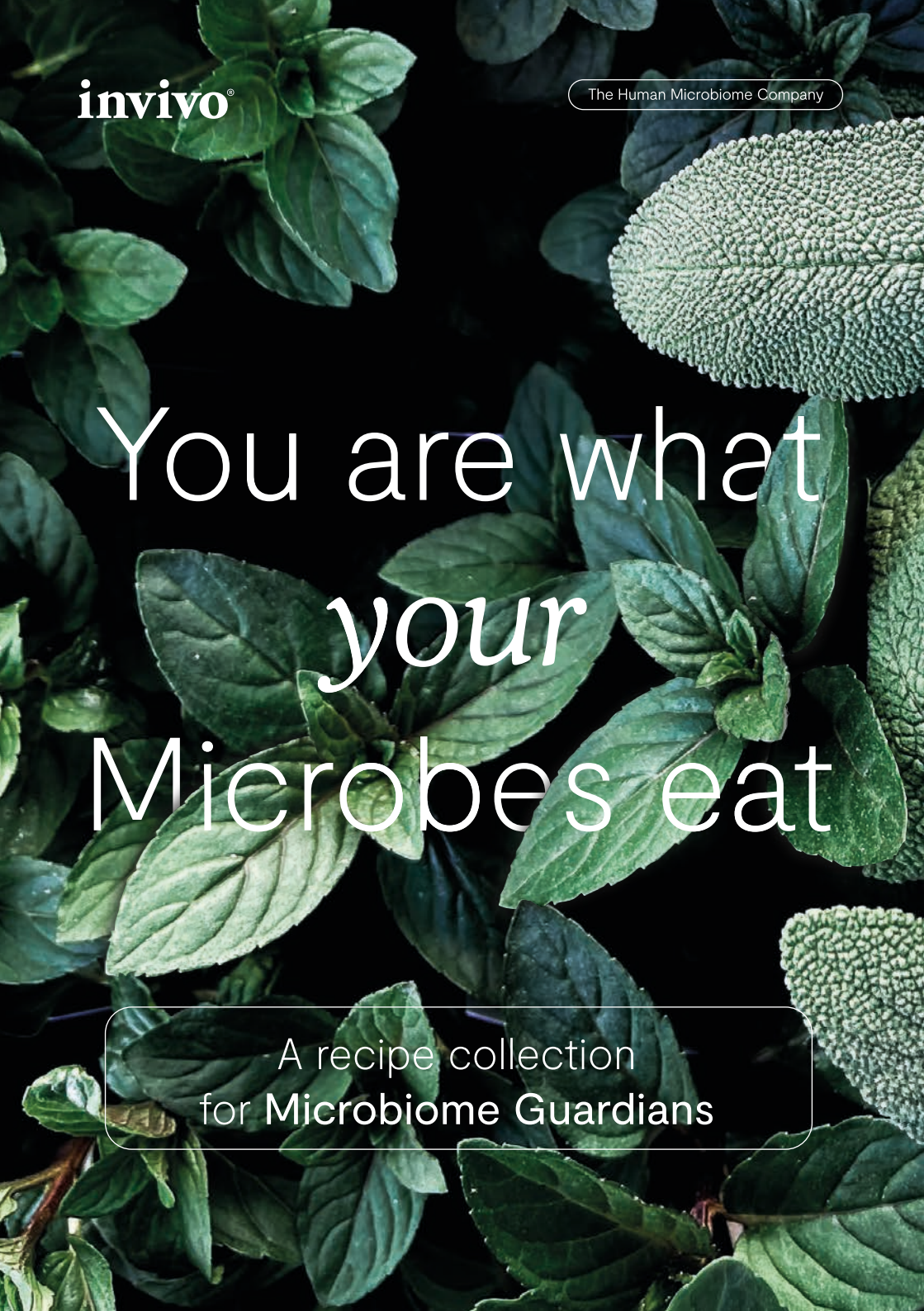
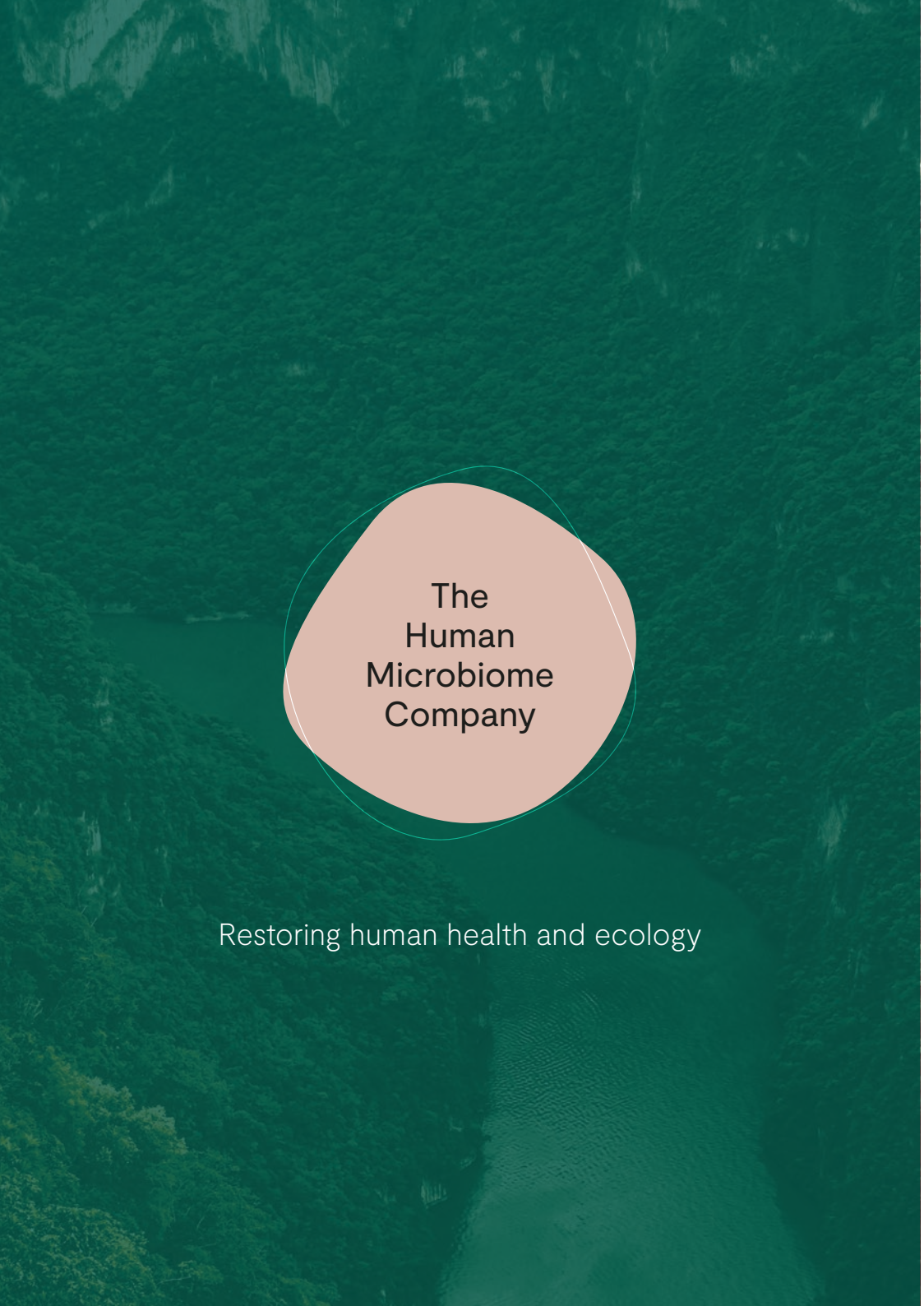

