

SUPERFOOD PROTEIN COMPLEX

white paper provided by Archmore Botanical Research Group, LLC

*A Dollar Coffee
Club product*



Superfood Protein Complex

a Dollar Coffee Club product

- A technical overview outlining the safety and efficacy of Superfood Protein Complex, a whey protein powder drink mix designed to support weight management and lean muscle mass*
- This technical white paper will include:
 - Formulation breakdown
 - Synopsis of health benefits associated with the proprietary ingredients
 - Efficacy
 - Cellular, animal, and human trials demonstrating weight management, building/maintaining lean muscle mass, and alleviating symptoms associated with metabolic syndrome
 - Secondary health benefits outside the scope of weight management
 - Safety and Usage Guidelines
 - An overview of the safety of ingredients in Superfood Protein Complex at recommended levels
 - Recommended guidelines for use including dosing recommendations and potential adverse events or warnings

**These statements have not been evaluated by the Food and Drug Administration and are meant for research purposes only.*



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Overview

Obesity and overweight are growing epidemics for much of the civilized world, leading to chronic diseases commonly associated with this health condition, such as cardiovascular issues, high blood pressure, diabetes, stroke, and potentially cancer. Preventing or reversing this debilitating condition has been the focus among complementary and alternative medicines, particularly within the nutraceutical and functional food industries. Many herbal products make claims toward weight loss and weight management, yet scientific research is scanty for these products at best. Researching and reviewing available scientific evidence prior to formulating novel products is ideal to insure the safety and efficacy of natural products.

Javita has formulated a high protein drink enriched with a superfood greens complex to assist with weight management through the building of lean muscle, appetite suppression, and energy enhancement. These mechanisms have been shown through clinical research to be highly effective for weight loss as well as weight loss maintenance. This paper will include descriptions and conclusions from various in vitro and in vivo trials showing efficacy and safety of the proprietary ingredients in this drink complex.

In addition to the scientific evidence supporting the functionality of this product for weight management, it was formulated to be an adjunct product to Javita's existing weight management formulations. This means that although it can be taken as a stand-alone product, it is recommended to be taken with one or many of Javita's weight management products to further enhance the benefits. This white paper will also touch on the synergistic benefits that can be found through its use with Javita's full line of weight management products.

As the 103rd US Congress dictated when passing the historical Dietary Supplement Health and Education Act (DSHEA) in 1994, "...consumers should be empowered to make choices about preventive health care programs based on data from scientific studies of health benefits related to particular dietary supplements." This paper is meant to assist in the empowerment of the educated consumer, to determine the best weight management product for their needs.



Formulation

- Formulation includes a superior whey protein to support lean muscle mass as well as appetite suppression
- It also includes a proprietary Superfood Greens Complex, providing botanical nutrition to support overall health
- A full spectrum B-Vitamin Complex increases metabolic energy levels even through calorie restriction
- Inulin supports healthy microbiota in the gut for satiety and digestion of proteins
- Natural Sweeteners including Stevia improve satiety and help reduce obesity compared to artificial sweeteners



Whey Protein- Overview

Whey protein is a healthy by-product from milk created as a result of cheese manufacturing. It is a mixture of globular proteins that have immense health benefits. Human milk is over 60% whey, while cow's milk is only 20% whey. Therefore, supplementing with a superior standard of whey protein concentrate, like in Javita's Superfood Protein Complex, provides nutrition at a higher level than what would be obtained through regular milk consumption.

Among these health benefits are many that support weight management, the main one being the growth and maintenance of lean muscle mass. Since muscle burns energy stores such as fat, maintaining healthy levels is key when trying to improve body composition. However, exercise and calorie restriction can degrade or break down these proteins, reducing lean muscle mass and potentially preventing optimal weight loss. Since proteins are the building blocks of these muscles, this loss can be prevented through healthy protein supplementation, such as that found in Javita's Superfood Protein Complex.

This powdered drink mix contains 18 grams of whey protein concentrate, a quickly digested protein rich in branched-chain amino acids. When amino acids are digested and absorbed into the bloodstream, they are available for the creation of new muscle, called muscle mass synthesis. Studies have shown that whey protein can help build and maintain muscle mass, assist athletes with recovery from heavy exercise and increase muscle strength in response to strength training. Overweight and obese individuals have shown that whey protein may improve body composition by decreasing fat mass and increasing lean mass. All of these functions can support healthy weight loss and improve body composition.

