INGREDIENT DATABASE

Ingredient: D-Aspartic Acid  
Usage: May boost testosterone and support muscle growth  
Side effects: Headache, irritability, acne (testosterone-related)  
Level of evidence: Mixed  
Recommended Dosage: 2000–3000 mg/day

Ingredient: Tongkat Ali (100:1 Extract)  
Usage: May enhance libido, energy, and testosterone levels  
Side effects: Restlessness, insomnia, increased heart rate  
Level of evidence: Mixed  
Recommended Dosage: 200–400 mg/day of 100:1 extract

Ingredient: Diindolylmethane (DIM)  
Usage: Supports estrogen metabolism and hormone balance  
Side effects: GI upset, headaches  
Level of evidence: Mixed  
Recommended Dosage: 100–200 mg/day

Ingredient: Epicatechin  
Usage: May support muscle growth and improve blood flow  
Side effects: Rare; potential mild stomach discomfort  
Level of evidence: Low/poorly researched  
Recommended Dosage: 200–300 mg/day

Ingredient: Zinc  
Usage: Essential mineral for immune function, testosterone production, and metabolism  
Side effects: Nausea, copper deficiency at high doses  
Level of evidence: High  
Recommended Dosage: 8–11 mg/day (up to 30 mg for short-term supplementation)

Ingredient: Magnesium  
Usage: Supports muscle/nerve function, sleep, and cardiovascular health  
Side effects: Diarrhea at high doses  
Level of evidence: High  
Recommended Dosage: 310–420 mg/day

Ingredient: Vitamin D3 (Cholecalciferol)  
Usage: Regulates calcium, boosts immunity, and supports hormone production  
Side effects: Toxicity at very high doses (hypercalcemia)  
Level of evidence: High  
Recommended Dosage: 600–2000 IU/day

Ingredient: Piperine  
Usage: Enhances absorption of nutrients like curcumin and supplements  
Side effects: May affect drug metabolism, cause mild GI discomfort  
Level of evidence: Mixed  
Recommended Dosage: 5–20 mg/day

Let me know if you’d like a complete combined list of all three batches of ingredients. I can format them into JSON, CSV, or a styled table if that helps.

Ingredient: Niacin  
Usage: Supports energy metabolism and cardiovascular health  
Side effects: Flushing, itching, potential liver toxicity at high doses  
Level of evidence: High  
Recommended Dosage: 14–35 mg/day

Ingredient: Beta-Alanine  
Usage: Buffers acid in muscles, improving endurance  
Side effects: Tingling (paresthesia)  
Level of evidence: High  
Recommended Dosage: 2000–5000 mg/day

Ingredient: Creatine Nitrate  
Usage: Enhances energy production and may increase blood flow  
Side effects: Water retention, possible GI upset  
Level of evidence: Mixed  
Recommended Dosage: 1000–3000 mg/day

Ingredient: Agmatine Sulfate  
Usage: May support nitric oxide production and improve mood  
Side effects: GI distress, nausea  
Level of evidence: Mixed  
Recommended Dosage: 250–1500 mg/day

Ingredient: Arginine AKG  
Usage: Promotes nitric oxide production, enhancing blood flow  
Side effects: GI discomfort, possible herpes virus activation  
Level of evidence: Mixed  
Recommended Dosage: 1500–3000 mg/day

Ingredient: Citrulline Malate  
Usage: Increases nitric oxide levels and reduces fatigue  
Side effects: Mild GI upset  
Level of evidence: High  
Recommended Dosage: 6000–8000 mg/day

Ingredient: Beta-Phenylethylamine (PEA)  
Usage: Stimulates mood and focus  
Side effects: Increased blood pressure, anxiety  
Level of evidence: Low/poorly researched  
Recommended Dosage: 100–500 mg/day

Ingredient: Choline Bitartrate  
Usage: Supports brain function and focus  
Side effects: Fishy body odor, GI distress  
Level of evidence: Mixed  
Recommended Dosage: 250–2000 mg/day

Ingredient: Caffeine Anhydrous  
Usage: Enhances energy, focus, and performance  
Side effects: Jitters, insomnia, increased heart rate  
Level of evidence: High  
Recommended Dosage: 100–400 mg/day

Ingredient: Eria Jarensis Extract  
Usage: Boosts mood and energy (acts like a stimulant)  
Side effects: Unknown, may increase blood pressure  
Level of evidence: Low/poorly researched  
Recommended Dosage: 100–300 mg/day

Ingredient: 2-Aminoisoheptane (DMHA)  
Usage: Acts as a stimulant, increasing energy and focus  
Side effects: Rapid heart rate, high BP, potential for dependency  
Level of evidence: Low/poorly researched  
Recommended Dosage: 100–200 mg/day

Ingredient: 1,3-Dimethylamylamine (DMAA)  
Usage: Potent stimulant for energy and fat loss  
Side effects: High BP, heart issues, banned in many countries  
Level of evidence: Low/poorly researched  
Recommended Dosage: 25–75 mg/day

Ingredient: Higenamine HCl  
Usage: May support fat burning and cardiovascular stimulation  
Side effects: Rapid heartbeat, jitteriness  
Level of evidence: Low/poorly researched  
Recommended Dosage: 20–50 mg/day

Ingredient: Hordeine  
Usage: May stimulate energy and metabolism  
Side effects: Limited data, possibly increases heart rate  
Level of evidence: Low/poorly researched  
Recommended Dosage: 25–75 mg/day

Ingredient: N-Methyl L-Tyramine HCl  
Usage: Boosts mood and energy, acts as a stimulant  
Side effects: Blood pressure elevation, headaches  
Level of evidence: Low/poorly researched  
Recommended Dosage: 25–100 mg/day

Ingredient: Gamma-Aminobutyric Acid (GABA)  
Usage: Promotes relaxation and sleep  
Side effects: Drowsiness, numbness  
Level of evidence: Mixed  
Recommended Dosage: 250–750 mg/day

Ingredient: Yohimbe Bark Extract  
Usage: Supports fat loss and increases libido  
Side effects: Anxiety, elevated BP, heart issues  
Level of evidence: Mixed  
Recommended Dosage: 5–15 mg Yohimbine (not bark extract)

Ingredient: Rauwolfia Vomitoria Root Extract (90% Alpha-Yohimbine)  
Usage: Enhances fat loss and mood at low doses  
Side effects: Anxiety, nausea, BP spikes  
Level of evidence: Mixed  
Recommended Dosage: 0.5–2 mg Alpha-Yohimbine

Ingredient: Calcium  
Usage: Essential for bone health, muscle contraction, and nerve signaling  
Side effects: Constipation, kidney stones (at high doses)  
Level of evidence: High  
Recommended Dosage: 1000–1300 mg/day

Ingredient: D-Ribose (Bioenergy Ribose)  
Usage: Supports ATP production and energy metabolism, often used for heart and muscle health  
Side effects: Mild nausea, headache, low blood sugar  
Level of evidence: Mixed  
Recommended Dosage: 2500–5000 mg/day