invivo®
The Human Microbiome Company
You are what
your
Microbes eat
A recipe collection
for Microbiome Guardians



CONTENTS:

At Invivo, we are more than just a human microbiome company. We are a movement with a mission to restore human health and ecology by harnessing the power of the human microbiome.

The microbes living within and on the human body – and how our body interacts with them – have a formative impact on human health and disease. Our approach focuses on empowering individuals to better understand and nurture their multiple microbiome sites to help them take control of their own well-being, through education, testing, and supplements.

The purpose of this little recipe book is to inspire you to increase your daily intake of one key ingredient for a healthy gut microbiome – prebiotics – in a delicious and accessible way which easily slots into your everyday life.

Pre, Pro & Postbiotics

In a world where more and more people are showing interest in the human microbiome and their own gut health, navigating the expanding world of 'biotics' can be confusing. While many are familiar with 'antibiotics' and 'probiotics', less are familiar with the other types of 'biotics', such as 'prebiotics'. Let's turn to a food analogy to help us explain.

Think of a sourdough starter. You add flour, rich in nutrients and wild probiotics, and water into a jar. After several days of feeding your starter, the mixture starts to bubble. So what exactly is happening? The flour provides fuel for the wild probiotics, which they ferment. The probiotics produce important acids as a by-product of this process. These acids create an environment in the jar which enables a diverse, balanced colony of microbes to thrive, often for decades if nurtured!

1. **Prebiotics**

The fuel for the healthy microbes that live within us

2. **Probiotics**

The name given to live microbes that are known for their positive impact on human health

3. **Postbiotics**

The helpful by-products of probiotic metabolism that we can then use in our body.

Prebiotics *the 'fuel'*

Prebiotics are substrates that are selectively utilised by specific microbes living in the colon, including *Lactobacillus*, *Akkermansia*, and *Bifidobacterium*, which then confers a benefit for human health.[1]

Probiotics *the live microbes*

Probiotics are the live microbes (e.g. bacteria, yeast) which benefit our health when consumed in a good amount, or are naturally occurring live microbes that live within us or on us, with a mutual benefit to both parties.[2]

Postbiotics *the probiotic 'after-life'*

This term recognises that the substances produced by probiotics, such as short chain fatty acids (SCFAs), and even dead probiotic bacteria, can benefit our health.[3]

Prebiotics

The story begins with prebiotics, the fuel for the indigenous microbes living in our gut. Scientific research continues to deepen our understanding of, and appreciation for, their benefits for human health, including but not limited to[4,5]:

- Improved nutrient absorption, especially of minerals such as iron and calcium
- Improved resilience of the gut to infection
- Maintenance of a healthy gut barrier
- Maintenance of a strong, balanced immune system, including a reduced risk of atopy and infection

In the UK, many of us don't get enough fibre, and this is made worse by the popularity of processed foods in Western countries. When we compare this to ancient and modern hunter-gatherer communities, the difference in fibre intake becomes clear. For example, the Hadza people in northern Tanzania eat around 80-150g of fibre each day. In contrast, the average intake in the USA and similar Western countries is only about 20g[6,7]. Even in the UK, where people typically have about 20g a day, it's still much less than the government's recommendation of 30g[8].

