MALT PRODUCTS CORPORATION

The Surprising Contributions of Malt Extract and Molasses to Pet Nutrition

Malt historically has been an attractive ingredient in pet food and animal feed for its whole grain derived nutritional contributions. Some of the more common associations with malt include:

Minerals: including calcium, copper, magnesium, manganese, potassium, selenium and zinc. Copper and selenium are integral as antioxidant enzyme co-factors which help shorten recovery in sporting and working dogs.

From malt extract, **B Vitamins**: (niacin, riboflavin, pantothenic acid, thiamin, nicotinic acid, Vitamin B6 (pyridoxine), biotin, and folic acid). Vitamins are primary cofactors in metabolism and formulating with vitamin containing ingredients helps aid energy production and utilization in animals that consume them.

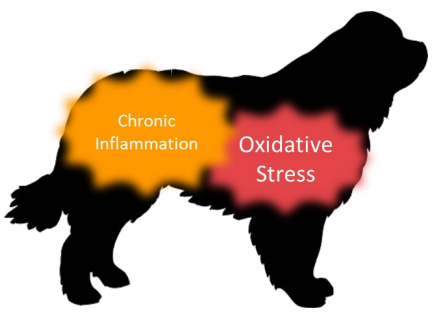
Protein and **amino acids**: malt extract contains ~6% protein and free amino acids which are nutritional components required for building and maintaining muscle tissue. Physical exertion increases the need to rebuild and reinforce muscle fibers, and the presence of protein and amino acid helps in this regard.

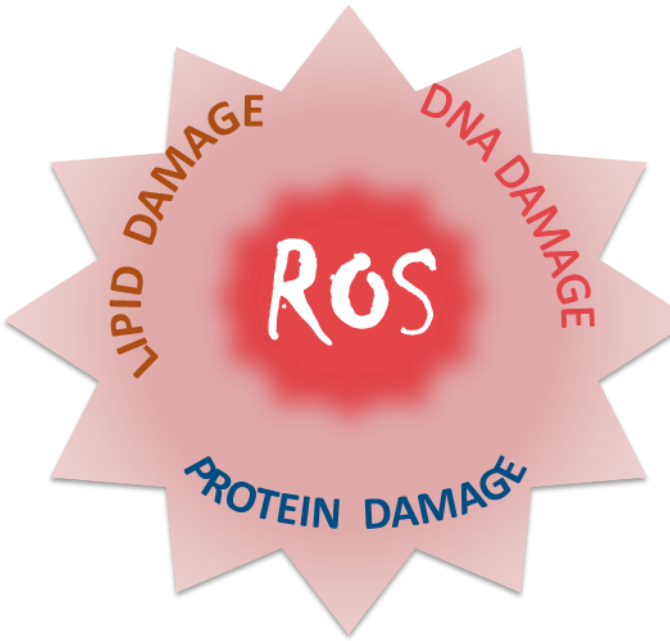
Pallatability: Malt contains compounds that help improve the overall flavor profile of petoods and that can mask bitter tastes.

Benefits beyond traditional nutrition: antioxidants

Malt and molasses contain compounds with benefits beyond typical nutritional associations. There is increased awareness that compounds from plants, also called dietary phytochemicals, play a role in the prevention of chronic disease, and that the health benefits conferred by vegetables, fruit, and whole grains are due in part to these compounds. This is increasingly relevant as the prevalence of obesity and chronic disease is increasing in both pets (and their owners.)

Not surprisingly, there is considerable and growing interest in research investigating the role antioxidant phytonutrients have on the long-term health and longevity of companion animals. While much of the research on antioxidant phytonutrients to date has focused on human health, many of the concepts regarding the protective benefits of antioxidants might be applied to other species including canines and felines. As of today, there is scant research focused on the health implications of phytonutrients on companion animals. Traditionally, pet foods have been formulated to deliver the nutrients required by the animal, however it is becoming recognized by nutrition experts that the importance of “non-essential” phytonutrients may be greater than anticipated and may play a critical role in the prevention of chronic diseases that are increasingly concerning to pet owners, such as obesity, diabetes, and cancer. Recently some pet owners have taken and interest in grain-free or low carbohydrate foods to address these issues. However, the phytonutrients that may play a role in chronic disease prevention are found abundantly in whole-grain derived materials such as malt extracts and molasses. These materials may also have the potential to be used as replacements for synthetic antioxidants for the stabilization of lipids in pet food and feed, an idea that may be new to the pet food and feed industry.





