



DOSSIER · SUBSTANCE

Humic Acid Complexes

Humic acid complexes are formed during the slow decomposition of plants, primarily from lignin; human studies show improvements mainly for shilajit and peat applications.

7,797

STUDIES IN
TOTAL

167

IN HUMANS

64

OF WHICH
CONTROLLED

422

IN ANIMALS

179

IN THE LAB

Figures from the IHR study database · Last updated 2026-10-16

How to Read This Dossier

ESTABLISHED

measured in humans, with a comparison group

PLAUSIBLE

supported by mechanism, animal studies or observation

HYPOTHESIS

a likely connection that still needs to be tested

Humic Acid Complexes at a Glance

In men, testosterone increased under shilajit in three randomized studies ⁶⁷²².

For energy and performance, shilajit preparations improved endurance performance and maximal oxygen uptake in several controlled studies ⁶⁷.

In eczema, investigators assessed the response under topical fulvic acid (CHD-FA) as better than under a plain care cream ¹².

We evaluated 71 human studies on Humic acid complexes, including 19 randomised controlled trials and 3 meta-analyses or systematic reviews; the controlled studies include 1,611 participants in total. As of 3 October 2026.

1. What Is Humic Acid Complexes? Occurrence, Origin and Forms

Humic acid complexes are mixtures of large organic molecules that form when dead plant matter is broken down and transformed over long periods – above all lignin, the woody substance of plants. There is no single, uniform humic acid: origin, degree of maturation and extraction determine which molecules a preparation contains. They are divided into humic acids, fulvic acids and humins.

Humic acid complexes occur in soils, in peat and bog, in brown coal and leonardite, in compost and in rivers, lakes and their sediments. Shilajit, also called mumijo, is a resin-like substance that seeps from rock in high mountain ranges such as the Himalayas and the Altai and consists largely of humic substances.

Preparations taken by mouth are mostly obtained from leonardite, brown coal or peat: the humic substances are dissolved with alkali, separated and purified. Shilajit is purified and dried. There is also fulvic acid manufactured from carbohydrates (carbohydrate-derived fulvic acid, CHD-FA). Baths and packs use medicinal peat.

Forms and Preparations Studied

- Humic acids and humates, such as sodium or potassium humate
- Fulvic acid, including carbohydrate-derived fulvic acid (CHD-FA)
- Shilajit (mumijo, momiai, asphaltum, mineral pitch)
- Drinkable peat and peat extracts taken by mouth
- Peat baths, peat packs and peloids made from peat
- Combination products containing humic acid complexes – the other ingredients are named in each case

Not covered on this page:

- Sulphur, brine, radon and mineral baths without peat, and mineral mud (fango) without peat → Balneotherapy and Moor Therapy
- Humus as a soil parameter in agricultural and environmental studies
- Isolated lignin from the wood and paper industry

2. What Does Humic Acid Complexes Do? Results by Area

AREA	RESULT IN CONTROLLED STUDIES	STRENGTH OF EVIDENCE	STUDIES	PARTICIPANTS
Bones, joints and muscles	mostly improved	high	1 meta-analyses · 11 controlled · 14 other	584
Hormones and fertility	mostly improved	high	1 meta-analyses · 4 controlled · 3 other	232
Energy, performance and fatigue	mostly improved	high	0 meta-analyses · 5 controlled · 6 other	415
Inflammation and immune system	mixed	moderate	0 meta-analyses · 5 controlled · 12 other	567
Metabolism and blood sugar	mostly improved	moderate	0 meta-analyses · 3 controlled · 7 other	292
Skin and wounds	mostly improved	moderate	0 meta-analyses · 3 controlled · 4 other	66
Digestion and gut	mostly no difference	unclear	0 meta-analyses · 1 controlled · 6 other	0
Brain and cognition	observational data only	unclear	0 meta-analyses · 0 controlled · 4 other	0
Other outcomes	mostly improved	high	0 meta-analyses · 12 controlled · 23 other	1,055