Ingredient: Acetyl L-Carnitine  
Usage: May support energy production, brain function, and fat metabolism  
Side effects: Fishy odor, agitation, nausea  
Level of evidence: Mixed  
Recommended Dosage: 500–2000 mg/day

Ingredient: Malic Acid  
Usage: May reduce muscle fatigue and support energy production (Krebs cycle)  
Side effects: Rare, but can include mild GI discomfort  
Level of evidence: Mixed  
Recommended Dosage: 600–2400 mg/day

Ingredient: N,N-Dimethylglycine HCl (DMG)  
Usage: Marketed for immune, athletic, and mental performance enhancement  
Side effects: Limited data; generally well-tolerated  
Level of evidence: Low/poorly researched  
Recommended Dosage: 50–250 mg/day

Ingredient: Rhodiola rosea Extract  
Usage: Adaptogen that may reduce fatigue and improve mental performance  
Side effects: Dry mouth, dizziness, irritability  
Level of evidence: Mixed  
Recommended Dosage: 200–600 mg/day (standardized to 3% rosavins)

Ingredient: Coenzyme Q10 (CoQ10)  
Usage: Supports mitochondrial energy production and heart health  
Side effects: GI discomfort, insomnia  
Level of evidence: High  
Recommended Dosage: 100–200 mg/day

Ingredient: Bromelain  
Usage: Anti-inflammatory and digestion aid, from pineapple or Aspergillus niger  
Side effects: GI discomfort, allergic reactions in sensitive individuals  
Level of evidence: Mixed  
Recommended Dosage: 200–2000 mg/day (depending on use)

Ingredient: Stevia Leaf Extract  
Usage: Natural zero-calorie sweetener  
Side effects: Rare, but can include bloating or nausea  
Level of evidence: High  
Recommended Dosage: Up to 4 mg/kg/day (FDA ADI) ≈ 300 mg/day for average adult

1. Vitamin D:

Purpose: Regulation of gene transcription in most tissues; prevents/treats insufficiency/deficiency affecting many body systems. Important for bone health and may influence immunity.

Recommended dosage: 800 IU to 1000–2000 IU/day to maintain status for the general population; higher doses (50,000 IU/week for 8–16 weeks or 10,000 IU/day for several weeks) may be appropriate for restoring status in deficient athletes, but careful monitoring is necessary.

Evidence level: Moderate support for preventing URS (upper respiratory symptoms); more evidence needed for athletes.

Potential side effects: Toxicity with high doses.

2. Iron:

Purpose: Prevents or treats iron deficiency, which can impair performance.

Recommended dosage: Varies depending on deficiency level; >18 mg/day for women and >8 mg/day for men. Higher doses may be needed for athletes with deficiency.

Evidence level: Not explicitly stated, but the text implies a strong evidence base for treating deficiency.

Potential side effects: Vomiting, diarrhea, abdominal pain, haemochromatosis, and liver failure if taken in excess of need.

3. Calcium:

Purpose: Prevents or treats calcium deficiency, which increases risk of suboptimal bone health.

Recommended dosage: 1500 mg/day, along with 1500–2000 IU vitamin D, to optimize bone health in athletes with low energy availability or menstrual dysfunction.

Evidence level: Not explicitly stated, but the text implies a strong evidence base for treating deficiency.

Potential side effects: Not explicitly stated.

4. Caffeine:

Purpose: Stimulant; improves endurance capacity, time-trial performance, and performance in short-term, supramaximal, and repeated sprint tasks.

Recommended dosage: 3–6 mg/kg body mass, consumed ~60 min prior to exercise. Lower doses (100–300 mg) during endurance exercise may also be beneficial.

Evidence level: Strong.

Potential side effects: Nausea, anxiety, insomnia, restlessness at higher doses (≥9 mg/kg body mass). Diuretic effect, but small at performance-enhancing doses.

5. Creatine Monohydrate:

Purpose: Acutely enhances performance in repeated high-intensity exercise; chronic use improves training adaptations (lean mass, strength, power).

Recommended dosage: Loading phase: ~20 g/day for 5–7 days; maintenance phase: 3–5 g/day.

Evidence level: Strong.

Potential side effects: 1–2 kg body mass increase (water retention), potentially detrimental for some sports.

6. Nitrate:

Purpose: Enhances nitric oxide bioavailability; improves exercise time to exhaustion and sport-specific time-trial performances.

Recommended dosage: 5–9 mmol (310–560 mg) for acute benefits; prolonged intake (>3 days) may also be beneficial. High nitrate foods include leafy greens and beetroot.

Evidence level: Strong for some exercise types.

Potential side effects: Gastrointestinal upset.

7. Beta-Alanine:

Purpose: Augments intracellular buffering capacity; improves sustained high-intensity exercise performance.

Recommended dosage: ~65 mg/kg body mass daily, split into doses over 10–12 weeks.

Evidence level: Moderate.

Potential side effects: Skin rashes, transient paresthesia.

8. Sodium Bicarbonate:

Purpose: Augments extracellular buffering capacity; improves short-term, high-intensity sprint performance.

Recommended dosage: 0.2–0.4 g/kg body mass, 60–150 min prior to exercise. Split doses or serial loading may also be effective.

Evidence level: Moderate.

Potential side effects: Gastrointestinal distress.

9. Probiotics:

Purpose: Increase beneficial gut bacteria; may modulate immune function and reduce gastrointestinal distress and infection.

Recommended dosage: ~10<sup>10</sup> live bacteria daily.

Evidence level: Moderate support for reducing URS.

Potential side effects: Minor side effects reported.

10. Vitamin C:

Purpose: Antioxidant; may reduce upper respiratory tract infections.

Recommended dosage: 0.25–1.0 g/day to potentially prevent URS; high doses may blunt training adaptations.

Evidence level: Moderate support for preventing URS; no support for treating URS.

Potential side effects: Not explicitly stated, but high doses may blunt training adaptations.

11. Zinc:

Purpose: May reduce incidence and duration of colds; required for DNA synthesis and immune cell function.

Recommended dosage: 75 mg zinc acetate lozenges at the onset of symptoms.

Evidence level: No support for preventing URS; moderate support for treating URS (when taken within 24 hours of symptom onset).

Potential side effects: Bad taste, nausea. High doses can decrease immune function.

12. Carbohydrate (drinks, gels):

Purpose: Maintains blood glucose during exercise; may counter immune dysfunction.

Recommended dosage: 30–60 g/hour.

Evidence level: Low-moderate support for attenuating stress hormones and some immune perturbations.

Potential side effects: Not explicitly stated.

13. Bovine Colostrum:

Purpose: Contains antibodies, growth factors, and cytokines; may improve mucosal immunity and resistance to infection.

Recommended dosage: Not specified in the text.

Evidence level: Low-moderate support for blunting decreases in saliva antimicrobial proteins after heavy exercise and some evidence of reducing URS.

Potential side effects: Not explicitly stated.