Whey protein has also been shown to help reduce appetite. This is done through regulation of various hormone channels and in some studies has been shown to be more effective than other types of proteins, such as soy.



Superfood Greens - Overview

Eating your fruits and vegetables is no longer something that is just said to children. Although they provide enormous benefits to a growing child, fruits and vegetables serve a great purpose in our adult lives, particularly when we are trying to lose weight. Dark leafy vegetables and deeply colored fruits and berries contain high concentrations of nutrients that have been shown to support healthy bodies. Everything from improving digestive function, protecting cells from toxic damage, reducing inflammation, and protecting from cardiovascular disease and diabetes can be accomplished by increasing your daily consumption of these powerful fruits and vegetables.

Javita's proprietary Superfood Greens contains a precise mixture of some of the most potent fruits and vegetables to help maintain optimal health. In particular, the botanicals in this blend were selected for their concentration of nitrites, compounds that help with the conversion of white fat cells (storage cells) to brown fat cells (burnable cells). This conversion primes fat cells for use as energy burners, allowing fat to be released and burned more efficiently. This assists with weight management particularly when exercise is increased and calories are reduced.

On top of this powerful combination of botanicals, the Superfood Blend as a whole contributes an entire gram of protein to the diet, protein that can be used for building lean muscle which burns fat as well. Combined with the 18 grams of protein from whey, Javita's Superfood Protein Complex is a high-protein, low carbohydrate, low calorie solution to support weight management goals.



Inulin- Overview

Dietary fibers have been shown to play a role in obesity prevention through appetite control and reduction of body weight. However, there are many different types of fibers, differing greatly in their fermentability in the gut, solubility, and viscosity, all of which may impact appetite differently.

Inulin is a dietary fiber that belongs to a class of fibers called fructans. It is derived from plants, most often chicory and is a group of polysaccharides found in the roots and rhizomes of these plants. Years of research have produced contradictory results regarding inulin and appetite control, since historically this has been a qualitative not quantitative measurement [1]. Research has advanced, and new mechanisms of action have been identified, allowing satiety and appetite control to be quantifiable endpoints, showing great benefits for inulin in weight management. In fact, applications for the use of inulin in the pharmaceutical world are even expanding, focusing on the use of the safe and effective fiber for the stabilization of proteins, modified drug delivery, and physiological and disease-modifying effects. It also has potential applications for colon specific drug administration and stabilizing and adjuvating vaccine formulations [2]. We will continue to see the rise in popularity of this flexible oligosaccharide both within the nutrition and pharmaceutical industries for weight management as well as a diverse array of health applications.



Formulation Efficacy

Whey Protein- efficacy

Whey protein is a group of globular proteins that are a byproduct in the manufacture of cheese from cows milk. Because this is such a large industry, a vast amount of whey is produced every year. Rather than allowing this to become a huge loss for production, the dairy industry invested heavily in research and determined that this byproduct can be used for improving human health. Since then whey protein has become a commonplace term, not just within the nutrition industry, but throughout the general public as well, because of these health benefits. Among these benefits are several that directly impact body composition and weight management. These include reducing appetite, building and maintaining lean muscle mass, improving insulin resistance and glycemic control, and benefits for exercise and fitness training.

Appetite Suppression and Satiety

There is a vast amount of research supporting the conclusion that a high proportion of calories from protein increases and maintains weight loss. This is because proteins are known to induce satiety and increase diet-induced thermogenesis. Whey protein is known as a “fast” protein, meaning that it is easily digested when compared to other proteins, such as casein. This allows more rapid appetite suppressing results. Some studies have shown that whey stimulates the secretion of incretin hormones glucagon-like peptide-1 and glucose-dependent insulinotropic polypeptide more than any other protein. Combined with the fast rate of absorption, whey seems to have a rapid, hormonally driven, benefit for suppressing appetite [3]. To demonstrate this in vivo, animals were fed whey protein versus casein for 15 weeks. Body composition, energy intake, and plasma levels of appetite-modulating hormones were assessed. However, researchers went a step further taking samples of various nutrient-responsive genes that are known to play a role in gastrointestinal structure and function. Whey protein and not casein was shown to have a significant effect on the signaling pathways for these genes, which in turn, reduced energy intake and balance. Researchers concluded a definitive mechanism of action for whey protein on the genetic expression of genes responsible for reducing appetite and creating a feeling of satiety [4].

