Bio.Me Essential

A foundational formula for your body's microbiomes, creating an optimal environment for your microbial inhabitants.

Bio.Me Essential was created to support a healthy microbiota, gut barrier, reduce gut inflammation and support the innervation to the gastrointestinal tract. It also works on the gut-brain axis.

As well as the direct impact polyphenols have on the gut, we considered the bigger picture of ecology, and the impact of nervous tension and immunity on gut function. The formula includes plants that are both digestive tonics, nerve tonics and immune enhancing in their action.

Bio.Me Essential can be thought of as a housekeeping product that creates a welcoming home to your microbiota, and helps boost the efficacy of probiotics. While it has been designed to work alongside our other Bio.Me products, it can also be used as a standalone for maintaining a healthy gut ecosystem.

A note on polyphenols and gut health

Polyphenols are large compounds that do not absorb well into the blood stream due to their size. They must be broken down into their metabolites for blood levels to be impacted. Approximately 5–10% of polyphenols can be absorbed in the small intestine, while the remaining 90–95% proceed to the colon[1]. Unabsorbed polyphenols in the small intestine are deconjugated by microbial glucuronidases and sulphatases in the colon, permitting further uptake as aglycones.

This led researchers to postulate, that the original polymers, and their subsequent monomers, may have an impact on the gut and microbiota, both locally and systemically. Bacteria in the gut can perform reactions that transform more complex plant phenolics such as anthocyanins, procyanidins, flavanones, flavonols, tannins and isoflavones into simple phenolic metabolites. The colon is thus a rich source of potentially active phenolic acids that may impact gut health. Polyphenols also offer nourishment for beneficial bacteria, resulting in significant growth in populations, while inhibiting pathogenic bacteria.

Nutritional Information	
Actives	**Per Dose** (3 capsules)
Citrus Bioflavanoid Extract (MicrobiomeX®)	500mg
Ecklonia cava Extract (SeaPolynol-50M®)	50mg
Blackcurrant Extract 11% (BerryPharma®)	200mg
MycoMix®Immun K (Cordyceps, Ganoderma lucidum, Lentinula edodes, Hericium erinaceus, Grifola frondosa, Poria cocos, Trametes versicolor, Agaricus blazei)	300mg
Grapeseed Extract 10:1 (95% Proanthocyanins)	100mg
Ashwagandha Root Extract (1.5% Withanolide)	250mg
Cocoa Extract (20% Theobromine)	250mg
Pomegranate	200mg
Green Tea	200mg
Chamomile	100mg
Lemon Balm	50mg
Other Ingredients: Magnesium Stearate, Capsule Shell (Hydroxypropyl Methylcellulose).	

GMO free

Suitable for vegetarians

Directions:

Take 3 capsules daily.

Do not exceed the recommended dose, unless advised by your healthcare professional.

Food supplements are not a substitute for a varied and balanced diet or lifestyle.

Store in the original packaging, at room temperature, in a dry place. Keep out of reach of children.

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Bio.Me Essential key ingredients

Polyphenols

MicrobiomeX

MicrobiomeX® is a flavobiotic developed from a citrus extract which consists of specific active flavonoids. MicrobiomeX® directly leverages the gut microbiome's potential and improves gut barrier function.

A clinical study using a daily dose of 500mg citrus fruit extract, showed a significant change in short-chain fatty acid (SCFA) composition (butyrate and propionate). These SCFAs have an impact on the health of the gut barrier and gut immunity. In the participants there was a strong trend towards a reduction in faecal calprotectin and pathogen load. Both results reinforce the hypothesis that citrus polyphenolic compounds may modulate gut microbiota composition and function, thereby promoting gut- and host-health through their anti-inflammatory effects[2].