14. Polyphenols (e.g., Quercetin):

Purpose: Anti-inflammatory, antioxidant, antipathogenic effects; may stimulate mitochondrial biogenesis and improve endurance performance.

Recommended dosage: Not specified in the text.

Evidence level: Low-moderate support for reducing URS during short periods of intensified training and mild stimulation of mitochondrial biogenesis and endurance performance.

Potential side effects: Not explicitly stated.

15. Glutamine:

Purpose: Energy substrate for immune cells; may reduce infections in athletes.

Recommended dosage: Not specified in the text.

Evidence level: Limited support for reducing URS after endurance events.

Potential side effects: Not explicitly stated.

16. β-glucans:

Purpose: Stimulate innate immunity.

Recommended dosage: Not specified in the text.

Evidence level: No support in humans.

Potential side effects: Not explicitly stated.

17. Omega-3 Fatty Acids:

Purpose: May improve cognitive processing, reduce risk/enhance recovery from mild traumatic brain injury (mTBI), increase muscle protein synthesis, and reduce muscle damage.

Recommended dosage: About 2 g/day.

Evidence level: Moderate support for some benefits, but more research is needed.

Potential side effects: Heavy metal contaminants, bleeding, digestive problems, increased LDL.

18. Gelatin and Vitamin C/Collagen:

Purpose: Increased collagen production; thickened cartilage; decreased joint pain.

Recommended dosage: 5–15 g gelatin with 50 mg vitamin C; or about 10 g/day collagen hydrolysate.

Evidence level: Low; more research is needed.

Potential side effects: Not explicitly stated.

19. Anti-inflammatory Supplements (Curcumin, Tart Cherry Juice):

Purpose: Anti-inflammatory effects; reduced symptoms of, or enhanced recovery from, muscle-damaging exercise.

Recommended dosage: About 5 g/day curcumin; 250–350 mL (or 30 mL concentrate) tart cherry juice twice daily for 4–5 days before or 2–3 days after an event.

Evidence level: Moderate; more research is needed.

Potential side effects: Not explicitly stated.

20. Protein:

Purpose: Enhances lean mass gains (with resistance training); enhances fat mass loss and promotes lean mass retention (with energy deficit).

Recommended dosage: 1.6 g protein/kg/day (up to 2.2 g/kg/day); 0.3–0.5 g protein/kg per meal (3–4 times per day).

Evidence level: Strong for muscle growth; strong for fat loss and lean mass retention.

Potential side effects: Not explicitly stated.

21. Leucine:

Purpose: Stimulates muscle protein synthesis; suppresses protein breakdown.

Recommended dosage: Not specified in the text.

Evidence level: Short-term mechanistic data available, but no long-term trials showing efficacy.

Potential side effects: Not explicitly stated.

1. Vitamin D:

Purpose: Regulation of gene transcription in most tissues; deficiency can impair many body systems, including bone health and potentially immune function. Important for immune function.

Recommended dosage: 800 IU to 1000–2000 IU/day for maintenance; higher doses (50,000 IU/week for 8–16 weeks or 10,000 IU/day for several weeks) may be appropriate for restoring deficiency, but careful monitoring is necessary.

Evidence level: Moderate support for preventing upper respiratory tract infections (URTI). More research needed on optimal levels for athletes.

Potential side effects: Toxicity with very high doses.

2. Iron:

Purpose: Correction of iron deficiency anemia, which can impair performance and training capacity.

Recommended dosage: Varies greatly depending on the level of deficiency; higher than the recommended daily allowance (RDA) may be needed for athletes with deficiencies. Specific dosage should be determined by a medical professional.

Evidence level: Strong for treating iron deficiency.

Potential side effects: Gastrointestinal distress (vomiting, diarrhea, abdominal pain), haemochromatosis, and liver failure if taken in excess when iron stores are already adequate.

3. Calcium:

Purpose: Optimizing bone health, particularly important for athletes with low energy availability or menstrual dysfunction.

Recommended dosage: 1500 mg/day, along with 1500–2000 IU of vitamin D.

Evidence level: Moderate support for bone health.

Potential side effects: No specific side effects mentioned in the text, but excessive intake could potentially lead to issues.

4. Iodine:

Purpose: Prevention of iodine deficiency.

Recommended dosage: Not specified in the text; depends on dietary intake and geographic location.

Evidence level: Not explicitly stated, but implied to be important for those with low iodine intake.

Potential side effects: Not specified.

5. Folate:

Purpose: Prevention of folate deficiency, particularly important for women who might become pregnant.

Recommended dosage: Not specified in the text.

Evidence level: Not explicitly stated.

Potential side effects: Not specified.

6. Vitamin B12:

Purpose: Prevention of vitamin B12 deficiency, particularly important for vegans or near-vegans.

Recommended dosage: Not specified in the text.

Evidence level: Not explicitly stated.

Potential side effects: Not specified.

7. Carbohydrate (sports drinks, gels, bars):

Purpose: Providing a convenient source of energy during and after exercise; supporting the immune system; improving bioavailability of other supplements (e.g., creatine).

Recommended dosage: Varies greatly depending on the product and the athlete's needs; 30–60 g/hour during prolonged exercise is often recommended.

Evidence level: Moderate to strong support for energy provision during exercise. Moderate support for immune function.

Potential side effects: Gastrointestinal distress if consumed too quickly or in excessive amounts.

8. Creatine Monohydrate:

Purpose: Enhancing short-term, high-intensity exercise capacity; promoting gains in lean mass and muscular strength and power.

Recommended dosage: Loading phase: ~20 g/day for 5–7 days; maintenance phase: 3–5 g/day.

Evidence level: Strong evidence for short-term, high-intensity exercise performance and muscle growth.

Potential side effects: Weight gain (primarily water retention), which may be detrimental in some sports.

9. Nitrate:

Purpose: Enhancing nitric oxide bioavailability, improving muscle oxygenation, and enhancing exercise tolerance.

Recommended dosage: 5–9 mmol (310–560 mg) for acute benefits; prolonged intake (>3 days) may also be beneficial. Sources include beetroot juice and leafy green vegetables.

Evidence level: Strong evidence for improving exercise time to exhaustion and time-trial performance in some situations.

Potential side effects: Gastrointestinal upset in some individuals.

10. Beta-Alanine:

Purpose: Augmenting intracellular buffering capacity, improving performance during sustained high-intensity exercise.

Recommended dosage: ~65 mg/kg body mass daily, split into doses over 10–12 weeks.

Evidence level: Moderate evidence for improving performance in some situations.

Potential side effects: Skin rashes and/or transient paresthesia (tingling).

11. Sodium Bicarbonate:

Purpose: Augmenting extracellular buffering capacity, improving performance during high-intensity exercise.

Recommended dosage: 0.2–0.4 g/kg body mass, 60–150 min before exercise. Split doses or serial loading may also be used.

Evidence level: Moderate evidence for improving performance in some situations.

Potential side effects: Gastrointestinal distress.

