



Available in Natural Lemon and Natural Fruit Punch

- Workout supplement
- Source of amino acids involved in muscle protein synthesis
- Assists in the building of lean muscle mass when combined with regular weight or resistance training and a healthy balanced diet

## Discussion

The amino acid (AA) formula that comprises XymoBolX was meticulously developed and studied by internationally recognized researchers in the fields of muscle metabolism and aging and longevity. Seventeen years of research have resulted in this particular blend of the nine essential amino acids (EAAs)—including the branched-chain amino acids leucine, isoleucine, and valine—plus arginine, proportioned in the most optimal ratios for muscle anabolism.<sup>[1-22]</sup> XymoBolX is designed for both young and elderly individuals who are seeking to stimulate muscle protein synthesis, hasten muscle recovery, and promote muscle strength and function.\*

### Quality Not Quantity

Amino acids are potent stimulators of muscle protein synthesis in both the young and the elderly. Of the AAs, data indicate that EAAs are primarily responsible for this biological process.<sup>[9]</sup> Moreover, studies demonstrate that there is no additional benefit to muscle protein synthesis from adding non-essential AAs to an EAA supplement.<sup>[21]</sup> For instance, the addition of 22 g of non-essential AAs to 18 g of EAAs produced no additional benefit to net muscle balance when compared to the provision of 18 g of EAAs alone.<sup>[21]</sup> Likewise, a 15 g EAA supplement—with the nine EAAs in similar ratios to XymoBolX—had twice the impact on muscle protein synthesis than that of an equal amount (15 g) of a high-quality protein.\*<sup>[14]</sup>

### Why Include Arginine?

In healthy young adults, sufficient arginine can be synthesized to meet normal demands. However, during rapid growth or in response to stress, there are heightened needs for arginine that may not be fully met. Furthermore, there is evidence that arginine has a unique stimulatory effect on muscle protein synthesis. While all mechanisms have not been fully elucidated and are likely multifactorial, it is known that arginine converts to nitric oxide, which relaxes blood vessels and improves blood flow to muscles. Last, arginine availability influences its own catabolism and that of other amino acids by controlling ureagenesis. A critical finding that solidified the need to add arginine to the EAA formulation was that without it, plasma arginine decreases; therefore, the rate of protein synthesis is potentially reduced.\*<sup>[17]</sup>

### Essential Amino Acids and Exercise

The effectiveness of EAA intake is amplified by ingestion before exercise because of the increased delivery of amino acids to the muscles.<sup>[6,21]</sup> In fact, results from acute studies have shown that exercise and EAA intake have additive effects on muscle protein synthesis.<sup>[17]</sup> Furthermore, branched-chain AAs (BCAAs), have been demonstrated to hasten post-exercise muscle recovery. Data show that BCAA (e.g., leucine) supplementation before and after exercise helps decrease exercise-induced muscle damage, promotes muscle protein synthesis, and modulates exercise-related cytokine production.<sup>[23,24]</sup> For example, leucine-enriched EAA supplementation (total EAA was 10 g of which

1.85 g were leucine) prolonged the anabolic response and the sensitivity of skeletal muscle to AAs.<sup>[25]</sup> Børsheim et al propose that over time, exercise will increase the beneficial effects of EAA supplementation on lean body mass and strength and improve functional parameters of muscles.\*<sup>[17]</sup>

### Muscle Loss with Aging

Beginning in the fourth decade of life, there is a natural and gradual decline in muscle mass (catabolism), strength, and function as a result of the innate metabolic changes and the more sedentary lifestyle that accompany aging. Studies using EAA supplementation at doses of 6.7 to 45 g/d in advanced age, bed rest, and recovery from surgery have demonstrated important benefits. These benefits include stimulation of muscle protein synthesis, enhancements in muscle strength, and improvements in functional parameters of the studied muscle(s).\*<sup>[11,14,15,17,20,22]</sup>

### In the Elderly

Protein supplements are often used to help ward off muscle-related losses in the elderly. According to Ferrando et al, "Increasing protein intake to 1.4 g/kg/d in the elderly with EAA supplementation indicates the potential for preserving muscle function."<sup>[20]</sup> Because non-essential AAs are not as effective as EAAs for muscle anabolism, supplements containing significant calories in the form of non-essential AAs may be inadequate to maximize anabolic efficiency in the elderly.<sup>[9]</sup> Furthermore, the elderly tend to use protein supplements as calorie substitutes and reduce their food intake.<sup>[9,20]</sup> In these cases, it becomes critical that the AA supplement be low-calorie, so as not to influence satiety, and highly efficient to confer maximum benefits to skeletal muscle.<sup>[20]</sup> A high proportion of leucine is another factor that is required for optimal stimulation of muscle protein synthesis in the elderly.<sup>[15]</sup> Additionally, there is evidence that the presence of carbohydrates in a nutritional supplement for the elderly is not beneficial and may actually impair muscle anabolism.<sup>[9,17]</sup> XymoBolX is a highly efficient blend of EAAs plus arginine that provides zero carbohydrates.\*

## XymoBoiX™ Natural Lemon Flavor

### Medicinal Ingredients (per vegetable capsule)

L-Leucine .....	1.5 g
L-Lysine HCL .....	672 mg
L-Valine .....	427 mg
L-Isoleucine .....	414 mg
L-Arginine .....	405 mg
L-Threonine .....	363 mg
L-Phenylalanine .....	260 mg
L-Methionine .....	128 mg
L-Histidine .....	64 mg
L-Tryptophan .....	2.5 mg

### Non-Medicinal Ingredients

Citric acid, malic acid, natural flavors (no MSG), stevia leaf, sea salt.

**May contain:** Riboflavin.

### Directions For Use:

**Adults:** Dissolve one scoop into 250 - 375 mL of room-temperature water and consume immediately once per day 30 to 60 minutes prior to resistance exercise or between meals or use as directed by your health care practitioner. Ensure to drink enough fluid before, during, and after exercise.

**Caution:** Consult a health care professional prior to use if you are pregnant or breastfeeding.

**Storage:** Keep out of children's reach. Keep closed in a cool, dry place.

**Formulated To Exclude:** Wheat, gluten, yeast, soy protein, animal and dairy products, fish, shellfish, peanuts, tree nuts, egg, ingredients derived from genetically modified organisms (GMOs), artificial colors, artificial sweeteners, and artificial preservatives.

Do not use if tamper seal is broken or missing.

## References

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Additional references available upon request

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