

Demulcents: The Slimy Herbs

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Intro ~

Demulcents, or mucilages, are a vitally important, but perhaps under-appreciated action of herbs. They have a wide range of important effects and benefits, especially helpful for many of the conditions we see today.

Demulcent herbs and foods include:

Marshmallow root (*Althaea officinalis*)

Slippery Elm bark (*Ulmus rubra*) – from sustainable sources only, UpS ‘At Risk’ list

Comfrey leaf or root (*Symphytum officinalis*) – usually short term use

Fenugreek seed (*Trigonella foecum-graecum*)

Plantain leaf or seed (*Plantago spp*)

Irish moss (*Chondrus crispus*)

Flax seed (*Linum usitatissimum*)

Chia seed (*Salvia hispanica*)

Pharmacology ~

Energetics: herbs of water; usually cool and moist

Structure: The mucilaginous texture of demulcents comes from a type of carbohydrate molecule technically called an “acidic heterogeneous polysaccharide”. They are large and branched in structure, and very hydrophilic, enabling them to absorb and hold many times their weight in water and other molecules. The bonds of these branched molecules are in beta-configuration, like other soluble fibers, so we don’t break them down in the upper digestive tract but our gut flora are able to metabolize them by fermentation.

There are many related soluble fibers in foods and herbs such as pectin and gums, and all of them work similarly depending on how viscous they get.

Benefits ~

soothe inflammation in esophagus

With reflux of stomach acid into the esophagus, irritation, inflammation and damage occur. Demulcents help protect the epithelium of the esophagus directly by augmenting mucus, and also soothe the nerves in these tissues to reduce reactivity such as coughing.

soothe irritation in respiratory and urinary tracts

A strong connection is found between reflux and asthma. By locally reducing irritation in the throat, demulcents calm ticklish dry coughs and prevent the coughing fits that in turn tend to weaken the lower esophageal sphincter. By reflex through the vagus nerve, they also reduce irritation in the urinary tract.

soothe stomach and intestinal mucosa directly, other systems indirectly

When we ingest them, the moistening and protective qualities of demulcents have a cooling and soothing effect on the surfaces of our GI tract, which is a huge area including all the villi. Considering also that there is an enormous amount of nervous and immune activity in the GI tract, these benefits can impact not only our gut but other systems as well. I have particularly seen that soothing the gut will in turn soothe the nerves and hypersensitivities.

support goblet cells that secrete mucus

In an animal study, dietary fiber increased number of goblet cells compared to animals that were fed a fiber-free diet. Goblet cells are normally found throughout mucus membranes to supply mucin, a major component of mucus. In response to fiber, mucin production increased overall, which contributes greatly to healthy mucus production. In addition, the study found increased height of villi in the ileum with ingestion of viscous fiber but not bulky fiber. (Hino)

reduce inflammation

Demulcents have a local, temporary anti-inflammatory action on our guts, but also systemic benefits. As we increasingly recognize the role of inflammation in chronic disease, mitigating that with diet is especially prudent. In both human and animal studies, a diet enriched with soluble fiber reduced some inflammatory and pro-oxidative markers including A1C and CRP. The researchers of two of these studies particularly suggest that their results show reduced propensity to metabolic syndrome with soluble fiber in the diet. (Sánchez , Dall'Alba, Ma)

All inflammatory conditions of the GI tract such as gastritis, peptic ulceration, enteritis, ileitis and colitis can be treated with demulcents. Studies have found that soluble fibers protect the GI mucosa even from the damaging effects of NSAIDs, notorious for causing inflammation to the gut. It's postulated that the mucilage has a directly protective effect, augmenting the mucus. (Satoh)

help heal gut tissue

One of the key breakdown products of gut flora's action on polysaccharides is short chain fatty acids (SFCA) that literally help feed the colonic epithelial cells, which are some of the fastest replicating cells in our body. A fed cell is healthier, has better structural integrity and ability to divide accurately and function optimally, so quite literally healed. Feed intestinal flora = feed epithelium.

normalize intestinal transit time & balance consistency of stool

The bulk of mucilage helps stretch receptors in the intestines recognize that there is food to be moved down the tract, enhancing motility. Stools remain soft because some liquid is always retained in the branched structure of the mucilage, making passage of bowel movements easier and more regular. This propensity to normalization is effective even when people go off narcotic and laxative medications, often prescribed together because the pain meds lead to constipation. The gut can have a difficult time rebalancing after withdrawal of the drugs, and demulcents really help. Since one of the key problems in irritable bowel complaints is inconsistency of stool, demulcents are being recognized as a key strategy in healing IBS.

slow assimilation of sugars

Other nutrients consumed with carbohydrates can slow the rate at which sugars enter our blood stream, such as protein and fat. The fiber content of the carbohydrate matters too, so consuming complex carbohydrates or including soluble fiber with our meal slows the rate of blood sugar rise, and thus also insulin rise. (Silva) Again, everything gets stuck in the gel. Blood sugar can have profound effects on our behavior, state of mind and overall health, so keeping it low and steady can greatly improve our quality of life.

