

DUOLIFE

# Boost Formula FIZZY EASY L-arginine COMPLEX

Food supplement



**DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX** is a food supplement in the form of effervescent tablets. It is based on amino acids, vitamins and active compounds, the combination of which provides support for optimal functioning of muscles and the building of muscle mass, as well as support for the functioning of the sexual, cardiovascular, nervous and immune systems. The food supplement is characterised by its unique composition – it contains amino acids – L-arginine and L-citrulline, plant extracts of beet root and ashwagandha, as well as rutin and B vitamins (niacin and B12). The product recipe is additionally enriched with BioPerine®\* – a reserved, patented formula of natural origin with proven properties enhancing the absorption of nutrients contained in this dietary supplement.



BioPerine®\*



Synergy of action



Convenient form of application



Complex composition



Multidirectional action



Complementary application

## When to use DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX?

The food supplement in the form of effervescent tablets, **DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX**, has a unique composition. It contains amino acids – L-arginine and L-citrulline, plant extracts of beet root and ashwagandha, as well as rutin and B vitamins (niacin and B12). The product's ingredients support the process of building muscle mass and controlling body weight. They also provide support for those wishing to maintain optimal sexual health and taking care of the condition of their circulatory and nervous systems. The product has been further enriched with BioPerine®\*, a proprietary patented formula of natural origin with a research-proven effect that promotes the absorption of nutrients contained in the food supplement.

**Food supplement DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX is intended for helping to maintain optimum functions of organism in people who want to support:**

- ▶ physical condition and endurance – especially in people involved in sports;
- ▶ maintaining a normal body weight;
- ▶ the functioning and performance of muscles during physical activity;
- ▶ optimal sexual functions and fertility;
- ▶ the quality of sleep;
- ▶ the functions of the nervous system and concentration, including in people exposed to chronic stress and struggling with nervousness, tension and anxiety;
- ▶ circulatory system function.

## How to use DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX?

DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX is a food supplement based on high-quality ingredients, including the reserved, patented BioPerine®\* formula of natural origin distinguished by its scientifically proven properties improving the absorption of nutrients contained in the product.

### Ingredients found in DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX support:

- ▶ the process of muscle mass building;
- ▶ performance during physical activity;
- ▶ body regeneration after exercise;
- ▶ body weight control;
- ▶ body fat burning;
- ▶ sexual functions;
- ▶ fertility in men;
- ▶ body relaxation;
- ▶ functions of the cardiovascular system;
- ▶ the maintenance of optimal mood;
- ▶ proper memory functions;
- ▶ optimal cognitive processes;
- ▶ concentration;
- ▶ optimal sleep;
- ▶ maintain optimal blood cholesterol level;
- ▶ nutrient absorption, including vitamins and minerals.



**Instructions for use:** dissolve 1 tablet in a glass (200 ml) of cold water and stir. Take three tablets a day. Consume immediately after preparation. Do not exceed the recommended maximum daily dose. The product should not be a substitute for a varied diet. A balanced diet and healthy lifestyle are essential for the proper functioning of the body.

**The product is not intended for children or infants.** Should you have any doubts concerning the use of the supplement, consult your doctor or pharmacist.



### DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX can be combined with:

other products from the following lines: DUOLIFE Boost Formula FIZZY EASY, Shape Code® Protein Shake, Shape Code® Slim Shake, DUOLIFE Vita C, DUOLIFE Vita C Powder, DUOLIFE Collagen, DUOLIFE Collagen Powder, ProStik®, ProCardiol®, DUOLIFE My Mind, ProCholterol®.

### Precautions

- ▶ Hypersensitivity to any of the ingredients.
- ▶ Do not use in children.
- ▶ Do not use in pregnant or breastfeeding women.
- ▶ The product should not be used with sedative, hypnotic, and antiepileptic drugs.
- ▶ Excess consumption may have a laxative effect.
- ▶ If you have a chronic condition or are taking medication, consult your doctor before using the product.



**Ingredients:** acidity regulators: citric acid, sodium carbonates; L-arginine hydrochloride; bulking agent: sorbitols; L-citrulline; common beet (*Beta vulgaris*) root extract; ashwagandha (*Withania somnifera*) root extract; acid: malic acid; aromas; powdered red beet juice concentrate; anti-caking agent: polyvinylpyrrolidone; rutin; colourant: carotenes; sweeteners: sucralose, steviol glycosides from stevia; niacin (nicotinic acid amide); powdered orange juice – 0.1%; vitamin B12 (cyanocobalamin); BioPerine®\* – a proprietary formula of black pepper (*Piper nigrum*) fruit extract 50:1 standardised for 95% piperine content.