Cocoa

Cocoa is high in the proanthocyanin polyphenols, which are metabolised down to catechin and epicatechin in the gut. Many animal studies have been conducted to examine whether cocoa may reduce circulating endotoxin, oxidative stress and inflammation. One study reported changes in gut microbiome[3], and two studies reported attenuated endotoxin levels[4, 5]. In select studies, cocoa and cocoa flavanols improved insulin sensitivity and reduced blood glucose, insulin, and HbA1c in subjects with varying degrees of glucose homeostasis (normoglycemic, prediabetic or T2DM) within 2–4 weeks[6–9]. Interestingly, no significant glycemic improvements were observed in the two studies that utilised epicatechin only[10–11]. This supports the idea that the larger PCs may be important, despite their relatively low bioavailability.

Lipopolysaccharides (LPS) are the primary ligand for toll like receptor 4 (TLR4), which is found on the cell surface of immune cells, skeletal muscle and many other tissues[12]. LPS binding to TLR4 initiates an inflammatory cascade that leads to nuclear translocation of nuclear factor kappa B (NF-κB), resulting in production of inflammatory cytokines. Poor gut barrier function may lead to elevated plasma endotoxin levels and metabolic disease[13]. Several studies have explored the effects of cocoa on inflammation and its contribution to diseases[10, 14, 15]. There are also studies investigating the effects of cocoa on metabolic endotoxemia[5, 15]. Overall, cocoa and other flavanols have the potential to improve gut barrier function, which may, in turn, alleviate metabolic endotoxemia. It is unknown if reduced endotoxemia is due solely to alterations of the gut microbiota and barrier function, or if flavanols can directly bind and inactivate LPS in the gut, blood, or modulate LPS-TLR4 binding and downstream signaling at the levels of skeletal muscle cells.

Grape seed extract

Grape seed extract is rich in Proanthocyanidins (PACs), or condensed tannins. In recent human trials, it displayed inhibitory activity of lipase and LPS binding. A parallel study was carried out in 12 normal weight and 17 overweight/obese subjects to determine the effect of this extract on the postprandial changes in plasma triacylglycerols, LPS and IL-6. The presence of small intestine bacterial overgrowth (SIBO), in which higher levels of bacteria and eventually LPS are present in the upper intestine, i.e. where dietary fat absorption occurs, was also evaluated. Compared with placebo, the grape extract did not affect postprandial triacylglycerolemia but decreased plasma LPS[16, 17].

Green tea

Epidemiological studies have shown an inverse relationship of green tea consumption with risk of gastric cancers[17–19]. The mechanisms may involve the inhibition of the growth of *Helicobacter pylori*, the causative microorganism in gastric carcinogenesis and the development of gastric and duodenal ulcers[20]. Antimicrobial activities of green tea have been well demonstrated[21], and green tea has been shown to inhibit the growth of *Vibrio cholerae, Salmonella typhi, Campylobacter jejuni, Campylobacter coli, H. pylori,* Shigella, Salmonella, *Clostridium pseudomonas, Candida, Mycoplasma* and Cryptococcus.

Green tea has also been shown to modulate the gut microflora by selectively increasing the growth of Bifidobacteria and Lactobacilli (acidophytes) in the gut wall[22, 23]. Green tea has been found to inhibit the expression of cyclooxygenases and inducible nitric oxide synthase in colonic tissues, which are constantly found to be elevated in subjects with ulcerative colitis[24]. Green tea polyphenols consistently inhibit cyclooxygenase-2 activity in human colon tumour tissues[25] and tea co-administration produces an enhancing effect with the cyclooxygenase inhibitors[26,27]. A trial on the effect of tea catechins in bowel movements in healthy volunteers has demonstrated an improvement of the bowel activity after taking epigallocatechin gallate for 3 months. The bowel movements became more regular and this may be attributed to the inhibition of a-amylase and the modulating effects of tea catechins on the faecal flora[28].