The International Scientific Association for Probiotics and Prebiotics (ISAPP) says we need at least 5g of prebiotics daily for health benefits[9]. Unfortunately, many of us are missing out on these benefits as well, and this doesn't just affect our own health—it could impact future generations too. An important animal study led by Sonnenburg et al.[2016] found that multiple generations of animals on a low microbiota-accessible carbohydrate (MAC) diet had a decreasing variety of gut microbes that didn't fully recover even when dietary fibre was reintroduced[10].

Looking after our gut isn't just about us; it's about the health of future generations. That's why prebiotics are the main focus in this recipe booklet—to help you improve your health and contribute to a healthier future.

Prebiotics & the gut ecosystem

“Imagine a virgin rainforest, verdant and dense with life: insects rule the undergrowth and primates hoot from the canopy. Now see the loggers move in, chainsawing the forest’s leafy infrastructure, established over millennia, and bulldozing the rest. Imagine too a weed invading, perhaps having hitchhiked as a seed on the wheels of the diggers, and then crowding out the natives as it takes hold. The forest will regrow, given time, but it will not be the same pristine, complex, unspoilt habitat it was before. Diversity will drop. Sensitive species will die out.
Invaders will flourish”

- Alanna Collen

This brief tale of a virgin rainforest echoes the natural order of the human gut microbiota and the importance of species diversity. The more diverse the species composition of the gut microbiota, especially of the commensal communities, the better.[12] Every microbe performs its own unique and special function or task, which in turn feeds and supports each other. A superpower of many microbes is their ability to produce short chain fatty acids (SCFAs) which can go on to feed other commensal microbes, as well as, inhibit the growth of less favourable microbes, which together helps to enable a balanced, resilient gut ecosystem. These bacterial by-products can also benefit human health in other ways, say by supporting the gut barrier and modulating inflammation and metabolic health.[13]

The opposite is also true – the poorer the diversity of the gut microbiome, the worse it is for the gut and whole-body health. For example, it has been associated with rheumatoid arthritis (RA), diabetes, inflammatory bowel disease (IBD), and mental health disorders.[14] Since each microbe has its own preferred fuel source, we need to enjoy a diet rich in a wide variety of prebiotic compounds to ensure that a wide variety of microbes are properly catered for and can go on to grow and thrive in our gut.

Where to find prebiotics
In Food

Carbohydrate sources include dietary soluble fibres, such as galactoligosaccharides (GOS), fructooligosaccharides (FOS), xylooligosaccharides (XOS), raffinose, glucomannan, resistant starch, and inulin. Key foods include:

- Onions & leeks
- Garlic
- Jerusalem artichokes
- Dandelion greens
- Pulses and legumes e.g. lentils, peas
- Wholegrains (e.g. rye, millet, wheat, oats)
- Cooked and cooled potato and pasta
- Banana (especially unripe) & plantain
- Chicory root
- Asparagus
- Pistachio
- Konjac root
- Oats
- Corn cobs

Non-carbohydrate sources include nutrients found in the coloured pigments in plants, such as polyphenols from:

- All types of berries (e.g. cranberry, aronia berry, blueberry, goji)
- Red grapes
- Tea (e.g. green tea, oolong)
- Coffee, ideally organic
- Cacao, ideally a high percentage dark chocolate (at least 70%)
- Pomegranate

Our top tips for increasing prebiotic intake
With Food

Consume 'wholefoods' wherever possible. The more processed a food, the lower the micronutrient, protein, and fibre content and the higher the content of unwanted ingredients such as additives and sweeteners – all of which negatively impacts health.[21,22]
A 2023 study of over 23,000 people found that those with the highest intake of ultra-processed food had a higher risk of psychological distress.[23]

Increase the diversity of your weekly plant intake of any type of plant, including herbs, spices, fruit, vegetables, and grains. The American Gut study discovered that eating more than **30 different types of plant per week** was associated with a healthier gut microbial community, in contrast to those who consumed 10 or fewer. There was increased gut microbial diversity, more protective microbes such as *Faecalibacterium prausnitzii*, and fewer antibiotic resistance genes.[24] Remember what we said earlier about each gut microbe having different food preferences? Nourishing our gut with a wide variety of plants helps to ensure that a wide range of microbes are catered for.

- **Track your diversity** by tallying up how many different plants you eat each week.
- Aim for a **couple of different colours** at each meal – this will prompt you to add a few more plants to your dish.
- **Herbs and spices** count towards your weekly plant numbers, so challenge yourself to add some new ones into your meals.
- Try a new **fruit/vegetable/herb/spice** each week.
- Try consuming **different colours/varieties** of a fruit or veg e.g. red onion instead of white onion.
- Check out the **Pesticide Action Network** UK 'Dirty Dozen' handout to help you affordably shop organic to reduce pesticide exposure – which can have a negative effect on the gut microbiome.