Ingredient content in the daily dose of the product	3 tablets
L-arginine	1500 mg
L-citrulline	600 mg
Common beet root extract	450 mg
Ashwagandha root extract	300 mg
Rutin	75 mg
Vitamin B12	3.75 µg (150%**)
Niacin	24 mg (150%**)
BioPerine®*	2 mg

\* *BioPerine®* is a *Sabinsa* ingredient protected by the intellectual property (IP) law.

\*\*NRV – Nutrient Reference Value for an average adult.

BioPerine®\*, a reserved formula of black pepper (*Piper nigrum*) fruit extract standardised for 95% piperine content

**BioPerine®\*** is a **reserved formula** of natural origin, basen on black pepper extract, **with a very high content (95%) of the active ingredient – piperine**. Piperine content in a daily serving of DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX food supplement is 2 mg and constitutes the highest serving of this ingredient allowed in food supplements in Poland since 2022.

It is proven and documented by scientific tests that **BioPerine®\*** properties improve bioavailability of nutrients from food and food supplements<sup>1-7</sup>. Thanks to it, the consumed portions of vitamins, minerals and many other active ingredients are better absorbed, which translates into full health benefits of their supplementation. **BioPerine®\*** formula contained in **DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX** ensures that nutrients, including vitamins, can be absorbed effectively, even if they are consumed in the form of isolated components with no biological background.

The mechanism of **BioPerine®\*** formula is based on fostering the process of structural thermogenesis (increase of metabolic activity and heat release), which leads to an increased need for nutrients and their better absorption. Piperine contained in the formula fosters local blood supply to the digestive tract, thus enhancing microcirculation in intestinal villi and improving penetration of nutrients through intestinal wall<sup>3,8</sup>.

Using this formula is safe, which has been proven in clinical trials. Piperine contained in **BioPerine®\*** is most effective in combination with nutrients (at the same time), and has little influence over the absorption of active ingredients taken at time intervals. For that matter, it doesn't modify the absorption and bioavailability of medication, providing an adequate time interval is observed.

Additionally, piperine has protective (anti-oxidising) properties for cells, helps reduce oxidative stress and inflammatory processes<sup>1,9,10</sup>.

## L-arginine

Amino acids, which are the key building blocks of the human body, can be divided into two groups: endogenous, i.e. those that are synthesised by the human body, and exogenous, i.e. those that the body cannot produce and must therefore be supplied with food.

**L-arginina** is an amino acid that can be produced by the body from glutamic acid and proline, however, very

often the production of this amino acid in the body is limited. The main factor causing a decrease in arginine production in the body is age. It is therefore referred to as a relatively exogenous amino acid.

L-arginine undergoes numerous transformations in the body, which mainly take place in the kidneys and liver. These are also the organs responsible for the biosynthesis of this substance (up to 60% of L-arginine can be synthesised in the kidneys). But synthesis of L-arginine in the body requires L-citrulline, which is produced in the small intestine. If the human body is unable to produce L-arginine on its own, it is then necessary to supply it with food so that the body's cells can function properly at all times, as it is primarily our muscular system that benefits from L-arginine, but also our digestive, circulatory, immune and reproductive systems. The combined supplementation of L-arginine and L-citrulline is therefore highly beneficial, as it not only provides essential amino acids from outside but also enables the body's own additional L-arginine biosynthesis.

L-arginine is actively involved in the production of proteins, creatine, proline, urea and polyamines. It also plays a vital role in the synthesis and release of growth hormone. L-arginine helps to build up muscle mass and also to reduce body fat. Regular use of L-arginine promotes blood supply to the muscles and improves their performance during high effort. This effect is sometimes referred to as a "muscle pump", as muscles have more oxygen and thus can increase their volume faster following exercise.

The use of L-arginine also speeds up recovery after exercise. The studies on the metabolism of L-arginine in the urea cycle have also demonstrated that this amino acid can promote muscle resilience, which in practice means greater muscle endurance, even during prolonged exercise<sup>11, 12</sup>.

L-arginine can also support the removal of harmful substances from the body when their accumulation is so high that the body can no longer be able to maintain the required efficiency of excretion. L-arginine, by supporting kidney and liver function, helps remove excess urea and ammonia from the body (in the so-called urea cycle).