12. Zinc:

Purpose: Promoting wound healing, tissue repair, and reducing the severity and duration of URTI symptoms.

Recommended dosage: Not specified in the text; lozenges (75 mg) may be beneficial at the onset of URTI symptoms.

Evidence level: Moderate support for treating URTI symptoms.

Potential side effects: Bad taste and nausea.

13. Probiotics:

Purpose: Improving gut health and modulating immune function; reducing the incidence of gastrointestinal infections.

Recommended dosage: ~10<sup>10</sup> live bacteria daily.

Evidence level: Moderate support for reducing URTI incidence.

Potential side effects: Minor side effects reported in some studies.

14. Vitamin C:

Purpose: Acting as an antioxidant; potentially reducing the incidence and duration of URTI symptoms.

Recommended dosage: 0.25–1.0 g/day for preventing URTI; higher doses may not be beneficial and could potentially blunt training adaptations.

Evidence level: Moderate support for preventing URTI; no support for treating URTI.

Potential side effects: Not specified, but high doses may blunt training adaptations.

15. Bovine Colostrum:

Purpose: Improving mucosal immunity and increasing resistance to infection.

Recommended dosage: Not specified in the text.

Evidence level: Low-moderate support for reducing URTI symptoms.

Potential side effects: Not specified.

16. Polyphenols (e.g., Quercetin):

Purpose: Anti-inflammatory, antioxidant, and antipathogenic effects; potentially improving mitochondrial biogenesis and endurance performance.

Recommended dosage: Not specified in the text.

Evidence level: Low-moderate support for reducing URTI symptoms and potentially improving endurance performance.

Potential side effects: Not specified.

17. Glutamine:

Purpose: Providing an energy substrate for immune cells.

Recommended dosage: Not specified in the text.

Evidence level: Limited support for reducing URTI symptoms.

Potential side effects: Not specified.

18. Caffeine:

Purpose: Stimulant; improving endurance capacity, vigilance, and alertness; reducing the perception of exertion.

Recommended dosage: 3–6 mg/kg body mass, ~60 min before exercise; lower doses may be beneficial during exercise.

Evidence level: Strong evidence for improving performance in various exercise scenarios.

Potential side effects: Nausea, anxiety, insomnia, restlessness, accelerated heart rate; more common with doses ≥9 mg/kg body mass.

19. β-Hydroxy β-methylbutyrate (HMB):

Purpose: Enhancing adaptive response to exercise; decreasing protein breakdown; increasing protein synthesis.

Recommended dosage: 3 g/day.

Evidence level: Weak to moderate evidence for benefits; effects on muscle damage are unclear.

Potential side effects: Not specified.

20. Omega-3 Fatty Acids:

Purpose: Improving cognitive processing; reducing risk/enhancing recovery from mild traumatic brain injury (mTBI); increasing muscle protein synthesis; reducing muscle damage.

Recommended dosage: ~2 g/day.

Evidence level: Moderate evidence for some benefits; more research needed on effects in athletes.

Potential side effects: Bleeding, digestive problems, increased LDL cholesterol.

21. Gelatin and Vitamin C/Collagen:

Purpose: Increasing collagen production; thickening cartilage; decreasing joint pain.

Recommended dosage: 5–15 g gelatin with 50 mg vitamin C; or about 10 g/day of collagen hydrolysate.

Evidence level: Limited evidence; more research needed.

Potential side effects: Not specified.

22. Anti-inflammatory Supplements (Curcumin, Tart Cherry Juice):

Purpose: Reducing inflammation; reducing symptoms of, or enhancing recovery from, muscle-damaging exercise.

Recommended dosage: ~5 g/day curcumin; 250–350 mL (or 30 mL concentrate) tart cherry juice twice daily for several days before or after exercise.

Evidence level: Moderate evidence for some anti-inflammatory effects; more research needed on effects in athletes.

Potential side effects: Not specified.

23. Protein (for muscle gain):

Purpose: Enhancing lean mass gains when combined with resistance training.

Recommended dosage: 1.6 g protein/kg/day (up to 2.2 g/kg/day).

Evidence level: Strong evidence for promoting muscle growth when combined with resistance training.

Potential side effects: Not specified, but excessive intake could potentially lead to issues.

24. Protein (for fat loss):

Purpose: Enhancing fat mass loss and promoting retention of lean mass when combined with an energy deficit.

Recommended dosage: Increased dietary intake or supplemental isolated proteins.

Evidence level: Strong evidence for promoting fat loss and lean mass retention when combined with an energy deficit.

Potential side effects: Not specified.

25. Other Supplements for Fat Loss (Pyruvate, Chromium, Green Tea, α-Lipoic Acid, Conjugated Linolenic Acid, Konjac Fiber, Chitosan):

Purpose: Various mechanisms proposed for fat loss, but evidence is weak or nonexistent for most.

Recommended dosage: Not consistently specified in the text.

Evidence level: Weak or no evidence of significant efficacy for most.

Potential side effects: Not consistently specified in the text.

**1. Whey Protein (Concentrate, Isolate, Hydrolysate)**

**Proper Dosage:** Typically, 20–30 grams per serving, taken 1–2 times daily, depending on individual protein requirements and dietary intake.

**Level of Evidence:** High. Whey protein is extensively studied and has been shown to support muscle protein synthesis, enhance muscle recovery, and improve body composition.

**Potential Drawbacks:** Some individuals may experience digestive discomfort, such as bloating, gas, or diarrhea, especially if lactose intolerant. High doses can cause increased bowel movements, acne, nausea, thirst, reduced appetite, tiredness, and headache. citeturn0search0

**2. Casein Protein**

**Proper Dosage:** Similar to whey, 20–30 grams per serving, often consumed before bedtime due to its slow digestion rate.

**Level of Evidence:** Moderate to high. Casein provides a slow release of amino acids, which may aid in muscle recovery during periods of fasting, such as overnight.

**Potential Drawbacks:** May cause digestive issues in those with dairy sensitivities or lactose intolerance.

**3. Soy Protein**

**Proper Dosage:** 20–30 grams per serving, based on individual protein needs.

**Level of Evidence:** Moderate. Soy protein is a complete plant-based protein and can support muscle protein synthesis, though it may be less effective than animal-derived proteins.

**Potential Drawbacks:** Some concerns exist regarding phytoestrogens in soy affecting hormone levels, but research is inconclusive. May cause digestive discomfort in some individuals.

**4. Brown Rice Protein**

**Proper Dosage:** 20–30 grams per serving, adjusted according to dietary protein intake.

**Level of Evidence:** Moderate. While not a complete protein, combining it with other plant-based proteins can provide all essential amino acids.

**Potential Drawbacks:** Generally well-tolerated; however, it may have a grainy texture and less favorable taste compared to other protein supplements.

**5. Pea Protein**

**Proper Dosage:** 20–30 grams per serving, depending on protein requirements.

**Level of Evidence:** Moderate. Pea protein is rich in essential amino acids and has been shown to support muscle gain similarly to whey protein.

