Modified Citrus Pectin

Code: FE2239 – 150 gr

Our **Modified Citrus Pectin** is a complex polysaccharide that comes from the soluble fibre of lemon peel. It has a low molecular weight and size, which allows it to easily pass through the intestinal wall into the bloodstream for better bioavailability. Once inside the circulatory system, it is exposed to all tissues and organs of the body to exert its action.

Ingredients: Modified citrus pectin powder, from lemon (*Citrus × limon*) fruit peel.

Nutritional information:	**3 scoops (15 g)**
Modified citrus pectin, from lemon (*Citrus × limon*) fruit peel	15 g

(providing on average 1 200 mg of sodium)

Size and format:
150 gr.

Recommended daily dose:

1 scoop (5 g) three times a day. Put a soop (5 g) in a glass and add water or juice, do not stir yet and let stand for 3-5 minutes. Stir the contents until the powder is dissolved.

Indications and uses:

- Detoxification, chelation of heavy metals.
- Chronic inflammatory diseases, cardiovascular diseases and obesity-associated fibrosis.
- Adjuvant in cancer treatments.

Cautions:
Do not use if pregnant or breastfeeding. Do not use with other potassium-containing supplements or potassium-containing salt substitutes. Take the product with plenty of water to ensure that the substance reaches the stomach. A choking hazard warning is provided for people with swallowing problems. Avoid consumption in conjunction with medicines and other fibre-based food supplements.

This product provides a significant amount of sodium.

Adverse reactions:
May occasionally cause gastrointestinal discomfort, heart rate disturbances or symptoms of hyperkalaemia such as weakness, tingling or numbness of the extremities, in which case discontinue use and consult a health care professional.

DETAILS:

Modified Citrus Pectin is an excellent nutrient for detoxification, as it selectively binds harmful and heavy metals and toxins for urinary excretion.

Once in the circulatory system, it exerts a mild detoxifying action on organs and tissues throughout the body. The systemic benefits of **Modified Citrus Pectin** include the binding of toxins and heavy metals accumulated due to environmental exposure. These toxins can then be eliminated through urinary excretion. Healthy urinary excretion of these harmful compounds does not alter the critical renal function of retaining minerals such as calcium, magnesium, iron, copper and selenium.

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INGREDIENTS:

MODIFIED CITRUS PECTIN (MCP): it is a low molecular weight form of citrus pectin that is known for its anti-cancer effects and its ability to chelate heavy metals [1]. Our **Modified Citrus Pectin** has been structurally modified to obtain a specific molecular weight, which allows it to be easily absorbed and therefore exert therapeutic properties in the body [1,2]. Unmodified citrus pectin, derived from citrus peel, has a molecular weight of approximately 50-300 kilodaltons (kDa), and these characteristics make it too large to be absorbed into the bloodstream. Modified citrus pectin has a molecular weight of 3-13 kDa and can easily enter the bloodstream.

Heavy metal chelation

It has been shown that it acts as a mild heavy metal chelator. A pilot study in healthy patients showed that ingestion of 5 g MCP three times a day for five days and 20 g on the sixth day resulted in an increase in urinary excretion of heavy metals [2]. After MCP ingestion, urine tests showed a 130% increase in arsenic excretion, 150% increase in cadmium excretion and 560% increase in lead excretion. This occurred in patients with "normal" body deposits of heavy metals, defined as asymptomatic and without other evidence of increased body burden. These authors suggested that "systemic chelation of toxic metals by MCP may be attributed in part to the presence of rhamnogalacturonan II, which has previously been shown to chelate heavy metals" [2].

Another study described this chelation in children with lead poisoning using MCP [3]. In this study, seven hospitalised children with a blood lead level above 20 µg/dl and who had not received any chelating or detoxifying medication during the previous three months received 15 g of MCP divided into three doses per day. After 28 days, blood tests showed a "dramatic decrease in serum blood lead levels" [3], with an average decrease of 161% and a concomitant increase in the 24-hour urine lead level, reflecting increased urinary excretion.

Chronic inflammatory disease

Galectin-3 is a lectin that belongs to the beta-galactoside-binding protein family and is present in most adult tissue types. However, it is overexpressed in cancer cells and is present at increased levels in the tumour microenvironment [4]. There is evidence that it not only has an effect on the development of cancer, but also plays an important role in other chronic inflammatory diseases. The role of galectin-3 in cardiovascular disease is probably the most studied, as it has been implicated in cardiovascular remodelling and fibrosis [5]. In fact, galectin-3 is approved as a diagnostic test in chronic heart failure. Elevated galectin-3 levels predict an increased risk of death [1]. Since then, galectin-3 has been associated with several cardiovascular conditions such as aneurysm, aortic stenosis, etc. [6,7]. Researchers found that "obesity increases galectin-3 production in the cardiovascular system" [5] and that "inhibition of galectin-3 with modified citrus pectin (100 mg/kg/day) reduced cardiovascular levels of galectin-3, total collagen, collagen I, transforming and connective growth factor, osteopontin and monocyte chemoattractant protein-1 in heart and aorta of obese animals without changes in body weight or blood pressure" [5]. In other words, MCP supplementation in animals reduced markers of inflammation, cardiac remodelling and fibrosis associated with obesity.

Cancer

Galectins play an essential role in the origin and development of cancer, such as angiogenesis, cell adhesion, invasion and migration [8]. In addition, galectin-3 has been shown to exert immunosuppressive effects on the tumour microenvironment, thereby facilitating cancer growth [4].

Research on galectin-3 in various types of cancer shows that galectin-3 plays a part on: helping breast cancer cells evade immunosurveillance and their destruction by T-cells; increasing uterine cancer cell resistance to chemotherapy; enhancing gastric cell motility and increasing metastasis; increasing melanoma cell growth, progression, angiogenesis and metastasis; increasing glioma (brain cancer) progression [4].

As galectin-3 is a beta-galactoside-binding protein, and MCP is rich in beta-galactose, MCP has the ability to bind to galectin-3, thus blocking its harmful effects [9]. In experimental models, MCP supplementation has been shown to achieve the following:

- It sensitises prostate cancer cells to chemotherapy agents (cisplatin), in vitro [10].
- It induces apoptosis in androgen-dependent and androgen-independent prostate cancer cells in vitro [11].
- It activates cytotoxic T-cells, B-cells and NK cells in chronic myeloid leukaemia cells, in vitro [12].
- It has synergistic cytotoxic effects with paclitaxel (chemotherapy) on ovarian cancer cells [13].
- It induces apoptosis in lung cancer cell lines [14].

In a Phase II clinical trial, MCP supplementation was shown to increase PSA doubling time (PSADT) in 13 men with prostate cancer who had a biochemical PSA relapse after localised treatment: radical prostatectomy, radiation or cryosurgery [15]. This means that, despite surgery and radiotherapy, these men experienced rising PSA levels that indicate prostate cancer recurrence. The time to double their PSA levels increased significantly in 70% of these men after taking MCP for 12 months, compared to before taking MCP. This means that MCP potentially increased the time to prostate cancer recurrence.

Many naturopathic doctors specialised in cancer treatment also use MCP before and after surgery to reduce the risk of metastasis (spread of cancer) [16].

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