L-arginine can also support the function of the immune system<sup>13</sup> and of the intestinal microflora. It also exhibits antioxidant properties, which translates into slowing down skin ageing processes<sup>14</sup>.

It is also worth noting that L-arginine is converted in the body into nitric oxide (NO), which performs many important functions<sup>15-17</sup>. Nitric oxide assists in vasodilation, maintaining blood pressure and coagulation at optimal levels<sup>18, 19</sup>. It also acts as a neurotransmitter in the nervous system<sup>20</sup> and promotes the healing of wounds.

Of equal importance is the fact that nitric oxide is a substance needed to achieve and maintain an erection, as it helps dilate blood vessels and thus facilitates blood flow to the genitals. Being a precursor to nitric oxide, L-arginine therefore indirectly contributes to maintaining sexual potency in men at optimal levels<sup>21</sup>.

## L-citrulline

**L-citrulline** is a non-proteinogenic amino acid, i.e. one that is not used to build proteins. It is formed in the body from ornithine as a result of the urea cycle occurring in the liver. The purpose of this cycle is to convert toxic ammonia (a product of protein breakdown) to urea, which is excreted from the body through the kidneys or with sweat.

Citrulline is a compound that is very popular among athletes because it has numerous valuable properties that support the body during and after exercise.

This is because this amino acid improves endurance, and thus performance, due to its support for, among other things, the process of blood flow (and with it oxygen) to the tissues, aerobic energy production by muscles during exercise and the contraction of muscle fibres<sup>22</sup>. Consequently, citrulline also helps the body to recover more quickly, for example by supporting the removal of lactic acid and ammonia after exercise, which can result in less muscle soreness<sup>23</sup>. In addition, by promoting nitric oxide formation, citrulline indirectly supports, among other things, the process of cellular respiration, the maintenance of optimal blood vessel wall tension and the stimulation of local blood flow. This may contribute to supporting the maintenance of optimal blood pressure in people with elevated blood pressure<sup>24</sup>.

Citrulline supplementation also helps to maintain a positive mood and keep cognitive functions at optimal levels, which is also linked to increased nitric oxide production. This is because nitric oxide promotes vasodilation, which in turn translates into increased blood flow and more oxygen, including to the brain. This process supports the maintenance of optimal mood, concentration and memory and cognitive processes, all thanks to the increased oxygenation of the brain<sup>25</sup>.

Equally importantly, citrulline can also support the reduction of body fat while preventing the loss of muscle tissue.

Citrulline can also support metabolism by, among other things, limiting the removal of essential elements from the body (e.g. calcium, magnesium, potassium, sodium) or supporting the maintenance of the body's acid-base balance.

Importantly, the results of research to date confirm that citrulline supports the body most efficiently when combined with other compounds, including L-arginine (both compounds work synergistically)<sup>26</sup>.

The combined supplementation of L-arginine and L-citrulline is therefore highly beneficial, as it not only provides essential amino acids from outside but also enables the own additional L-arginine biosynthesis.

## Common beet root extract (*Beta vulgaris*)

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**Beetroot** contains many essential compounds for the human body, e.g. vitamin A, vitamin C, B vitamins (B1, B2, B3, B6) and minerals such as potassium, phosphorus, magnesium, calcium, cobalt, zinc, manganese, as well as valuable dietary fibre (approximately 2.8 g per 100 g). In addition, beetroot is a rich source of phytosterols, folic acid, polyphenols and betalain, mainly betanin, a pigment that exhibits many benefits, including antioxidative properties.

An ingredient in beetroot that supports cardiovascular function, but is also the reason why beetroot is so popular in the world of sports, is nitrate (over 250 mg of nitrates in 100 g of fresh beetroot). After ingestion of nitrate-rich foods, anaerobic bacteria in the mouth carry out a reduction reaction that results in the formation of nitrites (the reduced form of nitrates) from some of the nitrates. The nitrites formed are transported through the digestive system and then absorbed from the intestines directly into the bloodstream, where they are reduced to nitric oxide (NO) with the help of special enzymes. The second most efficient way to synthesise nitric oxide is through nitrite reduction occurring in the acidic environment of the stomach.

Nitric oxide (NO) supports many functions in the body, the most important being the increased flow of blood and thus oxygen to all body tissues, the formation and efficiency of cellular mitochondria and the enhancement of muscle contraction<sup>27</sup>.

