

AppleActiv DAPP™ Overview

Organic (Dried Apple Peel Powder)

Apple peels are very rich in polyphenols and flavonoids that have been shown to have potent antioxidant and anti-inflammatory effects, and to improve joint health in in vitro and human clinical studies. Oxidative stress from free radicals and excessive inflammatory processes can contribute to the development of arthritis and joint pain, which stem from a number of causes including consumption of oxidized lipids from fried or overprocessed foods, too much dietary intake of omega-6 fatty acids, and insufficient intake of essential vitamins and minerals necessary to rebuild weakened or damaged cartilage. During aging, the chondrocyte cells of the joints experience a greater rate of cell deterioration and cell death, which contributes to loss of cartilage matrix tensile strength, and this leads to increased stiffness, restricted joint movement, and loss of mobility. However, dietary factors also can have very beneficial effects in ameliorating this damage. Through enhanced nutritional support, joint function can be improved, inflammation can be managed, and joint degradation slowed down to allow the natural repair processes to become more effective.

A specially processed 100% organic apple peel product known as AppleActiv DAPP™ has been developed from Ecocert certified (USDA National Organic Program equivalent) apples that are grown in North America using a gentle, low-heat drying process to preserve the antioxidant and anti-inflammatory phenolic

compounds found in apple peels. Apple flesh and peel contain compounds like phloretin glycosides, phloridzin, and chlorogenic acid; however, some flavonoids that are found exclusively in the apple peel have more potent antioxidant activities than apple flesh does (Wolfe, 2003). Chart 1 compares the antioxidant activity of apple peels with apple flesh.

Since gastrointestinal mucosa is constantly exposed to reactive oxygen species from various sources, the presence of antioxidants may contribute to the body's natural defenses against inflammatory diseases. Apple polyphenols extracted from dried apple peels (DAPP) were tested for antioxidant and anti-inflammatory potential in intestinal Caco-2/15 cells that had oxidative stress induced by an iron-ascorbate (Fe/Asc) combination and inflammation generated by lipopolysaccharides as a model of inflammatory bowel disease. The phenolic compounds present in AppleActiv DAPP (phenolic acids, flavonol glycosides, flavan-3-ols, and procyanidins) prevented Fe/Asc-mediated lipid peroxidation and counteracted LPS-mediated inflammation, which was shown by reduced levels of cytokines (TNF- α and IL-6) and prostaglandin E2 as well as by decreased activity of the inflammatory enzymes COX-2 and nuclear factor- κ B, which are involved in inflammatory bowel disease.

Nonsteroidal anti-inflammatory drugs like aspirin and ibuprofen are frequently used for joint pain, but they often have unwanted side effects, including a decrease in new cartilage synthesis as the beneficial pathways are shut down, and gastrointestinal and cardiovascular health issues, leading many consumers to seek out a natural approach (Pountos, 2011). Fruits are a rich source of polyphenolic flavonoids and have been found to have COX-2 inhibitory activity similar to ibuprofen to reduce inflammation (Seeram, 2001). Using a natural approach may have the potential to improve mobility and reduce pain sensation without the side effects of synthetic drugs. A 12-week study tested AppleActiv DAPP in healthy people with moderate symptoms of reduced joint range of motion in well-defined areas and associated chronic discomfort. Subjects consumed 4.25 grams of DAPP daily for 12 weeks, with evaluations of cellular antioxidant protection capacity (CAP-e bioassay), 17 distinct ranges of motion measurements, and joint discomfort feedback given as visual analog scales. The results found improved antioxidant protection and a statistically significant improvement in serum antioxidant status of the CAP-e bioassay, which included several inflammation markers. In

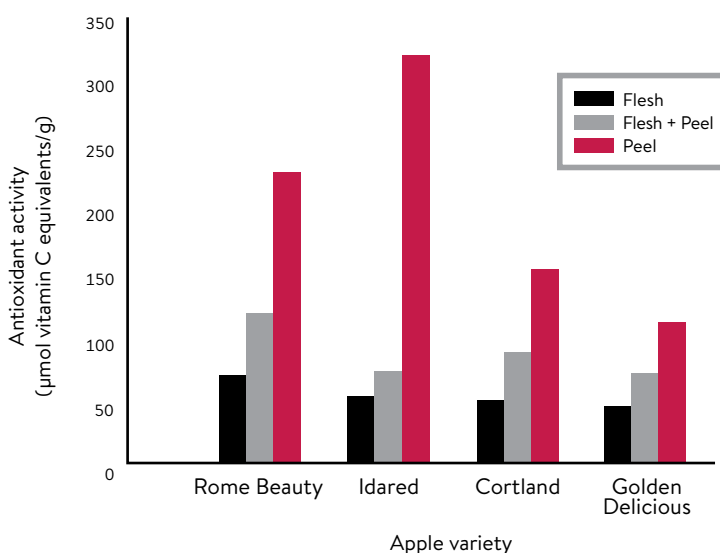


Chart 1. A comparison of antioxidant activity in apple peels and flesh.

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In addition, there was improved joint mobility and range of motion, with some subjects reporting improvements in as little as 2 weeks, but all areas showing improvement by 12 weeks. Reductions in joint discomfort were statistically significant after 4 weeks ($p < 0.05$) and were highly significant by the end of the 12-week period (Jensen, 2014). Additional in vitro testing found that AppleActiv DAPP provided antioxidants that were available to enter into and protect cells from oxidative damage and inhibited both COX-2 (cyclooxygenase-2) and lipoxygenase enzymes (see chart 2). White blood cells known as polymorphonuclear cells that are mediators of inflammation were pretreated with AppleActiv DAPP before inflammatory agents were given. The results showed reduced reactive-oxygen-species free-radical formation.

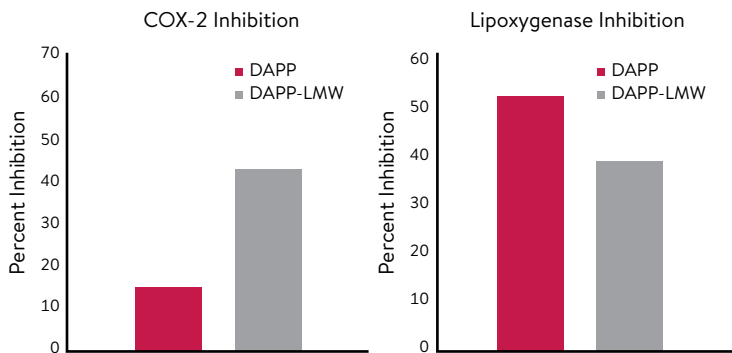


Chart 2. Apple peel powder's inhibitory effects on inflammatory enzymes and lipoxygenase.

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References

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