Similar measurements have been made in human clinical trials. In 2015, researchers published results from eighteen normal weight women supplemented with either whey protein or a carbohydrate control



beverage. They measured plasma concentrations of appetite-modulating hormones, such as glucagon-like peptide-1 and pancreatic polypeptide, and found that these were significantly increased by whey protein after only 90 minutes. They also saw an increase in plasma concentrations of amino acids and their metabolites, concluding that these combined with the appetite-modulating hormones would mediate the observed satiety response seen from whey protein [5].

In a 12-week long clinical trial to determine if these benefits can come from any type of protein, 45 men with BMI between 25-40 kg/m² were randomly assigned to receive either the whey protein or soy protein 30-minutes prior to their lunch meal. Compared to their baseline values, significant reductions in appetite were seen in the whey protein group as well as reductions in calorie intake, anthropometry (body weight, mass, and waist circumference), and body composition (fat mass and lean muscle). The soy protein group also saw significant changes in most parameters over baseline except for lean muscle mass. According to this study, consuming whey protein over soy protein 30-minutes prior to a meal significantly benefits appetite, calorie intake, anthropometry, and body composition [6].

As is often the case with complex products such as whey protein, researchers attempt to break the product down into single nutrients to determine if isolating this component will still achieve benefits. In the case of whey protein, it has been broken down into various peptides which have been individually researched, one being glycomacropeptide (GMP). In a study published in 2014, researchers compared this single component against whey protein as a whole with respect to appetite control. Using 22 normal-weight adult women, researchers determined that there was a significant reduction in appetite and food intake after consuming whey protein but not in carbohydrate beverages enriched with GMP or GMP alone. They concluded that it is not the presence of this single component that is suppressing appetite but the whey protein as a whole [7].

Lean Muscle Mass Building and Maintaining

In addition to supporting weight loss through appetite suppression, evidence also supports the use of whey protein for weight loss due to changes in body composition, specifically the building of lean muscle mass. This process is known as muscle synthesis, and is directly correlated to an increase in amino acid production or supplementation. Since amino acids are the building blocks of protein, supplementing with a high quality protein, such as whey, should produce more lean muscle mass.



This hypothesis has been confirmed in several types of trials, both animal and human, and the mechanism confirmed on the genetic level, particularly when whey supplementation is combined with exercise. Since exercise in and of itself can expedite weight loss, these researchers set the parameters of the trial to determine whether exercise alone or in combination with whey protein was better. In those animals supplemented with whey protein and resistance exercise, muscle weight was significantly increased over the non-whey plus exercise group. Looking at the results on a genetic level, they saw that certain gene transcription was induced only by this interaction of whey protein plus exercise, which led to significant production of lean muscle mass [8].

Loss of muscle mass due to aging is called sarcopenia and is of great concern in the adult and elderly populations. Sarcopenia can lead to nerve damage and loss, affecting the functionality of the brain. It can cause weakness, loss of stamina, and the inability to turn proteins into usable energy. While exercise seems to be the main cure for staving off sarcopenia, it can also be prevented through a higher intake of protein. In an animal trial to compare different strategies for staving off sarcopenia, researchers compared (1) whey protein supplementation against (2) a diet of high protein (casein source) or (3) a diet high in vitamin E, D and chamomile. This final diet was hypothesized to reduce inflammation and oxidative stress that could be damaging the muscle tissues as well. After 6 months, only the animals fed whey protein had a smaller loss of lean muscle mass. Although oxidative stress was reduced in the antioxidant group, this had no significant reduction in sarcopenia. Casein also was not successful in delaying this muscle loss. They concluded that only whey protein is effective for delaying sarcopenia [9].