The above points are key to concluding that beetroot extract supplementation can support the cardiovascular and respiratory systems, which in turn can translate into better performance in sports. Supporting the efficiency of gas exchange means that sufficient oxygen can reach the muscles and carbon dioxide can be efficiently removed from them. This process contributes to better performance during exercise and faster recovery after exercise.

The aforementioned nitrates in beetroot also indirectly support the maintenance of strong muscle fibres, the process of muscle contraction and also the maintenance of optimal levels of glucose and calcium. All this makes beetroot often referred to as a natural energy booster<sup>28-30</sup>.

Beetroot is also widely known for promoting hematopoietic processes. Due to their potassium content, they help to maintain normal blood pressure<sup>31</sup>, furthermore, they support maintaining of optimal cholesterol blood levels, influencing mainly the LDL fraction. The vegetable also promotes the reduction of inflammation in the body.

## Ashwagandha root extract (*Withania somnifera*)

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**Ashwagandha**, also known as winter cherry, is a plant native to India. It owes its valuable properties mainly to two groups of compounds: withanolides and glycowithanolides.

It is classified as an adaptogenic plant. The term "adaptogen" refers to a substance that enables the body to respond to physical, chemical and biological stressors by increasing the body's non-specific response to a particular type of stressor. This means that an adaptogen increases the body's ability to adapt to changing environmental conditions.

Ashwagandha is probably most famous for its properties that support the battle against stress<sup>32</sup>. Those wanting to support the quality of their sleep<sup>33</sup>. Active ingredients found in this plant's extract contribute to the maintenance of optimal cortisol (also known as the stress hormone) blood levels. As a result, ashwagandha helps the body maintain the state of relaxation and peacefulness<sup>34</sup>.

Research proves that ashwagandha can also contribute to the maintenance of optimal mental and cognitive activity, as well as support memory and concentration<sup>35,36</sup>.

Athletes also keenly use ashwagandha root. The results of multiple studies show that using this plant can support the body during physical exercise by fostering the maintenance of muscle strength, as well as performance during the workout, but can also contribute to minimising perceived muscle fatigue as well as the discomfort associated with muscle soreness after exercise<sup>37,38</sup>. Moreover, ashwagandha can contribute to the increase in muscle mass, as ingredients found in this plant support testosterone production by fostering the production of luteinising hormone (LH).

Ashwagandha is also popularly used by people who want to maintain optimal sexual function (by both men and women)<sup>39</sup>. In case of men, this plant additionally helps support sperm motility and count, which can contribute to the improvement in fertility<sup>40</sup>.

In addition, ashwagandha root can foster the maintenance of optimal blood glucose level<sup>41</sup> and supports the functioning of the heart, blood vessels and the respiratory system. It can also support the maintenance of healthy skin condition.

## Rutin

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**Rutin (rutoside)** is a plant-derived component belonging to the flavonoid group. It is a natural pigment present in some vegetables and fruits (e.g. citrus fruits, carrots, tomatoes, sweet potatoes or apples). The name rutin comes from the common rue (*Ruta graveolens*), a plant containing this important active ingredient. Rutin shows many valuable properties. Being an antioxidant, it can be used to support the body in the fight against free radicals and the resulting oxidative damage<sup>42</sup>.

Rutin is also widely known for its ability to support cardiovascular function. It promotes and reinforces blood vessels and makes them more flexible, and can help reduce capillary fragility. It should therefore be an integral part of the diet of people with couperose skin and those prone to bruising, and varicose veins<sup>43,44</sup>.

Due to the fact that it has the aforementioned antioxidative and cardiovascular support properties, rutin supplementation can be helpful for both amateur and professional athletes.

Furthermore, rutin promotes the protection of vitamin C against oxidation and also enhances its absorption<sup>45</sup>. It is therefore also recommended for those wishing to support their immune system, especially during the cold and flu season<sup>44</sup>.

## B vitamins – B3 (niacin) and B12 (cyanocobalamin)

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**Vitamin B3 (niacin)**, also referred to as **vitamin PP**. Scientists believe that this is the vitamin that humans need

the most of all B vitamins. It exhibits a wide range of effects to support the normal functioning of the human body. It is a progenitor of two important coenzymes: NAD and NADP, which are essential for converting nutrients into energy. This happens, for example, in glycolysis and the Krebs cycle, but also in anabolic processes that result in the production of new compounds, including sex hormones, stress hormones, cholesterol and fatty acids.

