

Flower Pollen Extract and its ability to reduce liver damage associated with hepatotoxicity

WHAT IS HEPATOTOXICITY?

Hepatotoxicity is damage that occurs to the liver due to the toxic buildup of elements in the body. The liver itself functions as a site for the transformation of foreign substances and various chemicals into less harmful compounds, in order to eliminate them from the body. Different metabolic processes that complete these chemical transformations make it possible to reduce the fat solubility and change the biological activity of toxic compounds. By converting the toxins to inactive water soluble chemicals, the liver stops toxins from being deposited and accumulated in the body's fatty tissues. These newly created water soluble chemicals may then be eliminated from the body via the urine or bile. The liver completes this process for both endogenous substances, which originate from within the body (e.g. cholesterol or proteins) and exogenous substances, which originate from outside the body (e.g. chemicals or drugs). Because the liver is a major site for these transformations, it is more susceptible to drug induced injury, both from over-the-counter medications (OTC) and pharmaceuticals.

WHAT CAUSES HEPATOTOXICITY?

Chemicals that can cause damage to the liver are called hepatotoxins. Common hepatotoxins include alcohols, OTC pain relievers, prescription medications, various herbs and industrial chemicals. Among these hepatotoxins, drug induced liver damage accounts for 50% of all acute

liver failures (1). Depending on the hepatotoxin, different forms of damage may occur, including zonal necrosis, hepatitis, cholestasis, granulomas and neoplasms. Based on the severity of the different damages and the magnitude of disturbances to liver functions, large concentrations of hepatotoxins lead to acute liver failure. To test for liver damage a number of different biochemical markers are used as indicators including aminotransferases, alkaline phosphatase, cholinesterase and bilirubin. These biochemical markers show a direct correlation to the amount of damage present in the liver.

WHAT IS FLOWER POLLEN EXTRACT?

Flower Pollen Extract is a standardized extract from targeted pollen producing species that has been used historically for over 50 years. This product is supported by a substantial amount of open, placebo-controlled and double-blind clinical trials for various health indications. Flower Pollen Extract is produced using a combination of unique growing and processing techniques. A specific number of selected plants contribute their pollen to produce Flower Pollen Extracts. These plants are chosen after acute oral, dermal and genetic toxicity assay are completed. The different pollens are harvested mechanically from the fields and are further processed to remove any plant material to isolate the pure pollen.

Once in pure form, the pollen is extracted to remove the outer shell and to release the internal nutrients. This

COLLEEN MAY

Graminex LLC
2-300 Co Rd C
Deshler, OH 43516, USA
Tel +1 (419) 278-1023

published by **B5** srl
Via Mario Donati, 6
20146 Milano - Italy
Tel. 0039 02 83241119
Fax 0039 02 8376457
www.b5srl.com

Table II – Summary of the clinical study findings for Flower Pollen Extract with different hepatotoxins

Hepatotoxin	Application Method	Results
Ammonium Fluoride	Prophylactic	1. Damage to the liver practically did not occur (2) 2. Prevented negative liver changes from occurring (2) 3. Normalized the disorder involving enzymatic and lipid parameters (3)
Paracetamol	Prophylactic Therapeutic	1. Increased the survival rate of animals (5) 2. Decreased hepatic lesions (5) 3. Hepatoprotective effects displayed by normalization of biochemical indicators associated with necrotic changes (6)
Allyl Alcohol	Therapeutic	1. Significantly reduced serum enzyme elevations induce by intoxication (7) 2. Reduced damage to the liver (8) 3. Normalized the activity of transaminase, phosphatase and bilirubin (8)
Galactosamine	Prophylactic Therapeutic	1. Prevented much of the damage actually caused by intoxication (8) 2. Showed a rapid, significant reversion to normal or almost normal aminotransferases and alkaline phosphatase activity, as well as the bilirubin level (9)
Ethionine	Prophylactic	1. May be used for effective protection of liver cells from toxic actions (5)
Carbon Tetrachloride	Therapeutic	1. Mitigated damage to the liver (8)
Organic Solvents	Prophylactic	1. Normalized impairments affecting the enzymatic and lipid parameters (10)
Testosterone	Therapeutic	1. Normalized biochemical indicators of necrotic changes, testifying to the hepatoprotective effects on hepatic cells (11)

CONCLUSIONS

Flower Pollen Extract has been used historically for a variety of health indications including liver support. The unique growing, manufacturing process and exact standardization methods provide a Flower Pollen Extract raw ingredient that goes beyond and is superior to the normal botanical extracts and bee pollen on the market. The chemical makeup of each batch of Graminex Flower Pollen Extract™ is the same each and every time it is manufactured, so finished goods contain the same levels of nutrients every time.

There is evidence in all of these clinical studies that supports the use of pollen extract as a hepatoprotective substance both therapeutically and prophylactically, especially when dealing with various intoxications with hepatotoxins. (Table II) It has been demonstrated that pollen extract can effectively normalize biochemical indicators and enzymatic activity associated with hepatotoxicity as well as reduce hepatic lesions and liver damage. Flower Pollen Extract may be considered as a useful supplement for the support of healthy liver functions, especially when dealing with hepatotoxicity.

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a rise in the activity of aminotransferases and alkaline phosphatase, and a decrease in cholinesterase. There was also a rise in the bilirubin levels tested in the blood serum, providing evidence that liver damage was occurring. A prophylactic application of pollen extract in this study was able to normalize the enzymatic activity of the biochemical indicators and lower bilirubin levels, demonstrating a beneficial effect on the liver.

Paracetamol

Another common hepatotoxin is paracetamol, or acetaminophen, a commonly used OTC analgesic. Paracetamol toxicity is the most common cause of acute liver failure in the United States and the United Kingdom (4). During the course of paracetamol intoxication biochemical indicators respond as previously mentioned with the addition of a decrease in glutathione. Glutathione is a natural antioxidant present in the liver that prevents liver damage from occurring. Levels of glutathione are often measured as an indicator for liver damage.

When pollen extract was administered therapeutically the survival rate of the animals was increased, glutathione levels were increased and on physical examination, the hepatic lesions were decreased (5). The role of glutathione was found to be significant for the mechanism of action of the pollen extract in protecting the liver. An

additional study indicated the normalization of the biochemical indicators of necrotic changes occurring in hepatic cells (6). In reference to paracetamol toxicity, these studies clearly display the hepatoprotective effects of the pollen extract.

Other Hepatotoxins

Other studies that have been conducted using Flower Pollen Extract to show support for liver function have used allyl alcohol and galactosamine. Studies that looked at allyl alcohol intoxication involved application of the pollen extract after intoxication and monitoring the biochemical markers for therapeutic effects (7,8). Both studies found that the pollen extract had a significant beneficial effect on the blood serum levels of biochemical indicators associated with allyl alcohol intoxication, including aminotransferases, alkaline phosphatase, and bilirubin. Other studies conducted with galactosamine, a hepatitis inducer, proved that pollen extracts brought about a rapid, significant reversion to normal or almost normal aminotransferases and alkaline phosphatase activity as well as normal bilirubin levels (8,9). This indicates a prevention of much of the damage caused by galactosamine in the liver. Various other studies have been completed showing Flower Pollen Extract's hepatoprotective effect on the liver under intoxications with different organic solvents and toxic compounds (10,11).