Ecklonia cava

Ecklonia cava is a brown algae found abundantly along the coastal areas of Korea and Japan and used traditionally for food and medicine[29–33]. E. cava has a variety of compounds including peptides, polysaccharides, carotenoids, fucoidans and phlorotannins exhibiting different biological activities that have shown to possess antioxidant, antidiabetic, anti-allergic, anti-retro-viral, matrix-metalloprotein inhibition, as well as other beneficial activities[32–36]. Phlorotannins and their metabolic by-products such as eckol, are only found in the marine algae.

As well as antioxidant studies, it has been shown that ethanolic extracts of E. cava inhibit LPS-induced NO and prostaglandin E2 (PGE2) production and inhibits inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2) in BV2 microglia[37]. These results suggest that E. cava extracts exert anti-inflammatory effects by suppressing proinflammatory cytokines[38].

A recent study indicated limited small intestinal absorption followed by gut microbial metabolism of the phlorotannins in the large intestine[38]. High colonic metabolism seems to occur, following fermentation of phlorotannins in the large intestine, and this may in turn impact bacterial diversity[41, 42].

Blackcurrant and pomegranate

Both blackcurrant and pomegranate are rich in anthocyanins; ellagitannins and proanthyocyandins represent the most abundant polyphenols in pomegranate juice and blackcurrants, respectively. As well as the aforementioned beneficial impacts on the gut flora, polyphenols also possess anti-oxidant and anti-inflammatory activities[39, 40, 43–47].

The anti-inflammatory activity of pomegranate at the gastric level has been evaluated both in vivo and in vitro. It is found to reduce H. pylori infection[48–50] and studies demonstrate a high antiulcer effect[51]. Pomegranate inhibits the expression and secretion of several inflammatory mediators (i.e., IL-6, IL-8, MCP-1, iNOS, COX-2, and PGE2) as well as inhibition of the NF-ϰB pathway and the MAPKs system. Polyphenolic substances present in blackcurrant fruits have been reported for antioxidant, antimicrobial, antiviral, and antibacterial properties[52].

The pomegranate metabolite, urolithin modulates the gut microbiota, enhancing the growth of beneficial strains despite pathogenic ones. Among urolithins, urolithins A has been shown to possess a significant anti-inflammatory activity both in vitro and in vivo, suggesting this could be the main phytochemical responsible for the anti-inflammatory properties observed with pomegranate extracts in the gut[53–58]. Research of catechins showed statistically significant enhancement of beneficial bacteria populations, such as Bifidobacterium spp. with a concomitant inhibitory effect on Clostridium histolyticum.

Immune, digestive, and nervous system actions

Chamomile

Traditionally, Chamomile is known for two major areas of action – for its carminative impact on the gastrointestinal tract, and as a nerve tonic. In Western herbal medicine, Chamomile is ascribed the actions of an anti-inflammatory, spasmolytic, mild sedative, antiulcer, carminative, vulnerary, and diaphoretic[59]. Chamomile is rich in flavonoids – the most studied being apigenin and luteolin, and in volatile oils, proazulenes such as matricine and its degradation product, chamazulene.

Apigenin has been shown to possess potent in vivo and in vitro anti-inflammatory activity by pleiotropic influence on multiple molecular pathways[60]. Chamomile has been shown to be anti-inflammatory and antiulcer[61-64], and have beneficial effects on symptom relief of childhood and infant colic, with no adverse effects[62,63].

Preclinical models suggest that chamomile inhibits *Helicobacter pylori*, the bacteria that can contribute to stomach ulcers[65]. In vitro studies have shown chamomile and its constituents to be inhibitory to the growth of S. aureus, E. coli, P. aeruginosa, S. epidermidis strains[66]. In addition to the GIT benefits of chamomile, it has also traditionally been used as a mild relaxant. Preclinical research has revealed a range of effects considered to be mediated via modulation of the GABA system, and some clinical trials in humans have shown it to be helpful in cases of general anxiety disorder[67].