Vitamin B3 is widely known for its properties that help maintain optimal blood cholesterol levels, as it supports the maintenance of “good” cholesterol (HDL) at optimal levels, while promoting the lowering of the unfavourable cholesterol (LDL) and triglyceride fractions in the blood<sup>46</sup>.

In addition to metabolism, the action of vitamin PP may include the transmission of signals between cells, support of brain and nervous system function, including the maintenance of normal psychological functions<sup>47</sup>. Moreover, niacin may contribute to the reduction of tiredness and fatigue.

What is more, this vitamin is valuable for those wishing to support the maintenance of the cardiovascular system in optimal condition. The function of niacin in this respect is to help dilate and strengthen blood vessels, so that the blood can circulate more freely through the body and deliver valuable nutrients along with oxygen to all body cells<sup>48</sup>.

Thanks to its properties, vitamin PP can also support the condition of the skin and hair, for example by promoting the reduction of blemishes and irritation and supporting the elasticity of the skin and the condition of the hair.

Supplementation with this vitamin also helps to maintain the normal condition of the mucous membranes.

**Vitamin B12** is a general name for compounds from the group of cobalamines with similar chemical structure and biological functions. Humans cannot synthesize vitamin B12 on their own. Physiologically, the production of this vitamin is aided by intestinal bacteria. As we age, as well as in case of gastrointestinal tract disorders and disorders of intestinal microflora, vegans and vegetarians, absorption of vitamin B12 is reduced. Therefore, it is recommended to supplement it on a level higher than prescribed nutrient reference value (NRV). This is also supported by our limited ability to absorb vitamin B12 from food supplements – compared to vitamin B12 produced in the intestines.

Among cobalamines, **cyanocobalamin** is well absorbed by the body and is easily converted in the body to the active form of vitamin B12, methylcobalamin. Cyanocobalamin belongs to the group of water-soluble vitamins and is a precursor of several enzymes important for the normal functioning of the human body.

Vitamin B12 supports the production of red blood cells. Insufficient levels of vitamin B12 are one of the main reasons why there are not enough erythrocytes (red blood cells) in the blood and, while those that are formed very often have an abnormal form, becoming larger and oval. Due to this non-standard shape, such blood cells are unable to move at the required speed, which can lead to many health problems<sup>49</sup>.

In addition to enabling the normal haematopoietic processes to take place, vitamin B12 (cyanocobalamin) also supports the nervous system, assists in the formation of myelin sheaths in nerves and promotes the formation of nerve transmitters. Thus, it contributes to maintaining normal psychological and cognitive functions and supports memory<sup>50,51</sup>. Moreover, vitamin B12 plays an important role in the synthesis and metabolism of serotonin, the so-called happiness hormone, responsible for regulating mood. A deficiency of vitamin B12 can therefore lead to reduced production of this hormone and, consequently, can lead to a depressed mood. Therefore, this vitamin contributes to the reduction of feelings of exhaustion and fatigue<sup>52, 53</sup>.

In addition, this vitamin promotes the proper metabolism of homocysteine and the maintenance of normal energy metabolism. Vitamin B12 is also used by those wishing to support the functioning of the immune system.

## What makes DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX so special?

- ▶ **Comprehensive formula based not only on a high dose of L-arginine and L-citrulline, but also on additional active compounds** for optimal muscle function and muscle mass building, supporting the functioning of the sexual, cardiovascular, nervous and immune systems.

- ▶ Contains an **absorption booster** – the composition of this dietary supplement has been enriched with **BioPerine®\*** – a reserved, patented formula of plant origin with **properties enhancing the absorption of nutrients** from this dietary supplement proven with scientific research.
- ▶ **Synergy** between all components.
- ▶ **Additional substances limited to those necessary from the technological point of view.**
- ▶ **Only natural colourants.**
- ▶ **Comfortable to use** – effervescent tablets which serve to prepare a refreshing orange and cherry drink.
- ▶ The product is **LACTOSE-FREE** and **GMO-FREE**.
- ▶ The product is **GLUTEN-FREE** – suitable for people with gluten intolerance.
- ▶ The product is **suitable for vegans and vegetarians.**

**i** Reference list for DUOLIFE Boost Formula FIZZY EASY L-arginine COMPLEX formulation can be found in the separate sheet of the binder.