**Potential Drawbacks:** May cause bloating or gas in some individuals due to its fiber content.

**6. Creatine Monohydrate**

**Proper Dosage:** A common regimen starts with a loading phase of 20 grams daily (divided into 4 doses) for 5–7 days, followed by a maintenance dose of 3–5 grams daily.

**Level of Evidence:** High. Creatine monohydrate is one of the most researched supplements, proven to enhance muscle strength, power, and exercise performance.

**Potential Drawbacks:** Generally safe for most people. Side effects might include dehydration, upset stomach, and muscle cramps. citeturn0search3

**7. Creatine HCL (Hydrochloride)**

**Proper Dosage:** Due to increased solubility, a lower dose of 1–2 grams daily is often recommended.

**Level of Evidence:** Moderate. While it may offer similar benefits to creatine monohydrate, there is less research supporting its efficacy.

**Potential Drawbacks:** Limited research on long-term safety; however, it is generally considered safe at recommended doses.

**8. Creatine Ethyl Ester**

**Proper Dosage:** Typically, 2.5–5 grams daily.

**Level of Evidence:** Low to moderate. Some studies suggest it is less effective than creatine monohydrate due to poor stability and absorption.

**Potential Drawbacks:** May be less effective, leading to reduced benefits compared to other forms of creatine.

**9. Beta-Alanine**

**Proper Dosage:** 2–5 grams daily, often divided into smaller doses to reduce the likelihood of paresthesia (tingling sensation).

**Level of Evidence:** High. Beta-alanine supplementation increases muscle carnosine levels, enhancing performance in high-intensity exercise lasting 1–4 minutes.

**Potential Drawbacks:** May cause a tingling sensation known as paresthesia, which is harmless but can be uncomfortable.

**10. Caffeine**

**Proper Dosage:** 3–6 mg per kilogram of body weight, consumed ~30–60 minutes before exercise.

**Level of Evidence:** High. Caffeine is well-documented to improve alertness, concentration, and athletic performance.

**Potential Drawbacks:** Can cause jitteriness, increased heart rate, gastrointestinal distress, and may disrupt sleep if taken later in the day.

**11. L-Citrulline**

**Proper Dosage:** 6–8 grams of L-citrulline malate taken ~30–60 minutes before exercise.

**Level of Evidence:** Moderate. L-Citrulline may enhance nitric oxide production, improving blood flow and exercise performance.

**Potential Drawbacks:** Generally well-tolerated; high doses may cause stomach discomfort.

**12. L-Arginine**

**Proper Dosage:** 3–6 grams taken 30–60 minutes before exercise.

**Level of Evidence:** Low to moderate. While L-arginine is a precursor to nitric oxide, its efficacy in enhancing performance is limited due to poor absorption.

**Potential Drawbacks:** May cause gastrointestinal issues such as

**16. Glutamine**

**Proper Dosage:** Commonly, 15–30 grams per day, divided into multiple doses. For children, doses up to 0.7 grams/kg body weight daily have been used. citeturn0search4

**Level of Evidence:** Moderate. Glutamine is a conditionally essential amino acid, and supplementation may support immune function and gut health, particularly during periods of stress or illness.

**Potential Drawbacks:** Generally well-tolerated. However, individuals with liver disease, bipolar disorder, or a history of seizures should avoid glutamine supplementation due to potential adverse effects. citeturn0search4

**17. Glutamine Peptides**

**Proper Dosage:** Dosage recommendations are similar to free-form glutamine, typically 15–30 grams per day, divided into multiple doses.

**Level of Evidence:** Limited. Glutamine peptides are touted to have better stability and absorption compared to free-form glutamine, but research comparing the two forms is scarce.

**Potential Drawbacks:** As with glutamine, individuals with certain medical conditions should exercise caution.

**18. BCAAs (Leucine, Isoleucine, Valine)**

**Proper Dosage:** A common ratio is 2:1:1 (leucine:isoleucine:valine), with total daily intake ranging from 5–20 grams, depending on body weight and activity level.

**Level of Evidence:** Moderate. BCAAs may reduce muscle soreness and support muscle protein synthesis, though their effectiveness beyond adequate dietary protein intake is debated.

**Potential Drawbacks:** Generally safe when taken within recommended doses. Excessive intake may lead to gastrointestinal discomfort. Individuals with certain medical conditions should consult a healthcare provider before use. citeturn0search0

**19. Leucine**

**Proper Dosage:** 2–5 grams per serving, often taken 2–3 times daily, particularly around workouts.

**Level of Evidence:** High. Leucine is a key regulator of muscle protein synthesis and is considered the most anabolic of the BCAAs.

**Potential Drawbacks:** High doses may cause hypoglycemia in susceptible individuals and could lead to ammonia buildup, potentially affecting brain function. citeturn0search0

**20. Isoleucine**

**Proper Dosage:** Typically included as part of BCAA supplements in a 2:1:1 ratio with leucine and valine; individual supplementation is less common.

**Level of Evidence:** Moderate. Isoleucine plays a role in muscle metabolism and immune function, but its isolated effects are less studied compared to leucine.

**Potential Drawbacks:** Excessive intake may lead to negative nitrogen balance and place strain on the kidneys. citeturn0search0

**21. Valine**

**Proper Dosage:** Similar to isoleucine, typically consumed as part of a BCAA supplement in a 2:1:1 ratio.

**Level of Evidence:** Moderate. Valine is involved in muscle metabolism and tissue repair, but research on its isolated supplementation is limited.

**Potential Drawbacks:** High doses may cause gastrointestinal discomfort and have been linked to hallucinations and decreased mental function in rare cases. citeturn0search0

**22. HMB (Beta-hydroxy-beta-methylbutyrate)**

**Proper Dosage:** 3 grams per day, divided into 1-gram doses.

**Level of Evidence:** Moderate to high. HMB may help reduce muscle protein breakdown and support muscle mass gains, particularly in individuals beginning resistance training or experiencing muscle wasting. citeturn0news11

**Potential Drawbacks:** Generally well-tolerated with no significant adverse effects reported at recommended dosages. Long-term safety data are limited. citeturn0news11

**23. Taurine**

**Proper Dosage:** 500 mg to 2 grams per day, with some studies using up to 6 grams daily.

**Level of Evidence:** Moderate. Taurine has antioxidant properties and may support cardiovascular health and exercise performance, though more research is needed.

**Potential Drawbacks:** Generally considered safe. High doses may cause gastrointestinal discomfort. Individuals with bipolar disorder should consult a healthcare provider before use, as taurine may affect mood.

**24. L-Carnitine**

**Proper Dosage:** 500 mg to 2 grams per day, depending on the form and intended use. For example, doses of 1.5 grams per day have been used in older adults to improve functional status. citeturn0search1

**Level of Evidence:** Moderate. L-Carnitine plays a role in fatty acid metabolism and may support exercise performance and recovery, though findings are mixed.

