

BERBERINE BENEFITS

Medicinal plants are gaining renewed interest as more studies show that these have multiple uses and are safe to use. Some of these medicinal plants include those belonging to the Berberidaceae family, plants that contain the potent compound, Berberine.

Berberine is a naturally occurring alkaloid compound in several plants, including barberry, tree turmeric, Oregon grape and goldenseal. Berberine is an interesting compound since it can be toxic parenterally but is highly effective in treating several conditions when taken orally. Common in the traditions of Native American healing, Ayurvedic medicine, and traditional Chinese medicine, Berberine has been used in these countries for millennia.

When ingested, Berberine is absorbed in the small intestine, enters the bloodstream, and is transported to the cells in different organs and tissues. In the cell, it can bind to other proteins and enzymes, just as drugs do. For example, a study demonstrated that Berberine can attack cancer cells, and its anti-cancer effects are seen in at least eight key mechanisms.

Berberine fostered anti-cancer activities by targeting critical proteins related to cell invasion and metastasis (spread), cell death, cell growth, cell cycle arrest, inflammatory factors, transcription factors, chemo-sensitivity, angiogenic and radio-sensitivity. Berberine has broad anti-cancer properties because it affects various cancer targets and pathways inside the cells.

The activities of Berberine and its ability to target multiple pathways and proteins inside the cells showed that it has the potential to treat several conditions. Further, it directly affects metabolism since it can activate an enzyme called AMP-activated protein kinase (AMPK). This enzyme improves the uptake of glucose and fatty acids and their oxidation when cells require energy. In addition, AMPK regulates mitochondrial function. When energy demands are increased, mitochondrial fusion maximizes ATP production. The ATP is the primary source of energy in the cell.

Berberine is effective in managing Type 2 Diabetes Mellitus. Type 2 diabetes remains an important cause of morbidity and mortality worldwide. It has affected millions of people and caused the death of millions of people each year.

Studies show that Berberine has similar effects as metformin in lowering blood glucose levels in patients with type 2 diabetes. Berberine lowers blood sugar levels by reducing the following:

- Hemoglobin A1c (HbA1c)
- Fasting blood glucose
- Plasma triglycerides
- Postprandial blood glucose

Berberine appears to lower blood glucose levels through multiple mechanisms:

- Decrease production of glucose (gluconeogenesis) in the liver
- Increase the breakdown of glucose in the body through a process called glycolysis
- Decrease resistance to insulin, allowing sugar to be transported into the cell where they are transformed into energy-building blocks
- Reduce the breakdown of glucose or carbohydrates in the gut
- Improve the microbiota of the gut by increasing the number of bacteria that are beneficial to the body.

In a pilot study that examined the effectiveness of Berberine in lowering blood glucose levels, results indicated that intake of 500 mg of Berberine three times a day resulted in a 0.8% decrease in HbA1c levels. Prior to receiving treatment, the participants' average HbA1c level was 8.1% and reduced to 7.3% after treatment with Berberine. Notably, fasting plasma insulin was also reduced by 28.1%. Insulin resistance was reduced, which in turn lowered blood glucose levels. Since Berberine works well in lowering blood glucose levels and has the same efficacy as metformin, it is an ideal supplement for managing type 2 diabetes mellitus.

Berberine is also effective in lowering cholesterol levels. Cardiovascular diseases remain among the top causes of death across the world. Several factors have been identified to cause heart disease. Healthcare practitioners measure blood cholesterol, low-density lipoprotein (LDL), the bad kind, triglyceride and high-density lipoprotein (HDL), the good kind, to determine an individual's risk of heart disease, heart attack and stroke.

A review and meta-analysis of 13 clinical trials revealed that Berberine:

- Increased HDL levels by 1.59 mg/dL in patients receiving treatment compared to the control group.
- Decreased triglyceride levels by 0.93 mmol/L in the treatment group compared to the control group.
- Decreased total cholesterol by 1.06 mmol/L in the treatment group compared to the control group.
- Lowered LDL by 1.77 mmol/L in the treatment group compared to the control group.

Berberine can potentially improve hyperlipidemia and thus also reduce obesity. Since Berberine can reduce blood glucose levels, improve cholesterol numbers, and manage obesity, this supplement can have protective effects against heart diseases in the long term. Besides reducing heart disease risk, current data from published studies have shown that Berberine can lead to other health benefits.

Cancer. Berberine reduces the risk of colon cancer by increasing the population of good bacteria in the gut. These good bacteria improve the integrity of the gut. In addition, Berberine also degrades a compound called β -catenin. This compound is critical in the development of colon cancer.

Dementia. Berberine increases the production of neurotransmitters, which are molecules that are secreted by a neuron and act in signaling another cell. It is believed that increased production of neurotransmitters will delay the progression of dementia. Since Berberine reduces metabolic dysfunction and cardiovascular disease, it can protect the brain against damage.

Infections. Several studies that examined the antimicrobial property of Berberine reported that it is effective against the following microorganisms: Escherichia coli, Salmonella, Vibrio, Klebsiella, Cryptococcus, Shigella, Pseudomonas, Proteus, and Clostridium. Although it is antimicrobial, Berberine does not affect the population of good bacteria in the gut while inhibiting the overgrowth of E. coli, the bacteria that cause diarrhea.

High blood pressure. Hypertension is one of the significant risk factors for stroke. Berberine reduces the risk of stroke by lowering triglycerides, total cholesterol, and LDL levels in the blood. Lowering these compounds also reduces blood pressure levels.