These results have been confirmed as well in human clinical trials. Since Vitamin D has been shown to play a role in muscle synthesis due to its benefits for calcium absorption, researchers combined it with whey protein in a double-blind randomized controlled trial. Eighty obese older adults underwent resistance training for 13 weeks while being supplemented with whey plus Vitamin D or placebo. Although both the intervention and control groups showed reductions in body weight due to exercise, only the intervention group had a significant increase in appendicular muscle mass [10]. This increase in lean muscle with a similar drop in body weight demonstrates a healthy shift in body composition that will ultimately benefit overall health.

And this change in body composition appears to be maintainable with whey protein supplementation.

During weight loss, myofibrillar protein synthesis (MPS) and lipolysis slow down. When these processes



slow, muscle mass decreases and fat burning is reduced. This may be one of the reasons weight loss is hard to maintain in the long term. Researchers have studied these processes to determine the impact that protein supplementation can have on modifying these rates. In a human trial on both men and women who had just completed a 14-day hypoenergetic diet, supplementation with whey protein did indeed slow the decline of myofibrillar protein synthesis (MPS) that tends to occur after weight loss. An interesting side note to this study was that these researchers tested whey protein against soy protein and only found significant results in the whey protein intervention group. They determined that whey protein is more effective for reducing muscle mass loss than soy and "...may be of importance in the preservation of lean mass during longer-term weight loss interventions" [11].

Muscle mass is not only beneficial for body composition and weight management but it is also the largest mass of insulin-sensitive tissue and the predominant reservoir for glucose disposal. This means that it plays a critical role in blood sugar regulation. Skeletal muscle makes up a significant majority of the muscle in our bodies, and unfortunately, this muscle declines as we age as well, resulting in blood sugar imbalances and higher risk for type 2 diabetes. There is currently a two-arm randomized controlled trial utilizing 200 adults with type 2 diabetes underway which will determine the benefits that whey protein plus vitamin D supplementation has on preserving skeletal muscle mass, glycemic control, and cardiometabolic risk factors [12]. This is an important area of research and will be updated as results are published.

Blood Sugar Imbalances and Metabolic Syndrome

An unfortunate consequence of metabolic syndrome and weight gain is the imbalance in blood sugars that can result. This can lead to serious health complications including diabetes and even death. Weight loss, physical activity, and calorie restriction are the cornerstones for reducing type 2 diabetes risk; however, whey protein supplementation has been shown beneficial for reducing this risk as well. Whey protein seems to play a role in improving post-meal glycemic control. In a clinical study conducted to better determine why this is, healthy young men received preloads of whey protein, glucose, or water and were then fed a preset pizza meal. The whey protein intervention slowed pre-meal gastric emptying rate compared to both the control and the glucose group. It also resulted in lower plasma glucose, insulin and C-peptide levels over the glucose group. Whey protein has the potential to play a powerful



role in blood sugar regulation due to its ability to lower post-meal glycemia by both insulin-dependent and insulin-independent mechanisms, as demonstrated in this study [13].

Benefits on blood sugar regulation from whey protein seem to be increased further when combined with different modes of exercise. In a clinical trial following free-living overweight/obese adults for 16-weeks, researchers examined the benefits of whey protein alone, whey protein plus resistance exercise, or whey protein plus multimode exercise (resistance, intervals, pilates, and endurance). All groups lost significant amounts of body weight, fat mass and abdominal fat with the multimode exercise group losing significantly more over the other two groups. In addition, only the resistance exercise and multimode exercise groups decreased fasting glucose levels and visceral adipose tissue. Conclusions were that combining exercise training with the timed ingestion of whey protein, independent of caloric restriction, can have benefits on total and regional body fat distribution, insulin resistance, and fat loss [14].

For those individuals where resistance or multimode exercise training is difficult to adopt, whey protein has been shown to still be of value. In a meta-analysis which examined the effect of whey protein on body weight and composition with and without resistance exercise, fourteen peer reviewed clinical trials were evaluated. More than 600 adults were studied. Significant reductions in both body weight and body fat were found over baseline for whey protein alone; however, the results were more favorable when whey protein was combined with resistance exercise. An interesting side note to this analysis as well was that whey protein produced better results over other types of proteins. In conclusion, whey protein has been shown to be beneficial for reducing body weight and improving body composition, alone or in conjunction with exercise, over baseline or other types of protein [15].