**Potential Drawbacks:** Generally safe at recommended doses. High doses may cause gastrointestinal issues, and there is some concern about the potential for increased production of trimethylamine-N-oxide (TMAO), which has been linked to cardiovascular risk. citeturn0search1

**24. L-Carnitine**

**Proper Dosage:** Common dosages range from 500 to 2,000 mg per day. It's advisable to start with a lower dose and adjust based on individual response and guidance from a healthcare provider.

**Level of Evidence:** Moderate. L-Carnitine is involved in energy production by transporting fatty acids into mitochondria. Some studies suggest it may aid in weight loss and improve exercise performance, but results are mixed. More research is needed to confirm these benefits. citeturn0search1

**Potential Drawbacks:** Generally considered safe when taken within recommended dosages. Possible side effects include nausea, vomiting, abdominal cramps, and a "fishy" body odor. L-Carnitine may interact with certain medications, such as antibiotics or anticonvulsants. Consult a healthcare provider before use, especially if you have underlying health conditions or are taking other medications. citeturn0search7

**25. Acetyl-L-Carnitine**

**Proper Dosage:** Typical doses range from 1,500 to 3,000 mg per day, divided into multiple doses. It's important to follow dosing recommendations provided by a healthcare professional.

**Level of Evidence:** Moderate. Acetyl-L-Carnitine is believed to support cognitive function and may have neuroprotective properties. Some studies indicate potential benefits for conditions like Alzheimer's disease and depression, but more research is necessary to establish efficacy.

**Potential Drawbacks:** Possible side effects include gastrointestinal discomfort, nausea, vomiting, dry mouth, headache, and restlessness. It can also cause a "fishy" odor of the urine, breath, and sweat. Individuals with a history of seizures should avoid Acetyl-L-Carnitine, as it may increase the risk of seizures. Additionally, it may interact with blood-thinning medications like warfarin, increasing the risk of bleeding. Consult a healthcare provider before use. citeturn0search0

**26. CLA (Conjugated Linoleic Acid)**

**Proper Dosage:** Commonly studied dosages range from 3 to 6 grams per day, divided into multiple doses. It's advisable to follow the manufacturer's guidelines or consult a healthcare provider for personalized dosing.

**Level of Evidence:** Moderate. CLA is often marketed for weight loss and body composition improvement. Some studies suggest modest benefits in reducing body fat, but results are inconsistent, and the overall effect size is small. Further research is needed to confirm its efficacy.

**Potential Drawbacks:** Possible side effects include gastrointestinal issues such as diarrhea, nausea, and abdominal discomfort. Some studies have raised concerns about potential negative effects on blood lipid profiles, such as reducing HDL ("good") cholesterol and increasing inflammation markers. Individuals with metabolic disorders should exercise caution and consult a healthcare provider before use.

**27. Fish Oil**

**Proper Dosage:** Typical doses provide 1,000 to 3,000 mg of combined EPA and DHA per day. It's important to consider the EPA and DHA content rather than the total fish oil amount. Consult a healthcare provider for personalized dosing recommendations.

**Level of Evidence:** High. Fish oil is rich in omega-3 fatty acids, particularly EPA and DHA, which have been extensively studied for their health benefits. Evidence supports their role in reducing triglyceride levels, supporting heart health, and possessing anti-inflammatory properties. citeturn0news11

**Potential Drawbacks:** Generally considered safe for most individuals. Possible side effects include gastrointestinal discomfort, fishy aftertaste, and, in high doses, an increased risk of bleeding. Individuals on blood-thinning medications or with bleeding disorders should consult a healthcare provider before use. Additionally, high doses may increase the risk of atrial fibrillation in certain populations. citeturn0news11

**28. Omega-3 Fatty Acids**

**Proper Dosage:** For general health, a combined daily intake of 250 to 500 mg of EPA and DHA is recommended. Higher doses may be used for specific health conditions under medical supervision. Consult a healthcare provider for personalized recommendations.

**Level of Evidence:** High. Omega-3 fatty acids, including EPA and DHA, are essential fats with numerous health benefits. They have been shown to support heart health, reduce inflammation, and play a crucial role in brain function. citeturn0news12

**Potential Drawbacks:** Generally safe when consumed within recommended amounts. High doses may lead to side effects such as reduced immune function and increased bleeding risk. It's advisable not to exceed 3 grams per day, with no more than 2 grams from supplements, to avoid potential risks. Consult a healthcare provider before starting supplementation, especially if you have underlying health conditions or are taking other medications. citeturn0news12

**29. EPA (Eicosapentaenoic Acid)**

**Proper Dosage:** Dosage varies based on health goals. For cardiovascular benefits, doses of 1,000 to 2,000 mg per day are common. Consult a healthcare provider for personalized dosing.

**Level of Evidence:** High. EPA is an omega-3 fatty acid known for its anti-inflammatory properties and benefits in reducing triglyceride levels. It has been studied for its role

**31. Vitamin D3 (Cholecalciferol)**

**Proper Dosage:** The recommended dietary allowance (RDA) varies by age, sex, and life stage. For adults aged 19-70 years, the RDA is 600 IU (15 mcg) per day; for those over 70, it's 800 IU (20 mcg) per day. Some individuals may require higher doses to correct deficiencies, but this should be done under medical supervision.

**Level of Evidence:** High. Vitamin D3 is essential for calcium absorption and bone health. It also plays a role in immune function and has been studied for its potential benefits in various conditions, including osteoporosis and certain autoimmune diseases.

**Potential Drawbacks:** Excessive intake can lead to hypercalcemia (elevated blood calcium levels), resulting in nausea, vomiting, weakness, and serious complications like kidney damage. The tolerable upper intake level (UL) for adults is 4,000 IU (100 mcg) per day.

**32. Vitamin B12 (Cobalamin)**

**Proper Dosage:** The RDA for adults is 2.4 mcg per day. Higher doses are often used to treat deficiencies, especially in individuals with absorption issues.

**Level of Evidence:** High. Vitamin B12 is crucial for red blood cell formation, neurological function, and DNA synthesis. Deficiency can lead to anemia and neurological disorders.

**Potential Drawbacks:** Generally considered safe, even at high doses, due to its water-soluble nature. However, some individuals may experience rare allergic reactions.

**33. Vitamin C (Ascorbic Acid)**

**Proper Dosage:** The RDA for adult men is 90 mg per day and for adult women is 75 mg per day. Smokers require an additional 35 mg per day. Higher doses (up to 2,000 mg per day) are sometimes used for their antioxidant properties.

**Level of Evidence:** High. Vitamin C is essential for collagen synthesis, antioxidant protection, and immune function. It has been studied for its role in reducing the duration of common cold symptoms.

**Potential Drawbacks:** Excessive intake can lead to gastrointestinal disturbances like diarrhea and may increase the risk of kidney stones in susceptible individuals. The UL for adults is 2,000 mg per day.

**34. Magnesium**

**Proper Dosage:** The RDA for adult men is 400-420 mg per day and for adult women is 310-320 mg per day. Supplemental doses vary depending on individual needs and medical advice.