Antioxidants are compounds that provide a protective function from damage caused by reactive oxygen species (ROS), or free radicals. ROS are an unavoidable product of normal metabolic activity and can also be a result of dietary and environmental factors. ROS are believed to be responsible for initiating some chronic diseases by inflicting oxidative damage on cellular components faster than the organism's ability to repair the damage. This is worrisome because obesity is increasing in companion animals, and excessive adiposity is correlated with an increase in oxidative stress. Oxidation of DNA can result in mutation and eventually cancer, while oxidative damage to other cellular components can lead to chronic inflammation that manifests itself as cardiovascular disease, neurodegeneration, and cancer.

Grain extracts such as malt extract and other plant derived materials such as molasses possess free phenolic compounds that provide protective benefits against reactive oxygen species (ROS) in potentially meaningful quantities and in a bioavailable form as compared with the bound phenolics found in whole grains. For example, malt extract has been shown to possess free phenolic levels three-fold higher than in the unmalted barley. Molasses also possesses a diverse profile of phenolic compounds present in concentrations of 2.8-3.9 g/L. Molasses also has been shown to prevent DNA oxidation, and provide protection to oxidatively stressed human HepG2 cells as effectively as α-tocopherol. Additionally, Studies have also shown phenolic compounds present in malt increase antioxidant capacity both in vitro and in vivo models, and that these compounds conferred protection against biological macromolecule damage by free radicals. Malted barley has also been shown to increase in antioxidant capacity after kilning, which may be due to the development of MRP antioxidant compounds. MRP are also effective synergists with phenolic antioxidants and assist in the decomposition of hydroperoxides. Some studies have found that the conditions of the Maillard reaction will dictate the degree of antioxidant capacity of the resulting compounds, and in some cases can result in some pro-oxidant compounds. Higher kilning temperatures have been shown to produce higher MRP content in malt but also higher pro-oxidant content, so the conditions in which these products are created needs to be understood in order to maximize the antioxidant potential of these products.

Benefits beyond traditional nutrition: anticariogenic & prebiotic support

As compared with the antioxidant properties of natural syrups, there is less evidence in the body of science to support the ability of malt extracts and molasses to influence microbial growth, but what does exist does support further investigation. Researchers have dentified phenolic compounds that inhibited the growth of cariogenic bacteria (*S. mutans* and *S. sobrinus)* in cane molasses. Also of interest is a study where cane molasses effectively killed *s. aureus* at 2 to 4% concentration, suggesting that it has a potential value as a therapeutic agent in antibiotic therapy. These findings suggest that the utilization of phytochemical rich materials like molasses cannot be compared to refined syrups, which may promote the growth of cariogenic bacteria much differently due to the absence of these compounds. Malt extract has also been shown to significantly increase the gastrointestinal tolerance of a probiotic , thus positively impacting the gut microbiota and digestive health of the animal. Acid and bile tolerance are properties that indicate the ability of a probiotic microorganism to survive the passage through the gastrointestinal (GI) tract, resisting the acidic conditions in the stomach and the bile acids at the beginning of the small intestine. A study investigated the effect of both malt extracts and cereal fiber on the viability of the lactic acid bacterium *Lactobacillus plantarum* under gastrointestinal tract conditions, with simulated gastric juice and bile juice used for the evaluation of gastrointestinal tolerance. Malt extracts were found to significantly enhance gastric tolerance and provide enhanced bile tolerance as compared control conditions. The unique sugar composition of malt was thought to drive this enhancement.

Malt Products Corporation wants to help you enhance your pet food formulation goals. Contact us at 800-526-0180, or send an email inquiry to: info@maltproducts.com

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