promote colonization of intestinal flora

Our steady and relatively slow transit time is part of what enables beneficial organisms to live within our colon, and some of them live specifically within the niche provided by mucus. Having a hospitable environment helps us maintain our microbes or recolonize them after illness.

promote liver detoxification

The absorptive nature of the mucilaginous gel takes up a variety of substances in the intestines and holds on to them for exit. Reducing leakiness in the gut also means garbage in the bile is excreted rather than reabsorbed. For example, fiber helps reduce intestinal reabsorption of estrogens that the liver has tagged for excretion, leading to lower levels circulating in the blood. (P&P)

benefit blood lipid levels

Soluble fiber in the diet (part of the meal itself) has been shown to improve blood lipids better than insoluble fiber (cellulose). Specifically, it helps to lower low-density lipoprotein and total cholesterol. The effective dose in studies was 10 grams/day for this use. (Glore)

Typically, bile salts enter the small intestine from the common bile duct and emulsify fats. From there they can be metabolized by gut flora, sometimes into toxic compounds, reabsorbed or excreted. Psyllium and other fibers have been found to increase intestinal excretion of bile, which is cholesterol, and reduce bacterial alteration of bile salts. This may be one possible mechanism explaining how some soluble fibers lower blood cholesterol. (Vahouny, Trautwein)

drawing and healing effect on wounds topically

Demulcents have long been used as poultices to help draw out anything from a splinter to infection from a wound or other ulceration. They have also been used as dressings, and today we still have colloid or moist dressings used for wounds, whether pharmaceutically manufactured or still using herbs or honey. Plantain on a sting is a perfect example!

Administration ~

Soak! Since demulcents work by being like big soft sponges, it is best to soak them before ingestion, making a 'cold infusion'. Some advise drinking a lot of water with capsules or granules of demulcents or soluble fibers, in which case 'soaking' takes place in the digestive tract. I prefer to soak ahead of time, so I know it's hydrated thoroughly. *Cold* infusion is key because heat causes molecules to move faster, and in this case that can break the branches that make it possible for the demulcent to hold water. So decocting these roots, seeds and barks will not give you as much of a gel, the thick slime that you really do want, rather you'll get a nice viscous tea, especially if you let it steep a while (so the less-damaged molecules have some time to swell). Tinctures are not a very useful way to take demulcents, especially for their effects on the gut because tinctures can't capture enough of the polysaccharides to gel up.

Clinically, I usually suggest 1-2 teaspoons of demulcent herbs per day, in one or two doses usually given between meals or bedtime. Depending on the indication, demulcents may be taken before or during meals for digestive problems of the stomach and small intestine, or after meals in the case of reflux or inflammation and protection from irritation.

Recipes ~

General directions for the 'mucilaginous mixture':

Mix a heaped teaspoon of herbal powder (marshmallow powder, slippery elm powder, chia seeds or freshly ground flax seeds) with 6-8 oz of tepid water. Soak for 10-15 minutes, longer is OK. Add this mixture to your recipe.

Smoothie:

Combine mixture with 1 cup whole, active culture yogurt or kefir and ½ cup or more of fresh or frozen fruit in a blender. Depending on the sweetness of the fruits, you can include a teaspoon of honey or maple syrup. (You can also add a teaspoon of ‘green powder’ – spirulina, etc, to this for even more gut healing benefit). Whiz until well combined and enjoy!

Oatmeal or Amaranth:

Per serving, cook ¼ cup oatmeal or (amaranth grain for a gluten-free version) with ¾ cup water and ½ cup fruits (fresh, dried or frozen) over low heat until cereal is thoroughly cooked. Add mixture, stir in well and heat through. Serve with yogurt and fresh nuts or seeds if desired. The proportions of grain and water can be adjusted to get the desired consistency of cereal.

Fruity Snack:

Combine mixture with 1 cup of applesauce and a bit of cinnamon or ginger powder to taste. Alternatively, you can stew apples with dried apricots, prunes or raisins in a little water, then stir in the mixture and heat through. This is also yummy served with some yogurt.

Chia pudding:

Stir 2-3 tablespoons of chia seeds into 1 can of coconut milk and 1 tablespoon (or to taste) of honey or maple in a wide-mouth glass jar or bowl. Cover and put in the refrigerator for 4+ hours, until set. Serve with fruit or even by itself.

Safety concerns~

Some folks get gassy and bloated from soluble fiber, especially if they are not used to it and begin taking lots. Herbal mucilage is often gentler, such as marshmallow or slippery elm rather than psyllium. Best to start slowly and gently, especially with dramatic changes.

There have been reports of obstruction in the esophagus from taking soluble fibers in a dry form, which is why I always suggest they be soaked before ingestion.

