The aim of AOK-9 Calm K9

The aim of AOK-9 is to combine the benefits of stimulation of the Monoamine neurotransmitters of the brain alongside the introduction of beneficial bacteria into the diet. Three neurotransmitters, serotonin, dopamine and norepinephrine are responsible for many different functions as seen below. If these are unbalanced a variety of adverse effects may manifest.

Dopamine and Serotonin don't just have an effect on the brain but they also play a role in digestion.

Dopamines role in digestion is complex but it is thought it regulates the release of insulin in the pancreas. It also affects movement in the small intestine and colon to help move food through the system. It also seems to have a protective effect on the mucosal lining of the gastrointestinal tract.

Serotonin is found in the gut and is released when food enters the small intestine, where it helps to stimulate contractions that push food through your intestines.

Passiflora Incarnata

Passion flower is a perennial, climbing vine with woody stems and auxillary tendrils, reaching up to 20 feet in length. It has three-lobed leaves and solitary, showy, white and purple flowers that are 2-4 inches in diameter. It is found in tropical areas around the world but is native to the southeastern United States and Central and South America, growing in thickets, roadsides and on wasteland.

In general there is good evidence to suggest Passionflower Incarnata helps relieve anxiety symptoms.

The applicable parts of passion flower are the above ground parts (88195). Passion flower contains flavonoids including vitexin, isovitexin, orientin, isoorientin, apigenin, quercetin, vicenin, lucenin, saponarin, swertisin, schaftoside, and kaempferol (88199,88200,95036). It also contains the indole alkaloids harman, harmol, harmin, harmalol, and harmalin (8811,9558,15339,88199,88200). Other constituents include glycosides, carbohydrates, amino acids, benzopyrones, chrysin, and pyrone derivatives such as maltol and ethyl maltol (88200,95036). Fatty acids, as well as phenolic, linoleic, linolenic, palmitic, oleic, and myristic acids are also present, along with essential oils (88199).

Sedative, anxiolytic, and anticonvulsant activity have been reported with passion flower extracts in animals (8811,9558,19235,68298,68309,88199,91205). Data suggest that passion flower inhibits uptake of gamma-aminobutyric acid (GABA) into neuronal synapses, and has affinity for GABA(A) and GABA(B) receptors (88199,91204). Some studies report that the anxiolytic and anticonvulsant activity of passion flower is similar to that of benzodiazepines and can be antagonized by flumazenil, suggesting binding to the benzodiazepine site on GABA(A) receptors (68298,91205,95037). However other studies suggest passion flower extracts bind to the GABA site on GABA(A), rather than the benzodiazepine site (88199,91204). The constitutent thought to be responsible for these effects is benzoflavone (95036). These effects may also be due to chrysin and maltol (95036).

L-Tryptophan

L-Tryptophan is an indirect precursor to serotonin. It is an essential amino acid found in many proteins. It has a number of critical metabolic functions and has been used widely in numerous research papers.

The body absorbs tryptophan from dietary protein sources, converts it to 5-hyrdoxytryptophan (5-HTP), then to serotonin (5-hydroxytryptamine).

Depletion of endogenous tryptophan can cause a relapse in treated depression and precipitate depressive symptoms in patients with a history or family history of depression, as well as in healthy volunteers (10854,10855). However, L-tryptophan depletion does not seem to worsen symptoms in people with untreated depression (1136). Additionally, dietary L-tryptophan depletion has been associated with bulimia relapse and deterioration of schizophrenia symptoms (1133,1134).

L-tryptophan can penetrate the blood-brain barrier and get converted to serotonin (10853,10857).

The body absorbs L-tryptophan from dietary protein sources (10853,10857).

In the body, L-tryptophan is converted to 5-hyrdoxytryptophan (5-HTP), then to serotonin (5-hydroxytryptamine) (10853,10857), mainly in the digestive tract (91461). L-tryptophan is also converted to melatonin in the body and can be measured in the blood (62803). Intermediate metabolites in the L-tryptophan to nicotinamide pathway include kyrurenine, anthranilic acid, kynurenic acid, 3-hydroxykynurenine, 3-hodroxyanthranilic acid, and quinolinic acid (91460).

Glutamic Acid

Glutamine is the most abundant free amino acid in the body (7739). It is produced primarily in skeletal muscle and then released into the circulation. Tissues that require glutamine such as the immune system, gastrointestinal tract, kidneys, and liver obtain glutamine as needed from the blood (7729). Glutamine acts as an inter-organ nitrogen and carbon transporter (5467). The intestinal mucosa can synthesize glutamine, but not enough to compensate for the body's needs during severe physiologic stress (7733). Although traditionally classified as a non-essential amino acid, glutamine is essential for maintaining intestinal function, immune response, and amino acid homeostasis during times of severe stress, suggesting that it is more appropriately called a conditionally essential amino acid (5468,7736).

There is some evidence suggesting that glutamine, in addition to serving as a metabolic fuel for enterocytes, might play a regulatory role in the intestine, affecting cell proliferation and differentiation (7733). The gastrointestinal tract is one of the largest utilizers of glutamine in the body (5469). Depletion of glutamine can result in atrophy, ulceration, and necrosis of intestinal epithelium.

In patients with diarrhoea, glutamine appears to increase water and electrolyte absorption (52336), reduce loss of water and sodium from the gut (52395), and improve gut permeability (7299,7300).

Lemon Balm

Lemon balm is a perennial, lemon-scented herb native to southern Europe, Asia Minor, and North Africa (9994,91732).

The applicable parts of lemon balm are the leaf and leaf oil. Lemon balm contains citronellal, neral, and geranial monoterpenoid aldehydes; flavonoids (including luteolin) and polyphenol compounds (including rosmarinic acid, caffeic acid, and tannins); monoterpene glycosides, and triterpenoids (including oleanolic acid and ursolic acid) (9994,59327,59357,59358,59362,59394,59395,59404,59460). The essential oil of lemon balm contains terpenes (10422,59370).

Lemon balm contains citronellal, neral, and geranial monoterpenoid aldehydes; flavonoids and polyphenolic compounds (including rosmarinic acid); and monoterpene glycosides. These substances may contribute to the behavioral effects of lemon balm dried leaf and essential oil (9994). Some research suggests lemon balm might have acetylcholine receptor activity with both nicotinic and muscarinic binding properties (9994,19530). Clinical research suggests that lemon balm induces a calming effect and reduces alertness (9994). Cholinergic modulation appears to play a role in the effect of lemon balm on memory and alertness (91733). Preliminary clinical research shows that lemon balm may induce anxiolytic effects that can help reduce symptomatic palpitations (91732). Other clinical research suggests that lemon balm, when given along with valerian, passion flower, and butterbur, can lower subjective anxiety scores during a social stress test in men, but without an associated alteration in salivary cortisol levels (97276). Animal research shows that lemon balm has dose-dependent sedative effects (19725).

Lemon balm is used in aromatherapy. The essential oil of lemon balm contains terpenes, which are rapidly absorbed through the lungs and cross the blood-brain barrier. In addition, these may possess cholinergic activity or act on gamma-aminobutyric acid (GABA) receptors (10422,59350,59351,59355).

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