How to read the table: counted are human studies whose results concern the area. “High” means at least one meta-analysis and two controlled studies showing improvement, or at least three controlled studies of which three quarters show improvement, with at least 300 participants in total. “Moderate” means at least two controlled studies showing improvement, as a majority, or one meta-analysis alongside controlled studies. “Low” means one controlled study showing improvement. Where an area has no controlled study, the strength of evidence is at most “low” (result “reviews only” or “observational data only”). Everything else is “unclear”. A study counts as showing improvement when at least half of its outcomes in this area improved. Reviews of combination products do not count as meta-analyses; results that only describe side effects or shares of users do not count as an effect. The same study is counted only once.

3. What the Studies Show in Detail

Humic Acid Complexes, Bones, Joints and Muscles: Human Studies

For bones, joints and muscles, peat applications relieved pain in controlled studies: in knee osteoarthritis under peat packs compared with a mere hot pack ¹⁹ and under peat compresses compared with a sham treatment ²⁶, in back pain under peat pack plus trunk training compared with training alone ²⁰. In another study on back pain, pain and mobility improved under peat therapy as well as under ultrasound and magnetic therapy; for pain, ultrasound performed best ²⁷. A meta-analysis on mud therapy, which included peat in addition to clay and mineral mud, found less pain and better physical function ¹. Under shilajit, muscle strength increased in randomized studies ⁶ and fatigue-related loss of strength decreased ²¹; after a tibial fracture, the bone healed faster under mumijo (Momiai) ⁵. Oral potassium humate relieved pain in knee osteoarthritis in a small randomized study ¹⁴. The strength of evidence is high, but many studies are small, and the comparison conditions as well as the composition of the preparations differ considerably.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
¹ Balakrishna et al. 2026	meta-analysis · 2,651 participants	Pelotherapy (mud, peat, clay, mineral-rich mud); Follow-up up to 6 months; vs. Sham, usual care, or no treatment
² Richard et al. 2025	systematic review	Balneotherapy: healing waters, peloids, peat packs, sepiolite clay; vs. heterogeneous controls, no meta-analysis pos
⁵ Seyed et al. 2020	randomised controlled · 160 participants	Momiaï (shilajit) capsules; two 500 mg capsules daily; 28 days; vs. Placebo
⁶ Divya et al. 2026	randomised controlled · 100 participants	TruBlik™ Shilajit resin (≥60% fulvic acid, ≥10% shilarathenes™); 250 mg twice daily; 90 days; vs. Placebo, double-blind
⁸ Darshani et al. 2025	randomised controlled · 66 participants	ShilAbsorb™ gummies (Shilajit plus herbs); two gummies daily; 60 days; vs. Placebo
¹⁴ C.E.J. et al. 2010	randomised controlled · 28 participants	Potassium humate (from brown coal) vs. lactose; 600 mg three times daily; 6 weeks per phase, 14 weeks total; vs. P
¹⁶ Neltner et al. 2024	randomised controlled	Oral Shilajit supplementation; 500 mg/day or 1000 mg/day; 8 weeks; vs. Placebo
¹⁹ Myeongkyu et al. 2020	randomised controlled	Peat pack applied to both knees; 20 minutes per session, 8 sessions over 5 days; 5 days; vs. Hot-pack-only control

Further studies in this area: [20](#) [21](#) [25](#) [26](#) [27](#) [33](#) [34](#) [36](#) [39](#) [41](#) [49](#) [50](#) [53](#) [54](#) [55](#) [56](#) [62](#) [68](#)