# Boost Formula FIZZY EASY L-arginine COMPLEX

## References

1. Meghwal, M., & Goswami, T. K. (2013). Piper nigrum and piperine: an update. *Phytotherapy Research*, 27(8), 1121–1130.
2. Fernández-Lázaro, D., Mielgo-Ayuso, J., Córdova Martínez, A., & Seco-Calvo, J. (2020). Iron and physical activity: Bioavailability enhancers, properties of black pepper (bioperine®) and potential applications. *Nutrients*, 12(6), 1886.
3. Alexander, A., Qureshi, A., Kumari, L., Vaishnav, P., Sharma, M., Saraf, S., & Saraf, S. (2014). Role of herbal bioactives as a potential bioavailability enhancer for active pharmaceutical ingredients. *Fitoterapia*, 97, 1–14.
4. Badmaev, V., Majeed, M., & Norkus, E. P. (1999). Piperine, an alkaloid derived from black pepper increases serum response of beta-carotene during 14-days of oral beta-carotene supplementation. *Nutrition Research*, 19(3), 381–388.
5. Badmaev, V., Majeed, M., & Prakash, L. (2000). Piperine derived from black pepper increases the plasma levels of coenzyme Q10 following oral supplementation. *The journal of nutritional biochemistry*, 11(2), 109–113.
6. Shoba, G., et al. Influence Of Piperine On The Pharmacokinetics Of Curcumin In Animals And Human Volunteers. *Planta Med.* 1998; 64(4):353–356.
7. Lambert, J. D., Hong, J., Kim, D. H., Mishin, V. M., & Yang, C. S. (2004). Piperine enhances the bioavailability of the tea polyphenol (–)-epigallocatechin-3-gallate in mice. *The Journal of nutrition*, 134(8), 1948–1952.
8. Reanmongkol, W., Janthasoot, W., Wattanatorn, W., Dhumma-Upakorn, P., & Chudapongse, P. (1988). Effects of piperine on bioenergetic functions of isolated rat liver mitochondria. *Biochemical pharmacology*, 37(4), 753–757.
9. Srinivasan, K. (2007). Black pepper and its pungent principle-piperine: a review of diverse physiological effects. *Critical reviews in food science and nutrition*, 47(8), 735–748.
10. Haq, I. U., Imran, M., Nadeem, M., Tufail, T., Gondal, T. A., & Mubarak, M. S. (2021). Piperine: A review of its biological effects. *Phytotherapy Research*, 35(2), 680–700.
11. Rahimi, P., & Pahlavani, N. (2022). The effect of L-arginine supplementation on body composition and performance in male athletes: a double-blinded randomized clinical trial. *Journal of Nutrition, Fasting & Health*, 10.
12. Viribay, A., Burgos, J., Fernández-Landa, J., Seco-Calvo, J., & Mielgo-Ayuso, J. (2020). Effects of arginine supplementation on athletic performance based on energy metabolism: A systematic review and meta-analysis. *Nutrients*, 12(5), 1300.
13. Bronte, V., & Zanovello, P. (2005). Regulation of immune responses by L-arginine metabolism. *Nature Reviews Immunology*, 5(8), 641–654.
14. Gad, M. Z. (2010). Anti-aging effects of L-arginine. *Journal of advanced research*, 1(3), 169–177.
15. Wu, G., Meininger, C. J., McNeal, C. J., Bazer, F. W., & Rhoads, J. M. (2021). Role of L-arginine in nitric oxide synthesis and health in humans. *Amino Acids in Nutrition and Health: Amino Acids in Gene Expression, Metabolic Regulation, and Exercising Performance*, 167–187.
16. Moncada, S., & Higgs, A. (1993). The L-arginine-nitric oxide pathway. *New England journal of medicine*, 329(27), 2002–2012.
17. Rajapakse, N. W., & Mattson, D. L. (2008). Role of L-arginine in nitric oxide production in health and hypertension. *Clinical and experimental pharmacology & physiology*, 36(3), 249–255.
18. Cylwik, D., Mogielnicki, A., & Buczek, W. (2005). L-arginine and cardiovascular system. *Pharmacol Rep*, 57(1), 14–22.
19. Maxwell, A. J., & John, P. (1998). Cardiovascular effect of L-arginine. *Current opinion in nephrology and hypertension*, 7(1), 63–70.
20. Vincent, S. R. (1994). Nitric oxide: a radical neurotransmitter in the central nervous system. *Progress in neurobiology*, 42(1), 129–160.
21. Scibona, M., Meschini, P., Capparelli, S., Pecori, C., Rossi, P., & GF, M. F. (1994). L-arginine and male infertility. *Minerva urologica e nefrologica= The Italian journal of urology and nephrology*, 46(4), 251–253.
22. Goron, A., Lamarche, F., Blanchet, S., Delangle, P., Schlattner, U., Fontaine, E., & Moinard, C. (2019). Citrulline stimulates muscle protein synthesis, by reallocating ATP consumption to muscle protein synthesis. *Journal of cachexia, sarcopenia and muscle*, 10(4), 919–928.
23. Barkhidarian, B., Khorshidi, M., Shab-Bidar, S., & Hashemi, B. (2019). Effects of L-citrulline supplementation on blood pressure: A systematic review and meta-analysis. *Avicenna journal of phytomedicine*, 9(1), 10.
24. Gonzalez, A. M., & Trexler, E. T. (2020). Effects of citrulline supplementation on exercise performance in humans: A review of the current literature. *The Journal of Strength & Conditioning Research*, 34(5), 1480–1495.