→

Our top tips for increasing prebiotic intake

With Food

- Try frozen berries or freeze-dried berry powders – these are a quick way to supercharge the foods which you consume regularly, such as smoothies or porridge.
- **Cook and cool starchy plants**, such as potatoes, root vegetables and wholegrain pasta, to transform the starch into the more microbiome accessible resistant starch.
- **Opt for wholegrain alternatives** as these are richer in fibre than their refined counterparts. Switch white rice to brown or wild rice, and white flour to wholemeal, spelt, or rye.
- **Enjoy fruit and vegetables with the skin on** (if you tolerate it) to increase your fibre, micronutrient, and polyphenol intake.
- **Make a nutty or seedy sprinkle** - blend a bag of mixed nuts or seeds in a food processor to a rough crumb texture, pop in a jar, and sprinkle onto porridge or Bircher muesli.
- **Think about the food and drink which you consume regularly** (e.g. instant coffee, cereal) and consider how you can opt for a wholefood alternative (e.g. an organic coffee made from grounds or beans, chia pudding).
- While working to increase your fibre intake, just make sure to **keep properly hydrated!**
- **Eating organic and seasonally,** where possible.

With Supplements

Prebiotics have been researched in multiple human clinical trials, including for constipation,(15) diarrhoea,(16) irritable bowel syndrome (IBS),(17) mineral absorption,(18) psychological stress,(19) and sleep quality.(20)

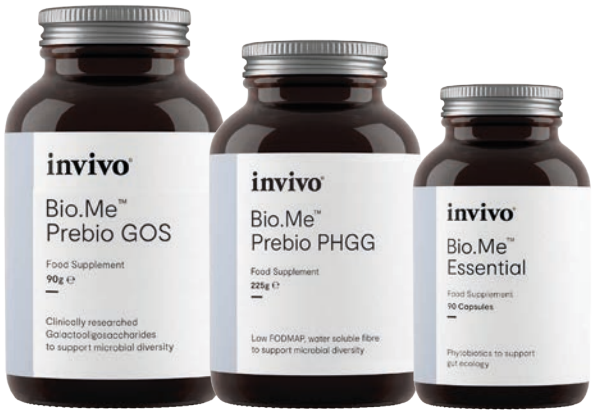
Many types of prebiotic fibre can be supplemented when you are keen to give your gut some extra TLC. These include:

- Partially hydrolysed guar gum (PHGG)
- GOS
- FOS
- Inulin
- Lactulose
- Acacia gum
- Colostrum

Several of these prebiotics, such as PHGG, GOS, FOS, and inulin, are available as a powder, they have a neutral (if occasionally slightly sweet) taste, and are both soluble and heat-stable. This means that they can be easily added into any food or drink. Our Bio.Me Prebio PHGG and GOS, can be added into a wide variety of foods and drinks. The basic requirement is that the prebiotic fibre needs to be mixed into something wet so it can dissolve well. We suggest:

- Your morning cuppa
- Smoothies
- Yoghurt
- Chia pudding
- Pancake batter
- Porridge
- Mixed into stovetop meals e.g. soups, stews
- Baked goods

It is always advisable to increase your prebiotic fibre intake through both food and supplements slowly to allow your gut to adapt. Of course, make sure to speak to a Healthcare Provider (HCP), such as a nutritional therapist or functional medicine practitioner, for guidance about whether a prebiotic supplement is suitable for you.



RECIPES

- Spicy scrambles
- Roasted squash & lentil soup
- Banana & dark chocolate bread
- Fruit & nut dark chocolate bark
- Banana split ice lollies
- Iced coffee
- Morning cuppa

Quick recipe

SPICY SCRAMBLES

Foodie prebiotic fact: The Allium family of plants is a prebiotic powerhouse. Garlic, onion, and leeks are some of the most prebiotic-rich foods, with especially good levels of FOS.[25] Better still, they are also the easiest and cheapest to buy.

Ingredients Veg GF Optional DF

Serves 2

2 tbsp extra virgin olive oil

3/4 tsp cumin seed

1/2 medium onion, peeled and diced

1 large garlic clove, peeled and crushed

1 inch ginger, washed, finely grated (skin on) or thinly sliced

1/2 tsp chilli flakes

1/2 tsp ground turmeric

1 small punnet cherry toms sliced in half (200g) – or about 4 large tomatoes, chopped

4 eggs, beaten

Sea salt and black pepper

Optional extras
for extra flavour & prebiotics:

- 1 tbsp unsalted butter
- 1/4 block feta
- Couple of finely sliced spring onions
- Small handful of coriander
- Any veg which you have to hand e.g. leftover veg from dinner the night before, handful of rocket, sauerkraut

Method

1. On a low heat, fry the cumin seed, onion, garlic, ginger, and chilli in the oil until translucent – 5 mins.
2. Add the turmeric, tomatoes, 1/2 tsp sea salt, and a good grind of black pepper.
3. Cook until the tomatoes are soft and the water has evaporated – 10 mins.
4. Add the beaten eggs and if using, the butter too. Scramble on a low heat – 2 mins. Sprinkle and mix through the feta if using, until lightly melted. Taste and adjust seasoning.
5. Serve and top with the spring onion and coriander if using, alongside any veg which you have to hand, such as leftover veg from dinner the night before, handful of rocket, and sauerkraut.