Humic Acid Complexes, Hormones and Fertility: Human Studies

In men, testosterone increased under shilajit in three randomized studies ⁶⁷²², a systematic review classifies shilajit as possibly effective in men with late-onset hypogonadism ³. One study also found a better sexual response ⁷, another an increase in DHEAS with unchanged levels of LH and FSH ²². A mixed preparation of shilajit with ashwagandha, ginger, black pepper, Mucuna pruriens and akarkara also improved free and total testosterone in a randomized controlled study ⁸. The strength of evidence is high, but the studies tested almost exclusively shilajit in men; for peat bath, drinkable peat and other humic acid complexes as well as for women, hardly any robust data are available.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
³ Morgado et al. 2024	systematic review	27 testosterone boosters, including purified Shilajit extract (PrimaVie™); vs. Placebo
⁶ Divya et al. 2026	randomised controlled · 100 participants	TruBlik™ Shilajit resin (≥60% fulvic acid, ≥10% shilarathenes™); 250 mg twice daily; 90 days; vs. Placebo, double-blind, r

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
⁷ Darshani et al. 2025	randomised controlled · 66 participants	ShilAbsorb™ gummies (Shilajit); 90 days; vs. placebo
⁸ Darshani et al. 2025	randomised controlled · 66 participants	ShilAbsorb™ gummies (Shilajit plus herbs); two gummies daily; 60 days; vs. Placebo
²² S et al. 2015	randomised controlled	Purified Shilajit (Ayurvedic rasayana); 250 mg twice a day; 90 consecutive days; vs. Placebo, randomised, double-blind
⁴⁰ Tuhin et al. 2010	study · 35 participants	Processed Shilajit (PS), capsule; 100 mg twice daily after major meals; 90 days; vs. Before-after comparison, no control
⁶⁶ R. et al. 2020	review	Shilajit with Triphala Kwath
⁶⁸ Beer et al. 2013	review	Therapeutic peat (peloid)

Humic Acid Complexes, Energy, Performance and Fatigue: Human Studies

In two randomized studies in men, shilajit improved muscular endurance and lowered perceived exertion ⁶; in the other, maximal oxygen uptake increased, and fatigue decreased somewhat more than under placebo ⁷. A mixed preparation of shilajit and herbs improved endurance in strength exercises ⁸. The strength of evidence is high, but the controlled studies predominantly tested shilajit alone or in mixtures, mostly included healthy, trained men and were partly small; for humic acids, fulvic acid, drinkable peat or medicinal peat as a single preparation for fatigue, controlled data are lacking.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
⁴ Victoria et al. 2025	randomised controlled · 166 participants	Placebo, PE 500 mg, PE 1000 mg, chromium 400 µg with 6 mg PE and 6 mg shilajit, chromium 800 µg with 12 mg PE and 6 mg shilajit
⁶ Divya et al. 2026	randomised controlled · 100 participants	TruBlk™ Shilajit resin (≥60% fulvic acid, ≥10% shilajithenes™); 250 mg twice daily; 90 days; vs. Placebo, double-blind
⁷ Darshani et al. 2025	randomised controlled · 66 participants	ShilAbsorb™ gummies (Shilajit); 90 days; vs. placebo
⁸ Darshani et al. 2025	randomised controlled · 66 participants	ShilAbsorb™ gummies (Shilajit plus herbs); two gummies daily; 60 days; vs. Placebo
¹⁵ Gonzalez et al. 2020	randomised controlled · 17 participants	multi-ingredient preworkout supplement with ancient peat and apple extracts; single dose, one hour before sprint protocol
³⁷ Stier-Jarmer et al. 2017	study · 78 participants	moor bath (moor application); 42 °C, 20 min, followed by 20 min rest; 7 applications over 3 weeks; vs. pre-post comparison
⁴¹ Divya et al. 2026	study · 25 participants	TruBlk™ Shilajit Resin; 500 mg/day (250 mg twice daily); 28 days; vs. no control group (open-label single-arm)
⁵⁵ Dr. et al. 2025	review	standardized Shilajit extracts (Asphaltum punjabianum); 250-500 mg/day; vs. no uniform comparator; review of preclinical