**Level of Evidence:** High. Magnesium is involved in numerous biochemical reactions, including muscle and nerve function, blood glucose control, and bone development.

**Potential Drawbacks:** High doses from supplements can cause diarrhea, nausea, and abdominal cramping. The UL for supplemental magnesium is 350 mg per day for adults.

**35. Zinc**

**Proper Dosage:** The RDA for adult men is 11 mg per day and for adult women is 8 mg per day. Supplemental doses may be higher for short-term use, especially during illness.

**Level of Evidence:** High. Zinc is vital for immune function, protein synthesis, wound healing, DNA synthesis, and cell division.

**Potential Drawbacks:** Excessive intake can lead to nausea, vomiting, loss of appetite, stomach cramps, diarrhea, and headaches. Chronic high intake can cause copper deficiency. The UL for adults is 40 mg per day.

**36. Calcium**

**Proper Dosage:** The RDA for adults aged 19-50 is 1,000 mg per day; for women over 50 and men over 70, it's 1,200 mg per day. Supplemental needs depend on dietary intake.

**Level of Evidence:** High. Calcium is essential for bone health, muscle function, nerve transmission, and vascular contraction.

**Potential Drawbacks:** Excessive intake can lead to kidney stones, vascular calcification, and impaired absorption of other minerals. The UL for adults is 2,500 mg per day for ages 19-50 and 2,000 mg per day for those over 50.

**37. Potassium**

**Proper Dosage:** The adequate intake (AI) for adults is 2,600 mg per day for women and 3,400 mg per day for men. Supplementation should be done cautiously and under medical supervision.

**Level of Evidence:** High. Potassium is crucial for maintaining normal fluid balance, nerve transmission, and muscle contraction.

**Potential Drawbacks:** Excessive intake, particularly from supplements, can lead to hyperkalemia, causing muscle weakness, paralysis, and cardiac arrhythmias.

**38. Sodium**

**Proper Dosage:** The AI for adults is 1,500 mg per day, with a recommended limit of less than 2,300 mg per day to reduce the risk of hypertension.

**Level of Evidence:** High. Sodium is essential for fluid balance, nerve function, and muscle contraction.

**Potential Drawbacks:** Excessive intake is associated with hypertension, increasing the risk of heart disease and stroke.

**39. Chromium**

* **Proper Dosage:** The AI for adult men is 35 mcg per day and for adult women is 25 mcg per day.

**39. Chromium**

**Proper Dosage:** Commonly supplemented in doses ranging from 200 to 500 mcg per day. Chromium is available in various forms, with chromium picolinate being one of the most studied.

**Level of Evidence:** Moderate. Chromium is an essential trace mineral involved in macronutrient metabolism and enhancing insulin action. Some studies suggest it may aid in blood sugar control for individuals with type 2 diabetes and assist in managing polycystic ovary syndrome (PCOS). However, evidence regarding its effectiveness for weight loss is limited and inconclusive. citeturn0news11

**Potential Drawbacks:** Generally considered safe when taken within the recommended dosage range. High doses may cause side effects such as headaches, dizziness, or gastrointestinal discomfort. Individuals with kidney or liver disease should exercise caution and consult a healthcare provider before use. citeturn0news11

**40. Boron**

**Proper Dosage:** Typical supplementation ranges from 1 to 3 mg per day. Boron is naturally present in foods like fruits, vegetables, and nuts.

**Level of Evidence:** Limited. Boron is a trace mineral that plays a role in bone health, hormone regulation, and cognitive function. While some studies suggest potential benefits, more research is needed to establish its efficacy for specific health outcomes.

**Potential Drawbacks:** Generally considered safe at low doses. High intake (above 20 mg per day) may lead to adverse effects such as nausea, vomiting, or other gastrointestinal issues. Long-term safety of high-dose supplementation has not been well studied.

**41. Alpha Lipoic Acid (ALA)**

**Proper Dosage:** Commonly supplemented in doses ranging from 300 to 600 mg per day. ALA is both water and fat-soluble, allowing it to function in various cellular environments.

**Level of Evidence:** Moderate. ALA is an antioxidant that may help reduce oxidative stress and inflammation. It has been studied for its potential benefits in conditions like diabetic neuropathy and may aid in weight management by influencing energy metabolism. However, more research is needed to confirm these effects.

**Potential Drawbacks:** Generally well-tolerated. Some individuals may experience mild side effects such as nausea, skin rash, or dizziness. High doses may interfere with thyroid function, particularly in individuals with existing thyroid disorders.

**42. Coenzyme Q10 (CoQ10)**

**Proper Dosage:** Typical doses range from 100 to 200 mg per day, though higher doses may be used under medical supervision. CoQ10 is fat-soluble, and its absorption can be enhanced when taken with meals containing fat.

**Level of Evidence:** High. CoQ10 is involved in cellular energy production and has antioxidant properties. It has been studied for its potential benefits in cardiovascular diseases, including heart failure and hypertension, as well as in mitigating statin-induced muscle pain. Evidence supports its use in improving symptoms and quality of life in certain conditions.

**Potential Drawbacks:** Generally well-tolerated. Some individuals may experience gastrointestinal symptoms such as nausea, diarrhea, or loss of appetite. CoQ10 may interact with blood-thinning medications like warfarin, potentially reducing their effectiveness.

**43. Green Tea Extract**

**Proper Dosage:** Supplementation typically provides 250 to 500 mg of green tea extract per day, standardized to 50–75% catechins and 2–10% caffeine. This is roughly equivalent to 3–5 cups of green tea.

**Level of Evidence:** Moderate. Green tea extract is rich in antioxidants, particularly catechins like EGCG. It has been studied for its potential benefits in weight loss, cardiovascular health, and cancer prevention. Some evidence suggests it may aid in modest weight reduction and improve metabolic health markers, but results are mixed.

**Potential Drawbacks:** Generally safe for most people when consumed in moderate amounts. High doses may lead to side effects due to caffeine content, such as insomnia, jitteriness, or gastrointestinal discomfort. There have been rare reports of liver toxicity associated with high-dose green tea extract supplementation.

**44. Garcinia Cambogia**

**Proper Dosage:** Commonly supplemented in doses ranging from 500 to 1,500 mg per day, standardized to contain 50–60% hydroxycitric acid (HCA). It's often taken before meals.

**Level of Evidence:** Low to Moderate. Garcinia cambogia is a tropical fruit whose rind contains HCA, purported to aid in weight loss by inhibiting fat production and suppressing appetite. However, clinical studies have yielded mixed results, with some showing minimal weight loss benefits and others indicating no significant effect. citeturn0news10

**Potential Drawbacks:** Generally considered safe for short-term use. However, there have been reports of serious liver toxicity and even liver failure associated with its use. Other side effects may include digestive upset, headache, or skin rash. Individuals should consult a healthcare provider before use, especially those with liver conditions. citeturn0search2

**45. Raspberry Ketones**

* **Proper Dosage:** There is no established standard dosage for raspberry ketones. Supplement manufacturers often recommend doses ranging from 100 to 400 mg per day, but the efficacy and safety of these doses are

**46. Ginseng**

**Proper Dosage:** The appropriate dosage of ginseng can vary depending on the specific type and form used. For example, studies have used doses ranging from 200 to 400 mg per day of standardized ginseng extract. It's important to follow the manufacturer's guidelines or consult a healthcare provider for personalized dosing recommendations.