ROASTED SQUASH & LENTIL SOUP

Foodie prebiotic fact: Lentils are a cheap, everyday superfood. Not only are they packed with protein, vitamins, and minerals, they are also a great source of prebiotics, including raffinose, FOS, and resistant starch.[26]

Ingredients VG GF DF

Makes **1x** big saucepan of soup

2-3 winter squashes or 1 large butternut squash, cut into 1 cm thick wedges (wash well; skin on)

5-6 peeled shallots or 1 large red or white onion, cut into large slices

1 leek, cut into large slices

2-3 whole garlic bulbs

1x vegetable or chicken stock paste/cube and/or c. 300g bone broth (ideally organic; pre-made or homemade)

1 handful uncooked red lentils, washed and rinsed

Extra virgin olive oil

Sea salt & black pepper

Optional extras for extra flavour & prebiotics:

- Add 1x heaped tsbp Bio.Me Prebio PHGG for a prebiotic boost
- Pinch of red chilli flakes
- Any hard herbs you have to hand – sage, rosemary or thyme work well
- Handful of roasted pumpkin seeds for added protein

Method

1. Pre-heat the oven to 180°C.

2. Lay out your squash, shallots, leek, and whole garlic bulbs in a large roasting tray. Season well with sea salt and black pepper. Coat with olive oil. Add the red chilli flakes and a generous handful of herbs if using and toss well.

3. Bake until the veg is well-caramelised and soft. Pop the roasted garlic bulbs on a side plate to cool slightly. Add the roasted veg to a large saucepan or stockpot along with the red lentils. Squeeze the roasted garlic out of the skins and into the pot.

4. Add stock paste/cubes or bone broth if using. Pour over boiling water – enough to ensure the vegetables are covered by 1 inch of liquid. Bring to boil and simmer until the lentils are soft.

5. Mix in 1 heaped tablespoon of Bio.Me Prebio PHGG if using. Blend everything together using a stick blender until smooth. If it feels a bit too thick, add extra boiling water until you reach the desired consistency. It should be velvety smooth and pour easily.

6. Serve, sprinkle with toasted pumpkin seeds if using, and enjoy!

BANANA & DARK CHOCOLATE BREAD

Foodie prebiotic fact: Dark chocolate is more nourishing for the gut microbiome, lower in sugar and richer in micronutrients and antioxidants than its milky counterpart. Using 85% can be a good idea as a small-scale 2022 study found that it beneficially modulates the gut microbiome with associated mental health benefits.[27]

Ingredients Veg Optional GF DF

Makes **1 loaf** (using 9"x 5" loaf tin) / about **6 muffins**

3/4 cup (150g) coconut, brown or rapadura sugar

1/3 cup (76g) soft butter or coconut oil

3 medium very ripe banana

2 large eggs, ideally organic, free-range

1 tsp vanilla extract

Pinch of sea salt

1 ¼ cups (205g) flour
e.g. ground almond, ancient grain flour (e.g. rye, spelt), gluten-free self-raising flour (e.g. by Doves Farm) or a combination of flours to make the amount
- If using ground almond or an ancient grain flour, add 2 tsp baking powder

1/4 cup chopped nuts (e.g. walnuts, pecans, pistachio)

1/4 cup flaxseeds, ideally freshly ground

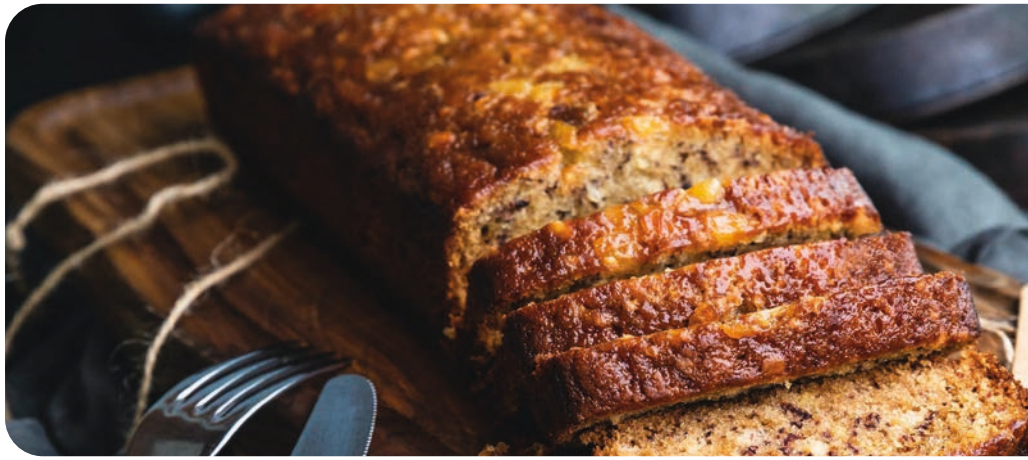
50g 85% dark chocolate, chopped into small pieces

Optional extras for extra flavour & prebiotics:

- 3 tbsp Bio.Me Prebio PHGG
- 1 tbsp Bio.Me Prebio GOS
- ½ tsp ground cinnamon
- ½ tsp ground ginger

Method

1. Preheat oven to 180°C and line the loaf tin with baking parchment.
2. Cream together the sugar and butter/coconut oil in a large mixing bowl.
3. Add the peeled bananas, mash with the back of a fork, and incorporate into the sugar mix.
4. Add the eggs, vanilla, and salt. Mix until lightly combined.
5. Fold in the flour, nuts, flaxseeds, chocolate, and if using, add the Bio.Me Prebio PHGG and GOS and spices.
6. Pour into the lined baking tin.
7. Bake for 45 mins or until a skewer removes cleanly from the cake. Leave to cool in the tin.
8. Serve and enjoy!