The assimilation of medications taken concurrently with demulcents or especially soluble fibers may be modified by the mucilage. In some cases, such as levodopa for Parkinson’s, “Plantago ovata husk administration caused a smoothing and homogenization of levodopa absorption, providing more stable concentrations and final higher levels, resulting in a great benefit for patients.” (Fernandez-Martinez) So interactions can be desirable, but other cases not. If you take a medication, best to research it’s interactions with soluble fibers like psyllium to determine at least generally if other demulcents may affect its absorption, and therefore levels in your blood. As with many herbs, there is concern that demulcent herbs interact with medications like warfarin/coumadin (blood thinners). Typically it’s a reduction in absorption of the drug that is feared. According to Expert Opinion Drug Metabolism Toxicology, “Drug interactions have been the subject of numerous studies, but few of them have been carried out with dietary fiber and the results obtained have often been variable. The incidence and importance of interactions between fiber and drugs has increased due to a worldwide rise in the use of dietary fiber. Plantago ovata husk has the potential for producing both benefits and risks with both desirable and undesirable effects when coadministered with drugs. More clinical studies are justifiably needed to improve treatments and to better evaluate patient safety.” (Fernandez)

There have also been concerns that demulcents, or at least soluble fibers, will reduce the bioavailability or assimilation of minerals. Studies on animals, at least, have not shown this to be the case, there were no mineral imbalances found in the test subjects (Vahouny) Principles & Practice of Phytotherapy, however, suggests that demulcent supplementation “should be kept under review in cases of: iron deficiency anaemia, osteoporosis and chronic malnutrition” because of possible reduced nutrient assimilation.

References ~

Principles & Practices of Phytotherapy, 2nd edition, Mills & Bone, Churchill Livingstone, 2013

Br J Nutr. 2013 Nov - **Improvement of the metabolic syndrome profile by soluble fibre - guar gum - in patients with type 2 diabetes: a randomised clinical trial.**

Dall'Alba V1, Silva FM, Antonio JP, Steemburgo T, Royer CP, Almeida JC, Gross JL, Azevedo MJ.

Expert Opin Drug Metab Toxicol. 2012 Nov - **Drug interactions with the dietary fiber Plantago ovata husk.**

Fernandez N1, Lopez C, Diez R, Garcia JJ, Diez MJ, Sahagun A, Sierra M.

BMC Complement Altern Med. 2014 Aug - **A randomised clinical trial to evaluate the effects of Plantago ovata husk in Parkinson patients: changes in levodopa pharmacokinetics and biochemical parameters.**

Fernandez-Martinez MN1, Hernandez-Echevarria L, Sierra-Vega M, Diez-Liebana MJ, Calle-Pardo A, Carriedo-Ule D, Sahagún-Prieto AM, Anguera-Vila A, Garcia-Vieitez JJ.

J Am Diet Assoc. 1994 Apr - **Soluble fiber and serum lipids: a literature review.**

Glore SR, Van Treeck D, Knehans AW, Guild M.

J Nutr. 2012 Aug - **Small intestinal goblet cell proliferation induced by ingestion of soluble and insoluble dietary fiber is characterized by an increase in sialylated mucins in rats.**

Hino S1, Takemura N, Sonoyama K, Morita A, Kawagishi H, Aoe S, Morita T.

Am J Clin Nutr. 2006 April - **Association between dietary fiber and serum C-reactive protein**

Yunsheng Ma, Jennifer A Griffith, Lisa Chasan-Taber, Barbara C Olendzki, Elizabeth Jackson, Edward J Stanek III, Wenjun Li, Sherry L Pagoto, Andrea R Hafner, and Ira S Ockene

Pharmacol Res. 2011 Jul - **Soluble fiber-enriched diets improve inflammation and oxidative stress biomarkers in Zucker fatty rats.**

Sánchez D1, Quiñones M, Moulay L, Muguerza B, Miguel M, Aleixandre A.

Dig Dis Sci. 2010 May - **Soluble dietary fiber protects against nonsteroidal anti-inflammatory drug-induced damage to the small intestine in cats.**

Satoh H, Hara T, Murakawa D, Matsuura M, Takata K.

Nutr Rev. 2013 Dec - **Fiber intake and glycemic control in patients with type 2 diabetes mellitus: a systematic review with meta-analysis of randomized controlled trials.**

Silva FM1, Kramer CK, de Almeida JC, Steemburgo T, Gross JL, Azevedo MJ.

Lipids. 1998 Jun - **Psyllium, not pectin or guar gum, alters lipoprotein and biliary bile acid composition and fecal sterol excretion in the hamster.**

Trautwein EA1, Rieckhoff D, Kunath-Rau A, Erbersdobler HF.

J Nutr. 1987 Dec - **Dietary fiber supplementation and fecal bile acids, neutral steroids and divalent cations in rats.**

Vahouny GV1, Khalafi R, Satchithanandam S, Watkins DW, Story JA, Cassidy MM, Kritchevsky D.