Further studies in this area: ⁵⁷ ⁶³ ⁶⁹

Humic Acid Complexes, Inflammation and Immune System: Human Studies

In hay fever and atopy, skin test reactions weakened in two small randomized studies, with fulvic acid (CHD-FA) ¹³ and with oral potassium humate ¹¹; in the potassium humate study, the eosinophil count also decreased, while immune cell functions such as neutrophil adhesion and basophil stimulation remained unchanged ¹¹. The strength of evidence is moderate: the controlled studies are small, some without a placebo group, and the larger investigations concern combination preparations or other diseases. Oral humates and fulvic acid, peat applications, and mixtures were studied; for peat baths, drinkable peat, and shilajit as a single preparation, predominantly uncontrolled observations are available, and a case report describes an exercise-induced anaphylaxis in which shilajit was considered a co-trigger ⁴⁴.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
¹¹ Justin et al. 2008	randomised controlled · 40 participants	oral potassium humate; vs. random assignment, no placebo group reported
¹³ Justin et al. 2012	randomised controlled · 30 participants	carbohydrate-derived fulvic acid (CHD-FA), 3.8%; 5–40 mL escalating; 20 or 40 mL twice daily; 3 days or 1 week each, with
¹⁴ C.E.J. et al. 2010	randomised controlled · 28 participants	Potassium humate (from brown coal) vs. lactose; 600 mg three times daily; 6 weeks per phase, 14 weeks total; vs. Placebo
²³ M. et al. 2018	controlled · 332 participants	CHD-FA in wellness drink F0210; vs. placebo, double-blind, parallel
²⁴ Strelis et al. 1991	controlled · 137 participants	Peloidin phonophoresis, humisol injections, torfotum injections; vs. Control group without mud preparations
⁴⁰ Tuhin et al. 2010	study · 35 participants	Processed Shilajit (PS), capsule; 100 mg twice daily after major meals; 90 days; vs. Before-after comparison, no control gr
⁴¹ Divya et al. 2026	study · 25 participants	TruBlk™ Shilajit Resin; 500 mg/day (250 mg twice daily); 28 days; vs. no control group (open-label single-arm)
⁴² N. et al. 2026	case series · 20 participants	fulvic acid-based gel; 21 days topical application, assessment until day 28

Further studies in this area: ⁴⁴ ⁴⁶ ⁴⁷ ⁴⁹ ⁵¹ ⁵⁷ ⁶⁰ ⁶² ⁶⁴

Humic Acid Complexes, Metabolism and Blood Sugar: Human Studies

A randomized study with shilajit gummies found no difference in body weight, BMI, and waist circumference ⁷. A study with a mixture of shilajit and agnimantha showed a lower body mass (BMI) and lower total cholesterol compared with another herbal preparation ⁹. The strength of evidence is moderate; it remains open whether the effects are due solely to the humic acid complexes and whether they can be confirmed in healthy people.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
⁴ Victoria et al. 2025	randomised controlled · 166 participants	Placebo, PE 500 mg, PE 1000 mg, chromium 400 µg with 6 mg PE and 6 mg shilajit, chromium 800 µg with 12 mg PE an
⁷ Darshani et al. 2025	randomised controlled · 66 participants	ShilAbsorb™ gummies (Shilajit); 90 days; vs. placebo
⁹ Eranga et al. 2026	randomised controlled · 60 participants	Agnimantha Shilajit Yoga (AS) vs. Bilvadi Yoga (BY); AS 0.5 g twice daily; BY 5 g twice daily with 10 mL honey; vs. AS vs

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
⁴³ Singh et al. 2025	case report · 1 participants	Shilajatu Darvi Yoga: Shilajit plus Berberis aristata decoction; 5 mL twice daily with warm water, empty stomach; 3 months
⁴⁸ Sharma et al. 2003	study	Shilajit; 2 g daily; 45 days
⁴⁹ H. et al. 2000	study	Sodium humate balneotherapy; low concentration of the preparation
⁵² Sakshi et al. 2026	review	Arogyavardhini Vati, Ayurvedic herbo-mineral formulation containing Shilajit
⁵⁴ Ashif et al. 2025	review	Shilajit (Asphaltum Punjabianum), purified; well tolerated even at very high doses; several weeks of continuous intake; \