FRUIT & NUT DARK CHOCOLATE BARK

Foodie prebiotic fact: nuts and seeds benefit the gut microbiome. A small-scale study from 2022 showed that an increased intake of almonds improved the production of butyric acid by our gut microbes.[28]

Ingredients VG GF DF

Makes **1 small tray**

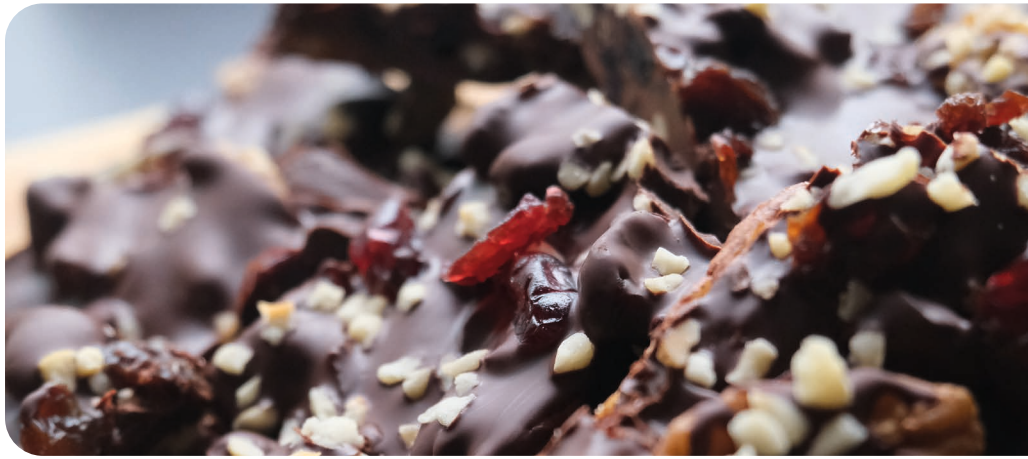
200g 70%+ dark chocolate
A handful of raisins
A handful of pecans
A handful of almonds
A handful of finely chopped hazelnuts
A handful of dried cherries

Optional extras for extra prebiotics:
– 1 tsp Bio.Me Prebio PHGG or GOS

Method

1. Set a glass or metal bowl over a saucepan of water. Bring the water to boil.
2. Break the chocolate into small pieces and place into the bowl.
3. Pop the bowl on the pan of boiling water and gently melt your chocolate.
4. Sprinkle in the Bio.Me Prebio PHGG or GOS if using and mix well.
5. Line a baking tray with baking parchment.
6. Create a spread on the tray of your fruit and nuts (reserve the chopped hazelnuts to one side).
7. Cover with your melted chocolate.
8. Sprinkle with chopped hazelnuts.
9. Put into the fridge to set, ideally overnight.
10. Tear the bark into shards and enjoy!

Top tip: at Easter, why not try setting this mix into Easter egg moulds!



BANANA SPLIT ICE LOLLIES

Foodie prebiotic fact: this recipe uses very ripe bananas as they taste better in sweet desserts. To functionally consume bananas for their prebiotic content, it is best to eat green, unripe bananas (e.g. as a snack) as they are a richer source of prebiotics, especially resistant starch.[29]

Ingredients VG GF DF

Makes **6** ice lollies

1/2 tin coconut milk (ideally in a BPA-free tin and additive free e.g. Biona)

3 medium very ripe bananas or 2 large

1x 100g bar at least 70% dark chocolate, ideally 85%

Pinch of sea salt

Handful of cacao nibs or nuts (e.g. flaked almonds, chopped roasted hazelnuts or peanuts)

Ice cream lolly moulds

Optional for extra prebiotics:

- 6 heaped tsp Bio.Me Prebio PHGG

Method

1. Make space in the freezer for the moulds.
2. Whizz the coconut milk, bananas, and PHGG until smooth. Use a smoothie machine or stick blender.
3. Divide the mix into the lolly moulds and add the sticks (ideally metal moulds with wooden sticks). Freeze overnight until solid.
4. Melt the chocolate in a heatproof bowl over a pan of boiling water and stir through a pinch of sea salt. Set aside to cool. Get your chocolate and toppings ready on the worktop.
5. Take the lollies out of their moulds and place on a greaseproof paper lined tray. Dunk the tip of each lolly into the chocolate, pop back on the tray, and sprinkle over toppings. Put straight back into the freezer for at least 30 minutes until fully set.

Tweaks

You can follow this method to make ice lollies using your favourite smoothie. Add a protein powder or nut butter of your choice to increase the protein content, or sub out the coconut milk for live yoghurt – whatever you have to hand.

ICED COFFEE

Foodie prebiotic fact: Individuals with a higher caffeine and coffee intake have been shown to have a more diverse gut microbiome with a higher relative abundance of anti-inflammatory bacteria, such as Faecalibacterium and Roseburia and lower levels of potentially harmful bacteria.[30]
Consume wisely and listen to your body.

Ingredients VG GF DF

Your favourite coffee, ideally organic

Milk or your favourite milk alternative – if using

Ice cubes

Bio.Me Prebio PHGG or GOS

Method

1. Add 1-2 tbsp of Bio.Me Prebio PHGG or GOS to a mug or small jug.
2. Fill with a fresh hot brew of your favourite coffee. Stir well and set aside to slightly cool.
3. Add ice to a glass and pour your coffee.
4. Enjoy black or add milk to taste.