25. Shafqat, A., Robinson, H., Riley, L., Hepburn, L. E., Fairbairn, P., Carr, R. D., & Orubide, D. (2016). *CITRULLINE AND ITS EFFECTS ON MOOD AND COGNITIVE FUNCTION* (Doctoral dissertation, Queen Margaret University).
26. Morita, M., Hayashi, T., Ochiai, M., Maeda, M., Yamaguchi, T., Ina, K., & Kuzuya, M. (2014). Oral supplementation with a combination of L-citrulline and L-arginine rapidly increases plasma L-arginine concentration and enhances NO bioavailability. *Biochemical and biophysical research communications*, 454(1), 53-57.
27. Adji, F. R., Sofro, Z. M., & Hapsari, M. (2022). The effect of beetroot juice (*Beta Vulgaris L.*) supplementation on O<sub>2</sub>max of youth soccer athletes. *Journal of Public Health in Africa*, 13(s2).
28. Benjamim, C. J. R., S. Júnior, F. W., de Figueirêdo, M. Í. L., Benjamim, C. J. R., Cavalcante, T. C. F., da Silva, A. A. M., ... & Valenti, V. E. (2021). Beetroot (*Beta Vulgaris L.*) extract acutely improves heart rate variability recovery following strength exercise: a randomized, double-blind, placebo-controlled crossover trial-pilot study. *Journal of the American College of Nutrition*, 40(4), 307-316.
29. Volpe, S. L. (2013). Does Beetroot Juice Really Help With Endurance Performance?. *ACSM's Health & Fitness Journal*, 17(1), 29-30.
30. Breese, B. C., McNarry, M. A., Marwood, S., Blackwell, J. R., Bailey, S. J., & Jones, A. M. (2013). Beetroot juice supplementation speeds O<sub>2</sub> uptake kinetics and improves exercise tolerance during severe-intensity exercise initiated from an elevated metabolic rate. *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*, 305(12), R1441-R1450.
31. Siervo, M., Lara, J., Ogbonmwan, I., & Mathers, J. C. (2013). Inorganic nitrate and beetroot juice supplementation reduces blood pressure in adults: a systematic review and meta-analysis. *The Journal of nutrition*, 143(6), 818-826.
32. Pratte, M. A., Nanavati, K. B., Young, V., & Morley, C. P. (2014). An alternative treatment for anxiety: a systematic review of human trial results reported for the Ayurvedic herb ashwagandha (*Withania somnifera*). *The Journal of Alternative and Complementary Medicine*, 20(12), 901-908.
33. Salve, J., Pate, S., Debnath, K., Langade, D., & Langade, D. G. (2019). Adaptogenic and anxiolytic effects of ashwagandha root extract in healthy adults: a double-blind, randomized, placebo-controlled clinical study. *Cureus*, 11(12).
34. Lopresti, A. L., Smith, S. J., Malvi, H., & Kodgule, R. (2019). An investigation into the stress-relieving and pharmacological actions of an ashwagandha (*Withania somnifera*) extract: A randomized, double-blind, placebo-controlled study. *Medicine*, 98(37).
35. Pingali, U., Pilli, R., & Fatima, N. (2014). Effect of standardized aqueous extract of *Withania somnifera* on tests of cognitive and psychomotor performance in healthy human participants. *Pharmacognosy research*, 6(1), 12.
36. Choudhary, D., Bhattacharyya, S., & Bose, S. (2017). Efficacy and safety of Ashwagandha (*Withania somnifera* (L.) Dunal) root extract in improving memory and cognitive functions. *Journal of dietary supplements*, 14(6), 599-612.
37. Wankhede, S., Langade, D., Joshi, K., Sinha, S. R., & Bhattacharyya, S. (2015). Examining the effect of *Withania somnifera* supplementation on muscle strength and recovery: a randomized controlled trial. *Journal of the International Society of Sports Nutrition*, 12(1), 43.
38. Sandhu, J. S., Shah, B., Shenoy, S., Chauhan, S., Lavekar, G. S., & Padhi, M. M. (2010). Effects of *Withania somnifera* (Ashwagandha) and *Terminalia arjuna* (Arjuna) on physical performance and cardiorespiratory endurance in healthy young adults. *International journal of Ayurveda research*, 1(3), 144.
39. Dongre, S., Langade, D., & Bhattacharyya, S. (2015). Efficacy and safety of Ashwagandha (*Withania somnifera*) root extract in improving sexual function in women: a pilot study. *BioMed research international*, 2015.
40. Mahdi, A. A., Shukla, K. K., Ahmad, M. K., Rajender, S., Shankhwar, S. N., Singh, V., & Dalela, D. (2011). *Withania somnifera* improves semen quality in stress-related male fertility. *Evidence-Based Complementary and Alternative Medicine*, 2011.
41. Durg, S., Bavage, S., & Shivaram, S. B. (2020). *Withania somnifera* (Indian ginseng) in diabetes mellitus: a systematic review and meta-analysis of scientific evidence from experimental research to clinical application. *Phytotherapy research*, 34(5), 1041-1059.
42. Boyle, S. P., Dobson, V. L., Duthie, S. J., Hinselwood, D. C., Kyle, J. A. M., & Collins, A. R. (2000). Bioavailability and efficiency of rutin as an antioxidant: a human supplementation study. *European Journal of Clinical Nutrition*, 54(10), 774-782.
43. Altinterim, B. (2014). Citrus, rutin and on their vein permeability effects. *RJAEM*, 3(2), 80-81.
44. Ganeshpurkar, A., & Saluja, A. K. (2017). The pharmacological potential of rutin. *Saudi pharmaceutical journal*, 25(2), 149-164.
45. Crampton, E. W., & Lloyd, L. E. (1950). A quantitative estimation of the effect of rutin on the biological potency of vitamin C. *Journal of Nutrition*, 41, 487-498.
46. Crouse III, J. R. (1996). New developments in the use of niacin for treatment of hyperlipidemia: new considerations in the use of an old drug. *Coronary artery disease*, 7(4), 321-326.
47. Wuerch, E., Urgoiti, G. R., & Yong, V. W. (2023). The Promise of Niacin in Neurology. *Neurotherapeutics*, 1-18.
48. Digby, J. E., Ruparelia, N., & Choudhury, R. P. (2012). Niacin in cardiovascular disease: recent preclinical and clinical developments. *Arteriosclerosis, thrombosis, and vascular biology*, 32(3), 582-588.