Further studies in this area: ⁵⁷ ⁵⁸

Humic Acid Complexes, Skin and Wounds: Human Studies

In eczema, the investigators assessed the response with fulvic acid (CHD-FA) for topical application as better than with a plain care cream in a small randomized study; however, severity and redness improved in both groups ¹². A controlled, non-randomized study with oral shilajit found better skin blood flow and altered activity of genes for connective tissue and vessels in middle-aged women ³⁰. The strength of evidence is moderate; the studies are small, and the shilajit study is not randomized. It remains open whether the findings apply to other preparations and over longer periods.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
¹² Justin et al. 2011	randomised controlled · 36 participants	topical CHD-FA versus placebo (emollient); twice daily; four weeks; vs. placebo/emollient therapy
²⁹ Rondanelli et al. 2012	controlled · 30 participants	Association of Massaciuccoli peat and sodium chloride water of Undulna Thermae; 2 weeks; vs. Intervention group vs
³⁰ Amitava et al. 2019	controlled	oral shilajit supplement; 125 or 250 mg bid; 14 weeks; vs. placebo and baseline
⁴² N. et al. 2026	case series · 20 participants	fulvic acid-based gel; 21 days topical application, assessment until day 28
⁵⁶ Aleksander et al. 2025	review	peat and sapropel peloids containing humic, fulvic, hyalomelanic acids; vs. classical thermal versus non-thermal pe
⁶² Tian et al. 2022	review	Mud (raw and refined clay)
⁶⁷ Varsha et al. 2019	review	Fulvic acid as topical cream/lotion in a moisturizing base; vs. Emollients alone

Humic Acid Complexes, Digestion and Gut: Human Studies

For digestion and the gut, two controlled studies are available. In people with diarrhea-predominant irritable bowel syndrome, a randomized study found no confirmed difference from placebo with humic acids ¹⁸. Women responded better than men ¹⁸. A wellness drink with fulvic acid (CHD-FA) was overall well tolerated in a controlled study of 332 HIV-positive people ²³. However, gastrointestinal complaints occurred more frequently with it than with placebo ²³. The strength of evidence is overall unclear, as the controlled findings do not give a consistent picture. Reliable statements about digestive complaints cannot be derived from this.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
¹⁸ Ingolf et al. 2021	randomised controlled	Humic acids versus placebo; vs. Placebo, double-blind, randomised
²³ M. et al. 2018	controlled · 332 participants	CHD-FA in wellness drink F0210; vs. placebo, double-blind, parallel

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
⁴⁵ Shklliaev et al. 2011	case series	SMC electrophoresis combined with peloidotherapy (Uva peat muds)
⁵² Sakshi et al. 2026	review	Arogyavardhini Vati, Ayurvedic herbo-mineral formulation containing Shilajit
⁵⁶ Aleksander et al. 2025	review	peat and sapropel peloids containing humic, fulvic, hymatomelanic acids; vs. classical thermal versus non-thermal pelotherapy t
⁶¹ Paul et al. 2023	review	Ingredients containing fulvic acids and/or humic acids; Long-term use
⁶² Tian et al. 2022	review	Mud (raw and refined clay)