MORNING CUPPA

We work with a large community of health care providers (HCPs) and many of them regularly recommend for their clients to add our Bio.Me Prebio PHGG or GOS into a client's morning cuppa. Since most of us have a morning hot drink, building on this existing habit can make taking this supplement so much easier to remember! To ensure that the fibre blends well, we have the following in-house and HCP-tested tips for you:

1. Sprinkle the prebiotic into the base of the mug. Pour over the freshly boiled water, stirring continuously to dissolve the fibre.
2. If making a milky coffee or hot chocolate, you can use a battery-powered milk frother to blend well (but this is not essential).

The recipes and introductory text for this book were put together by passionate foodie, microbiome guardian, Nutritional Therapist and Clinical Educator at Invivo, **Emily Blake**.

To learn more about Invivo and our supplement range and microbiome test offering, visit our website: **www.invivohealthcare.com**

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- VG Vegan
- Veg Vegetarian
- GF Gluten-free
- DF Dairy-free

REFERENCES

1. Gibson GR, Hutkins R, Sanders ME, Prescott SL, Reimer RA, Salminen SJ, et al. Expert consensus document: The International Scientific Association for Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of prebiotics. Nat Rev Gastroenterol Hepatol [Internet]. 2017 Aug 1 [cited 2022 Dec 5];14(8):491–502. Available from: https://pubmed.ncbi.nlm.nih.gov/28611480/

2. Hill C, Guarner F, Reid G, Gibson GR, Merenstein DJ, Pot B, et al. The International Scientific Association for Probiotics and Prebiotics consensus statement on the scope and appropriate use of the term probiotic. Nat Rev Gastroenterol Hepatol 2014 118 [Internet]. 2014 Jun 10 [cited 2023 Feb 8];11(8):506–14. Available from: https://www.nature.com/articles/nrgastro.2014.66

3. Salminen S, Collado MC, Endo A, Hill C, Lebeer S, Quigley EMM, et al. The International Scientific Association of Probiotics and Prebiotics (ISAPP) consensus statement on the definition and scope of postbiotics. Nat Rev Gastroenterol Hepatol [Internet]. 2021 Sep 1 [cited 2022 Dec 5];18(9):649–67. Available from: https://pubmed.ncbi.nlm.nih.gov/33948025/

4. Carlson JL, Erickson JM, Lloyd BB, Slavin JL. Health Effects and Sources of Prebiotic Dietary Fiber. Curr Dev Nutr [Internet]. 2018 Mar 1 [cited 2023 Feb 8];2(3). Available from: /pmc/articles/PMC6041804/

5. Neri-Numa IA, Pastore GM. Novel insights into prebiotic properties on human health: A review. Food Res Int [Internet]. 2020;131(December 2019):108973. Available from: https://doi.org/10.1016/j.foodres.2019.108973

6. Pontzer H, Wood BM, Raichlen DA. Hunter-gatherers as models in public health. Obes Rev [Internet]. 2018 Dec 1 [cited 2023 Aug 9];19 Suppl 1:24–35. Available from: https://pubmed.ncbi.nlm.nih.gov/30511505/

7. McKeown NM, Fahey GC, Slavin J, Van Der Kamp JW. Fibre intake for optimal health: how can healthcare professionals support people to reach dietary recommendations? BMJ [Internet]. 2022 [cited 2023 Aug 10];378. Available from: https://pubmed.ncbi.nlm.nih.gov/35858693/

8. Public Health England. National Diet and Nutrition Survey. Roling programme Years 9 to 11 (2016/2017 to 2018/2019). 2020;11:1–29.

9. ISSAP. Prebiotics - International Scientific Association for Probiotics and Prebiotics (ISAPP) [Internet]. Https://Isappscience.Org/for-Scientists/Resources/Prebiotics/. 2022. p. 1. Available from: https://isappscience.org/for-scientists/resources/prebiotics/

10. Sonnenburg ED, Smits SA, Tikhonov M, Higginbottom SK, Wingreen NS, Sonnenburg JL. Diet-induced extinction in the gut microbiota compounds over generations. Nature [Internet]. 2016 Jan 13 [cited 2022 Apr 1];529(7585):212. Available from: /pmc/articles/PMC4850918/

11. Collen A. 10% Human: How Your Body's Microbes Hold the Key to Health and Happiness. Harper Collins; 2015.

12. González Olmo BM, Butler MJ, Barrientos RM. Evolution of the human diet and its impact on gut microbiota, immune responses, and brain health [Internet]. Vol. 13, Nutrients. MDPI AG; 2021 [cited 2021 Jun 23]. p. 1–16. Available from: https://pubmed.ncbi.nlm.nih.gov/33435203/

13. Canani RB, Costanzo M Di, Leone L, Pedata M, Meli R, Calignano A. Potential beneficial effects of butyrate in intestinal and extraintestinal diseases. World J Gastroenterol [Internet]. 2011 Mar 28 [cited 2020 Dec 21];17(12):1519–28. Available from: /pmc/articles/PMC3070119/?report=abstract

14. Vijay A, Valdes AM. Role of the gut microbiome in chronic diseases: a narrative review. Eur J Clin Nutr 2021 764 [Internet]. 2021 Sep 28 [cited 2023 Feb 8];76(4):489–501. Available from: https://www.nature.com/articles/s41430-021-00991-6

15. Kapoor MP, Sugita M, Fukuzawa Y, Okubo T. Impact of partially hydrolyzed guar gum (PHGG) on constipation prevention: A systematic review and meta-analysis. Vol. 33, Journal of Functional Foods. Elsevier Ltd; 2017. p. 52–66.