**Level of Evidence:** Moderate. Ginseng is an herbal supplement commonly used to enhance energy, improve cognitive function, and support immune health. Some studies suggest potential benefits in these areas, but results are mixed, and more research is needed to confirm its efficacy.

**Potential Drawbacks:** Generally considered safe for short-term use. Some individuals may experience side effects such as headaches, sleep disturbances, gastrointestinal issues, or allergic reactions. Ginseng may interact with certain medications, including blood thinners and diabetes medications. Consult a healthcare provider before use, especially if you have underlying health conditions or are taking other medications.

**47. Yohimbe**

**Proper Dosage:** Yohimbe supplements often contain varying amounts of yohimbine, the active compound. A common dosing guideline is up to 0.2 mg per kg of body weight. However, due to safety concerns, it's crucial to consult a healthcare provider before use.

**Level of Evidence:** Low to Moderate. Yohimbe is sometimes used to address sexual dysfunction and for its purported fat-burning properties. However, evidence supporting these uses is limited and inconclusive. Additionally, the variability in supplement formulations makes it difficult to determine efficacy.

**Potential Drawbacks:** Yohimbe can cause serious side effects, including increased heart rate, high blood pressure, anxiety, dizziness, and gastrointestinal distress. Higher doses may lead to severe complications such as heart attacks or seizures. Due to these risks, yohimbe should only be used under medical supervision. citeturn0search0

**48. DHEA (Dehydroepiandrosterone)**

**Proper Dosage:** Common doses range from 25 to 50 mg per day. However, dosing should be individualized based on specific health goals and under the guidance of a healthcare provider.

**Level of Evidence:** Moderate. DHEA is a hormone that serves as a precursor to androgens and estrogens. It's used for various purposes, including improving bone density, enhancing mood, and increasing muscle mass. Some studies suggest potential benefits, but results are mixed, and long-term safety data are lacking.

**Potential Drawbacks:** Possible side effects include acne, hair loss, stomach upset, high blood pressure, and changes in menstrual cycle. DHEA can influence hormone levels, potentially exacerbating hormone-sensitive conditions. It's essential to consult a healthcare provider before use, especially for individuals with a history of hormone-related cancers or other health concerns.

**49. ZMA (Zinc, Magnesium Aspartate)**

**Proper Dosage:** Typical formulations provide approximately 30 mg of zinc, 450 mg of magnesium, and 10.5 mg of vitamin B6 per serving. It's usually taken before bedtime to potentially enhance sleep quality and recovery.

**Level of Evidence:** Low. ZMA is marketed to athletes and bodybuilders with claims of boosting testosterone levels, improving strength, and enhancing recovery. However, scientific evidence supporting these claims is limited. Some studies have not found significant benefits in athletic performance or hormonal changes.

**Potential Drawbacks:** Generally considered safe when taken as directed. Excessive intake of zinc or magnesium can lead to adverse effects such as nausea, diarrhea, and abdominal cramps. High doses of vitamin B6 over prolonged periods may cause nerve damage. It's important not to exceed recommended dosages and to consult a healthcare provider before use.

**50. Glucosamine**

**Proper Dosage:** A common dosage is 1,500 mg per day, taken as a single dose or divided into multiple doses. Glucosamine sulfate is the form most often studied and used.

**Level of Evidence:** Moderate. Glucosamine is commonly used to support joint health and manage symptoms of osteoarthritis. Some studies suggest it may provide pain relief and slow joint degeneration, particularly in the knee. However, results are mixed, and more research is needed to confirm its efficacy.

**Potential Drawbacks:** Generally considered safe for most individuals. Some may experience mild side effects such as nausea, heartburn, diarrhea, or constipation. Individuals with shellfish allergies should exercise caution, as some glucosamine products are derived from shellfish. Additionally, glucosamine may interact with blood-thinning medications like warfarin, potentially increasing the risk of bleeding.

1. L-Citrulline (10,000 mg):

- Efficacy: L-Citrulline is a potent nitric oxide precursor that enhances blood flow and vasodilation. It is more effective than L-Arginine for increasing arginine levels in the body, which is crucial for nitric oxide production.

- Potential Side Effects: Generally well-tolerated, but high doses may cause gastrointestinal discomfort.

2. Creatine Monohydrate (5,000 mg):

- Efficacy: Creatine is one of the most researched supplements for improving strength, power output, and muscle size. It helps replenish ATP stores during high-intensity exercise and promotes muscle hydration.

- Potential Side Effects: May cause water retention, gastrointestinal issues, or cramping in some individuals.

3. Betaine Anhydrous (4,000 mg):

- Efficacy: Acts as a methyl donor and osmolyte, potentially enhancing hydration and muscle pumps. It may also support muscle growth and fat loss.

- Potential Side Effects: Generally safe, but high doses can lead to gastrointestinal discomfort.

4. Glycerol Powder (4,000 mg, 65% Glycerol):

- Efficacy: Glycerol enhances hyperhydration, allowing muscles to retain more water, which can improve endurance and performance.

- Potential Side Effects: Can cause gastrointestinal distress if taken in excess.

5. Malic Acid (3,000 mg):

- Efficacy: May help reduce lactic acid buildup during exercise, potentially improving endurance and recovery.

- Potential Side Effects: Generally safe, but excessive amounts may lead to digestive issues.

6. Agmatine Sulfate (1,500 mg):

- Efficacy: Enhances nitric oxide production and may improve mood and pain tolerance during workouts.

- Potential Side Effects: Generally well-tolerated, but may cause gastrointestinal discomfort in some individuals.

7. Nitrosigine (1,500 mg):

- Efficacy: A bonded arginine silicate that enhances nitric oxide levels and may improve mental acuity and recovery.

- Potential Side Effects: Generally safe, but individual reactions may vary.

8. Sodium Nitrate (1,500 mg):

- Efficacy: Provides a source of nitrates, which can be converted to nitric oxide, enhancing blood flow and performance.

- Potential Side Effects: High doses may lead to gastrointestinal discomfort or increased blood pressure.

9. VasoDrive AP (254 mg):

- Efficacy: A peptide that acts as an ACE inhibitor, promoting vasodilation and improving blood flow.

- Potential Side Effects: Generally safe, but individual responses may vary.

Important Note: This information is for educational purposes only and should not be considered medical advice. Always consult with a qualified healthcare professional or registered dietitian before starting any supplement regimen, especially if you are an athlete. The information provided here is based on a single research paper and may not represent the full range of current scientific understanding.