
Comprehensive Information on Humic Acids

1. HUMIC ACIDS

(Humic acids) — Chemical and Biological Nature

Humic acids are **high-molecular-weight polyfunctional organic compounds** containing:

- carboxyl groups (–COOH)
- phenolic hydroxyl groups (–OH)
- aromatic rings

This structure determines their **sorption, ion-exchange, and antioxidant properties**.

Mechanisms of Action

1. Enterosorption and Detoxification

Humic acids:

- possess pronounced **chelating capacity**
- bind cations of heavy metals (Pb^{2+}, Hg^{2+}, Cd^{2+})
- form stable, insoluble complexes

Important:
They are **not absorbed into systemic circulation** and act locally in the intestines, which reduces the risk of systemic side effects.

Their mechanism is comparable to **medical enterosorbents**, but is considered more physiologically balanced.

2. Barrier Protection of the Gastrointestinal Mucosa

Studies show that humic acids:

- form a **protective film on the intestinal epithelium**
- reduce permeability of the intestinal barrier
- decrease the contact of toxins and allergens with the mucosal surface

This is particularly relevant in:

- **increased intestinal permeability syndrome (leaky gut)**
- chronic gastrointestinal inflammation
- diarrheal syndromes

3. Anti-Inflammatory Effects

Mechanism:

- reduction of pro-inflammatory cytokine production (TNF-α, IL-6)
- binding of bacterial endotoxins (lipopolysaccharides)

The effect is **immunomodulatory rather than immunosuppressive**.

4. Antioxidant Activity

Phenolic groups:

- neutralize free radicals
- interrupt lipid peroxidation chain reactions

This is especially important in:

- chronic inflammation
- metabolic stress
- intoxication conditions

Clinical Positioning

Humic acids are appropriate when the goal is:

- **detoxification**
- gastrointestinal support
- reduction of inflammatory burden
- recovery after infections and antibiotic therapy

(local intestinal action, detoxification)

Conditions and Disorders Where Use May Be Justified

1. Intoxication and Toxic Load

- chronic exposure to heavy metals
- environmental and occupational intoxication
- accumulation of mycotoxins
- **endogenous intoxication syndrome** associated with constipation and dysbiosis

Rationale: enterosorption and binding of toxins and endotoxins in the intestine.

2. Gastrointestinal Disorders

- irritable bowel syndrome (IBS)
- chronic gastritis (outside acute exacerbation)
- chronic colitis

- functional diarrhea
- increased intestinal permeability syndrome (*leaky gut*)

Rationale: protective mucosal coating, anti-inflammatory effects, and reduced epithelial permeability.

3. Dysbiosis and Post-Antibiotic Conditions

- disruption of intestinal microbiota after antibiotics
- bloating and unstable stool
- increased intestinal sensitivity

Rationale: binding of bacterial toxins and creation of a favorable environment for microbiota recovery.

4. Allergic and Pseudo-Allergic Conditions

- food intolerance
- gastrointestinal-associated atopic reactions
- histamine reactions of intestinal origin

Rationale: reduction of antigenic load through the intestinal barrier.

5. Inflammatory and Metabolic Conditions

- low-grade chronic systemic inflammation
- metabolic syndrome (as part of a comprehensive approach)

Rationale: binding of lipopolysaccharides and reduction of inflammatory signaling originating from the intestine.

Conclusion

“Humic acids function as a physiological intestinal detox agent — they are not absorbed, do not burden the liver, and help reduce the toxic load on the body.”