16. Yasukawa Z, Inoue R, Ozeki M, Okubo T, Takagi T, Honda A, et al. Effect of repeated consumption of partially hydrolyzed guar gum on fecal characteristics and gut microbiota: A randomized, double-blind, placebo-controlled, and parallel-group clinical trial. Nutrients [Internet]. 2019 Sep 1 [cited 2021 Jun 23];11(9). Available from: /pmc/articles/PMC6769658/

17. Silk DBA, Davis A, Vulevicà J, Tzortzis G, Gibsonà GR. Clinical trial: the effects of a trans-galactooligosaccharide prebiotic on faecal microbiota and symptoms in irritable bowel syndrome. Aliment Pharmacol Ther. 2009;29:508–18.

18. Paganini D, Uyoga MA, Kortman GAM, Cercamondi CI, Moretti D, Barth-Jaeggi T, et al. Prebiotic galacto-oligosaccharides mitigate the adverse effects of iron fortification on the gut microbiome: a randomised controlled study in Kenyan infants. Gut [Internet]. 2017 Nov 1 [cited 2021 Aug 5];66(11):1956–67. Available from: https://gut.bmj.com/content/66/11/1956

19. Hughes C, Davoodi-Semiromi Y, Colee JC, Culpepper T, Dahl WJ, Mai V, et al. Galactooligosaccharide supplementation reduces stress-induced gastrointestinal dysfunction and days of cold or flu: A randomized, double-blind, controlled trial in healthy university students. Am J Clin Nutr [Internet]. 2011 Jun 1 [cited 2021 Apr 21];93(6):1305–11. Available from: https://pubmed.ncbi.nlm.nih.gov/21525194/

20. Thompson RS, Roller R, Mika A, Greenwood BN, Knight R, Chichlowski M, et al. Dietary prebiotics and bioactive milk fractions improve NREM sleep, enhance REM sleep rebound and attenuate the stress-induced decrease in diurnal temperature and gut microbial alpha diversity. Front Behav Neurosci [Internet]. 2017 Jan 10 [cited 2021 Apr 21];10. Available from: /pmc/articles/PMC5223485/

21. Rauber F, Louzada ML da C, Steele EM, Millett C, Monteiro CA, Levy RB. Ultra-Processed Food Consumption and Chronic Non-Communicable Diseases-Related Dietary Nutrient Profile in the UK (2008–2014). Nutrients [Internet]. 2018 May 9 [cited 2023 Aug 9];10(5). Available from: /pmc/articles/PMC5986467/

22. Monteiro CA, Cannon G, Moubarac JC, Levy RB, Louzada MLC, Jaime PC. The UN Decade of Nutrition, the NOVA food classification and the trouble with ultra-processing. Public Health Nutr. 2018;21(1):5–17.

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23. Lane MM, Lotfaliany M, Hodge AM, O'Neil A, Travica N, Jacka FN, et al. High ultra-processed food consumption is associated with elevated psychological distress as an indicator of depression in adults from the Melbourne Collaborative Cohort Study. J Affect Disord [Internet]. 2023;335(May):57–66. Available from: https://doi.org/10.1016/j.jad.2023.04.124

24. McDonald D, Hyde E, Debelius JW, Morton JT, Gonzalez A, Ackermann G, et al. American Gut: an Open Platform for Citizen Science Microbiome Research. mSystems. 2018 Jun 26;3(3).

25. Kaur AP, Bhardwaj S, Dhanjal DS, Nepovimova E, Cruz-martins N, Kuča K, et al. Plant prebiotics and their role in the amelioration of diseases. Vol. 11, Biomolecules. 2021. p. 1–28.

26. Johnson N, Johnson CR, Thavarajah P, Kumar S, Thavarajah D. The roles and potential of lentil prebiotic carbohydrates in human and plant health. Plants People Planet. 2020;2(4):310–9.

27. JH S, CS K, L C, S K, S L, S C, et al. Consumption of 85% cocoa dark chocolate improves mood in association with gut microbial changes in healthy adults: a randomized controlled trial. J Nutr Biochem [Internet]. 2021 Sep [cited 2021 Oct 5];108854. Available from: https://pubmed.ncbi.nlm.nih.gov/34530112/

28. Creedon AC, Dimidi E, Hung ES, Rossi M, Probert C, Grassby T, et al. The impact of almonds and almond processing on gastrointestinal physiology, luminal microbiology, and gastrointestinal symptoms: a randomized controlled trial and mastication study. Am J Clin Nutr. 2022 Dec 1;116(6):1790–804.

29. Phillips KM, McGinty RC, Couture G, Pehrsson PR, McKillop K, Fukagawa NK. Dietary fiber, starch, and sugars in bananas at different stages of ripeness in the retail market. PLoS One [Internet]. 2021;16(7 July):1–21. Available from: http://dx.doi.org/10.1371/journal.pone.0253366

30. Dai A, Hoffman K, Xu AA, Gurwara S, White DL, Kanwal F, et al. The Association between Caffeine Intake and the Colonic Mucosa-Associated Gut Microbiota in Humans—A Preliminary Investigation. Nutrients [Internet]. 2023 Apr 1 [cited 2023 Aug 10];15(7):1747. Available from: https://www.mdpi.com/2072-6643/15/7/1747/htm

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