Humic Acid Complexes, Brain and Cognition: Human Studies

For the brain and mental performance, only observations without a control group are available for humic acid complexes. A study without a comparison group reports a better mood after rhythmic rubbing with Solum oil, a peat extract with lavender oil ³⁵. Another study reports a better mood after a peat bath ³⁷. Two review articles suggest benefits for mental performance from shilajit ⁵⁴ and in neurodegenerative diseases from fulvic acid ⁶⁴. Since no controlled studies and no meta-analyses are available, the strength of evidence is unclear; a peat extract-lavender oil mixture, a peat bath, shilajit, and fulvic acid were studied.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
³⁵ Thomas et al. 2008	study · 100 participants	Solum Oil: aqueous peat extract (1:5) 1.96 g and lavender oil 0.5 g per 10 g; 3 treatments within 24 days; 24 days; vs. no control group, pr
³⁷ Stier-Jarmer et al. 2017	study · 78 participants	moor bath (moor application); 42 °C, 20 min, followed by 20 min rest; 7 applications over 3 weeks; vs. pre-post comparison without cont
⁵⁴ Ashif et al. 2025	review	Shilajit (Asphaltum Punjabianum), purified; well tolerated even at very high doses; several weeks of continuous intake; vs. no comparisor
⁶⁴ Didiek et al. 2021	review	Fulvic acid (FA), extracted from lignite, peat, bog and compost

Humic Acid Complexes: Further Outcomes in Studies

After disc surgery, everyday resilience (Oswestry index) improved with peat mud applications ²⁵, and in knee osteoarthritis, general health status improved with peat compresses ²⁶. With shilajit, perceived stress ⁷ and signs of oxidative stress ¹⁰ decreased, and with mumijo, a lowered platelet count was less common ²⁸. A randomized study with shilajit also showed lower muscle damage values (creatine kinase, lactate dehydrogenase) ⁶; with potassium humate, the liver value GGT temporarily rose in four participants, and with placebo in two ¹⁴. A meta-analysis on mud therapy, which also included peat, found no increase in serious adverse events ¹. The strength of evidence is overall high, as several controlled studies are available; shilajit, mumijo, fulvic acid (CHD-FA), potassium humate, and peat applications were tested, some in combination preparations. The transferability to other humic acid complexes and the confirmation of the safety findings in larger, longer-term studies remain open.

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
¹ Balakrishna et al. 2026	meta-analysis · 2,651 participants	Pelotherapy (mud, peat, clay, mineral-rich mud); Follow-up up to 6 months; vs. Sham, usual care, or no treatment
² Richard et al. 2025	systematic review	Balneotherapy: healing waters, peloids, peat packs, sepiolite clay; vs. heterogeneous controls, no meta-analysis pos
⁴ Victoria et al. 2025	randomised controlled · 166 participants	Placebo, PE 500 mg, PE 1000 mg, chromium 400 µg with 6 mg PE and 6 mg shilajit, chromium 800 µg with 12 mg PE
⁶ Divya et al. 2026	randomised controlled · 100 participants	TruBlik™ Shilajit resin (≥60% fulvic acid, ≥10% shilarathenes™); 250 mg twice daily; 90 days; vs. Placebo, double-blind

STUDY	DESIGN · PARTICIPANTS	PREPARATION · DOSE · DURATION · COMPARISON
⁷ Darshani et al. 2025	randomised controlled · 66 participants	ShilAbsorb™ gummies (Shilajit); 90 days; vs. placebo
⁹ Eranga et al. 2026	randomised controlled · 60 participants	Agnimantha Shilajit Yoga (AS) vs. Bilvadi Yoga (BY); AS 0.5 g twice daily; BY 5 g twice daily with 10 mL honey; vs. AS
¹⁰ Satish et al. 2023	randomised controlled · 60 participants	Purified shilajit (Asphaltum punjabianum); 500 mg twice daily; 30 days; vs. Shilajit plus antihypertensives vs antihype
¹³ Justin et al. 2012	randomised controlled · 30 participants	carbohydrate-derived fulvic acid (CHD-FA), 3.8%; 5–40 mL escalating; 20 or 40 mL twice daily; 3 days or 1 week ea

Further studies in this area: [14](#) [17](#) [23](#) [25](#) [26](#) [28](#) [29](#) [31](#) [32](#) [34](#) [35](#) [38](#) [40](#) [41](#) [42](#) [43](#) [46](#) [48](#) [51](#) [54](#) [56](#) [57](#) [59](#) [63](#) [64](#) [65](#) [66](#)

4. How Is Humic Acid Complexes Dosed? Preparation, Dose and Duration in Studies

The studies investigated mainly shilajit as capsules, gummies or resin, peat applications as baths, packs and peloids, as well as oral humates and fulvic acid. Some preparations were mixtures, such as shilajit with herbs or fulvic acid in a wellness drink. The doses and application durations are shown in the table.