49. Ankar, A., & Kumar, A. (2022). Vitamin B12 deficiency. In *StatPearls* [Internet]. StatPearls Publishing.
50. Markun, S., Gravestock, I., Jäger, L., Rosemann, T., Pichierri, G., & Burgstaller, J. M. (2021). Effects of vitamin B12 supplementation on cognitive function, depressive symptoms, and fatigue: a systematic review, meta-analysis, and meta-regression. *Nutrients*, *13*(3), 923.
51. Köbe, T., Witte, A. V., Schnelle, A., Grittner, U., Tesky, V. A., Pantel, J., ... & Flöel, A. (2016). Vitamin B-12 concentration, memory performance, and hippocampal structure in patients with mild cognitive impairment. *The American journal of clinical nutrition*, *103*(4), 1045-1054.
52. Seppälä, J., Koponen, H., Kautiainen, H., Eriksson, J. G., Kampman, O., Leiviskä, J., ... & Vanhala, M. (2013). Association between vitamin b12 levels and melancholic depressive symptoms: a Finnish population-based study. *BMC psychiatry*, *13*(1), 1-8.
53. Syed, E. U., Wasay, M., & Awan, S. (2013). Vitamin B12 supplementation in treating major depressive disorder: a randomized controlled trial. *The open neurology journal*, *7*, 44.