Lemon balm

Lemon balm has traditionally been used to treat gastrointestinal symptoms associated with nervousness and spasms. It has also been used to reduce irritability, restlessness and anxiety[67].

In a recent trial in infants, lemon balm, in combination with chamomile and Lactobacillus acidophilus (HA122), was compared with simethicone for infantile colic for a 28-day period. The herbal and probiotic combination was shown to be more effective than simethicone[68]. Earlier trails in infants have shown similar results. Research in IBS and colitis have shown lemon balm to reduce visceral hypersensitivity and cytokine profiles in rat models[68]. The essential oils have demonstrated pain-relieving activities in the gastrointestinal tract, and neuroprotective qualities[69].

In human studies, lemon balm has moderately improved anxiety symptoms. In vitro studies have revealed anxiolytic activity via elevation of GABA levels from inhibition of GABA-transaminase[70].

Ashwaganda – Withania somnifera

Withania is a native herb to India, which has traditionally been used as a tonic food, adaptogen, nervine, sedative and anti-inflammatory. It has been shown to improve neutropenia, it has been used in children to improve resilience and that it possesses similar effects to panax ginseng as an adrenal tonic[71]. Recent research has shown Withania to be inhibitive to candida spp. growth in-vitro[145]. Witherin A, a constituent of withania, has been shown to induce apoptosis by ROS-dependent mitochondrial dysfunction in human colorectal cancer cells[73].

MycoMix®Immun

MycoMix®Immun is a synergetic formulation of mushrooms which helps strengthen the immune system, as well as providing immunity to various seasonal and autoimmune diseases.

The mix contains the following medicinal mushrooms: Cordyceps, *Ganoderma lucidum* (Reishi mushroom), *Lentinula edodes* (shiitake mushroom), *Hericium erinaceus, Grifola frondosa* (maitake mushroom), *Poria cocos*, *Trametes versicolor* and *Agaricus blazei*. MycoMix® contains up to ten times as many medicinal substances as does one medicinal mushroom species alone.

A note on polyphenols and cognitive function

Epidemiological evidence suggests a relationship between flavonoid intake and cognitive decline/dementia[74, 75]. Several different mechanisms of action have been proposed including anti-inflammatory and antioxidant actions and improvements to neural signalling[76].

Polyphenols have been shown to inhibit the formation and extension of β-Amyloid (Aβ) fibrils and to destabilise the preformed Aβ fibrils in vitro[77]. Anthocyanins, their aglycones and phenolic acids have been shown to have monoamine oxidase (MAO) inhibitory effects in vitro[78]. The MAO enzymes directly produce hydrogen peroxide as they metabolise monoamines. Inhibition of these enzymes, may therefore reduce oxidative stress associated with this process and lead to increased concentrations of monoamine neurotransmitters, which are essential for normal cognitive function and mood. Three published peer-reviewed intervention studies have demonstrated positive effects of berry consumption on human behaviour, affecting verbal memory and spatial memory after supplementation[79, 80] and in adults with age related memory decline[81].

Epicatechin has been shown to cross the blood brain barrier in animal studies[82], suggesting that flavonoids from the cacao bean have the ability to act directly on the brain, which may lead to cognitive enhancement[83]. Additional evidence from animal studies on flavanols found that flavanol consumption boosts memory and learning[84,85] by acting directly on numerous receptors, kinases and transcription factors[86]. A recent review concluded that flavonoids may be beneficial to attention, working memory, and psychomotor processing speed in a general population[87, 88]. A trial with green tea consumption in the elderly suggested that 12 months green tea consumption may prevent an increase of oxidative stress in the elderly population[89]. Similar trials have been shown with the polyphenols from grapeseed extract[90–95] and pomegranate[96]. Phlorotannins from Eckolonia Kava have shown in studies its nontoxic nature and its antioxidant, anti-inflammatory, hepatoprotective, hypotensive, and plasmin-activating activities, which can all have cognitive impacts[94, 95, 97].

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