PREPARATION OR FORM	DOSE	DURATION	STUDY
Placebo, PE 500 mg, PE 1000 mg, chromium 400 µg with 6 mg PE and 6 mg shilajit, chromium 800 µg with 12 mg PE and 12 mg shilajit	shilajit 6 mg/day (Cr-400) or 12 mg/day (Cr-800), once daily	12 weeks	4
Momiaï (shilajit) capsules	two 500 mg capsules daily	28 days	5
TruBlk™ Shilajit resin (≥60% fulvic acid, ≥10% shilarathenes™)	250 mg twice daily	90 days	6
ShilAbsorb™ gummies (Shilajit)	—	90 days	7
ShilAbsorb™ gummies (Shilajit plus herbs)	two gummies daily	60 days	8
Agnimantha Shilajit Yoga (AS) vs. Bilvadi Yoga (BY)	AS 0.5 g twice daily; BY 5 g twice daily with 10 mL honey	—	9
Purified shilajit (Asphaltum punjabianum)	500 mg twice daily	30 days	10
topical CHD-FA versus placebo (emollient)	twice daily	four weeks	12
carbohydrate-derived fulvic acid (CHD-FA), 3.8%	5–40 mL escalating; 20 or 40 mL twice daily	3 days or 1 week each, with washout	13
Potassium humate (from brown coal) vs. lactose	600 mg three times daily	6 weeks per phase, 14 weeks total	14
multi-ingredient preworkout supplement with ancient peat and apple extracts	—	single dose, one hour before sprint protocol	15
Oral Shilajit supplementation	500 mg/day or 1000 mg/day	8 weeks	16
Aviron Rapid, dietary supplement containing andrographolide, spirulina and humic acid	—	5 days (adolescents) and 7 days (children)	17
Peat pack applied to both knees	20 minutes per session, 8 sessions over 5 days	5 days	19
Mud pack plus core exercise	Mud pack 30 min, core exercise 50 min, twice daily	4 days, 8 sessions	20

5. Is Humic Acid Complexes Safe? Side Effects in Studies

The studies predominantly report good tolerability. More frequently mentioned were temporary skin redness and fatigue under mud and peat applications, briefly lasting burning under topical fulvic acid, as well as gastrointestinal complaints under a fulvic acid-containing drink. One case report describes an exercise-induced anaphylaxis in which shilajit was considered a co-trigger, and in one study the liver value GGT temporarily increased under potassium humate in four and under placebo in two participants.

STUDY	REPORTED SIDE EFFECTS
¹ Balakrishna et al. 2026	Skin erythema 6.5%, transient fatigue 4.8%; no increase in serious adverse events
⁵ Seyed et al. 2020	no significant difference between groups (p = 0.839)

STUDY	REPORTED SIDE EFFECTS
⁶ Divya et al. 2026	No adverse events recorded in the active group
⁷ Darshani et al. 2025	no adverse events reported
⁸ Darshani et al. 2025	Safety assessed, no details in abstract
¹¹ Justin et al. 2008	safety assessed via blood and nasal samples
¹² Justin et al. 2011	short-lived burning sensation on application, otherwise no difference
¹³ Justin et al. 2012	no severe adverse events; safety parameters constant
¹⁴ C.E.J. et al. 2010	GGT increase (4 vs. 2), normalized after discontinuation; tolerability good
¹⁷ Rada et al. 2023	Low number of adverse events, no major differences between groups
¹⁸ Ingolf et al. 2021	No adverse events reported; no patient discontinued
²³ M. et al. 2018	gastrointestinal intolerance (diarrhoea, nausea, vomiting) more frequent than placebo

6. What Remains Open: Limits of the Evidence

- Many studies are small and of short duration.
- The comparison conditions and the composition of the preparations differ considerably.
- For peat bath, drinkable peat and other humic acid complexes as a single preparation for fatigue, controlled data are lacking.
- Almost all studies on hormones and fertility tested shilajit in men; for women, hardly any robust data are available.
- It remains open whether the effects are due solely to the humic acid complexes or to other components of mixed preparations.

7. Bottom Line: What Is Established About Humic Acid Complexes

Humic acid complexes are not a uniform substance but mixtures of large organic molecules from decomposed plant material, primarily from lignin. Human studies show improvements for shilajit and peat applications in pain, physical function, muscle strength, testosterone, endurance performance and some skin and immune parameters. The strength of evidence is high for bones, joints and muscles, hormones as well as energy and performance, moderate for metabolism, skin and immune system, and unclear for digestion as well as brain. Many studies are small, the preparations differ greatly, and controlled data are lacking for several preparations.

Frequently Asked Questions

How well has Humic acid complexes been studied in humans?

We evaluated 71 human studies on Humic acid complexes, including 19 randomised controlled trials and 3 meta-analyses or systematic reviews; the controlled studies include 1,611 participants in total. As of 3 October 2026.

Does Humic acid complexes help with bones, joints and muscles? What the studies show

We evaluated one meta-analysis or systematic review, 11 controlled studies and 14 further studies; the controlled studies include 584 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: high. Sources: [1256](#)

Does Humic acid complexes help with hormones and fertility? What the studies show

We evaluated one meta-analysis or systematic review, 4 controlled studies and 3 further studies; the controlled studies include 232 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: high. Sources: [3678](#)

Does Humic acid complexes help with energy, performance and fatigue? What the studies show

We evaluated 5 controlled studies and 6 further studies; the controlled studies include 415 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: high. Sources: [4678](#)

Does Humic acid complexes help with inflammation and immune system? What the studies show

We evaluated 5 controlled studies and 12 further studies; the controlled studies include 567 participants in total. Result of the controlled studies: mixed. Strength of evidence under our published rules: moderate. Sources: [11131423](#)

Does Humic acid complexes help with metabolism and blood sugar? What the studies show

We evaluated 3 controlled studies and 7 further studies; the controlled studies include 292 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: moderate. Sources: [47943](#)

Does Humic acid complexes help with skin and wounds? What the studies show

We evaluated 3 controlled studies and 4 further studies; the controlled studies include 66 participants in total. Result of the controlled studies: mostly improved. Strength of evidence under our published rules: moderate. Sources: [12293042](#)

What are humic acid complexes?

Humic acid complexes are mixtures of large organic molecules that form during the long decomposition of dead plant material, primarily from lignin. These include humic acids, fulvic acids and humins. Known forms are shilajit, humates, fulvic acid, drinkable peat and peat applications.

What effects do human studies show?

In men, testosterone increased under shilajit in three randomized studies [6722](#).

How safe are humic acid complexes?

The studies predominantly report good tolerability. More frequently mentioned were temporary skin redness and fatigue under mud and peat applications, briefly lasting burning under topical fulvic acid, as well as gastrointestinal complaints under a fulvic acid-containing drink. One case report describes an exercise-induced anaphylaxis in which shilajit was considered a co-trigger.

For which complaints are there no robust evidence?

For digestion and gut, two controlled studies are available that show no confirmed benefit [1823](#). For peat bath, drinkable peat and other humic acid complexes as a single preparation for fatigue, controlled data are lacking.

What should be considered when evaluating the studies?

Many studies are small and of short duration. The comparison conditions and the composition of the preparations differ considerably. Almost all studies on hormones and fertility tested shilajit in men; for women, hardly any robust data are available.

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