Superfood Greens- efficacy

Javita's Superfood Greens contain a proprietary blend of dark leafy vegetables, deep-colored fruits and berries, healthy grasses, and beneficial botanicals all known to provide substantial health benefits and assist in cellular processes. This includes antioxidation, cellular protection, energy metabolism and even fat burning.

The specially formulated blend of botanicals used in Superfood Greens consists of nutritionals known as "superfoods". Although there is no specific definition as to what constitutes a superfood, many scientific review articles characterize them as functional foods that may be effective in the prevention or treatment of serious conditions, including metabolic syndrome, diabetes, heart disease, and cancer [16]. Historically, superfoods have only been consumed by those in a higher socioeconomic position, not necessarily due to cost but rather due to the importance of personal health that most in these advantageous circumstances possess [17].

Spirulina and Chlorella

Microalgae is algae that is not visible to the naked eye and includes such species as Spirulina and Chlorella. This unique botanical provides an immense resource for human nutrition as it is loaded with proteins, lipids, and phytochemicals [18]. In their natural environment, microalgae are able to clean and detoxify their surrounding environments. This function also occurs when these botanicals are consumed by humans. As an easy measurement tool, researchers confirmed that toxic lead can be cleansed from the body through the consumption of microalgae. In an animal trial where mice were exposed to high quantities of lead, Spirulina showed significant protection of liver cells normally damaged by this exposure [19]. In a second animal study, lead levels were reduced by Spirulina consumption in both the blood and the brain, and oxidative protection of these tissues was significant [20].

Microalgae is not just a detoxifying agent. They have immense biodiversity, are able to grow in difficult environments, and have a manipulatable metabolism (i.e. they can be cultivated to produce specific molecules); therefore, microalgae are being studied for more diverse human applications, including heart health, diabetes, immune support, and cancer treatment support [21].

In a double-blind placebo-controlled clinical trial, Chlorella demonstrated significant improvements in blood lipid balancing for hypercholesterolemia [22]. Supporting trials have attributed these benefits to



the high content of carotenoids and omega-3 fatty acids contained in this species [23]. Spirulina has shown similar results in humans, greatly benefiting cardiovascular function. In a proposed clinical trial to take place in the coming years, these benefits will be tested with and without rigorous exercise; researcher hypothesize that the cardiovascular benefits of Spirulina will only be heightened with exercise [24].

Both cardiovascular disease and diabetes can be caused by the metabolic syndrome; and therefore, functional foods that may benefit one of these symptoms could be used for both. This is true of Spirulina. This microalgae has significant anti-inflammatory benefits including protecting the viability and functionality of pancreatic cells that are damaged in diabetes. Animal studies have shown that Spirulina can decrease glucose levels, increase insulin, and improve liver enzyme markers in diabetic animals [25].

Much research is focused on cancer treatment and prevention. Spirulina and Chlorella both contain protein hydrolysates and peptides with immunomodulatory and anti-cancer activities [26]. In a cellular trial, these compounds were isolated from Spirulina significantly reduced lung cancer cell viability with no cytotoxic effect on normal healthy cells [27].

In healthy individuals, Spirulina has immunomodulating benefits. It is well known that rigorous exercise decreases immunity particularly to viruses. A double-blind study published in Feb 2018 tested the benefits of Spirulina on the immune response in the national Polish Rowing Team. After 6-weeks of daily supplementation, cellular expression of immune cells were significantly greater particularly those with anti-infectious functions [28].

Blueberry, Strawberry, and Apple

Edible berries, such as blueberries and strawberries, are rich in anthocyanins, containing some of the highest concentrations of these compounds in nature [29]. These are powerful antioxidants believed to produce the most benefits from these fruits, including benefiting cardiovascular health, age-related decline, and inflammatory responses [30, 31]. They may assist in regulating cholesterol and platelet accumulation, benefiting heart and metabolic health [32, 33].



Strawberries and blueberries also contain specific flavonoids and phenolic acids shown to detoxify free radicals, modulate gene expression for cell survival, and protect and repair DNA damage [34]. These phenols also have anti-microbial, anti-allergy, and anti-hypertensive properties [35]. Many studies have demonstrated the crucial role these compounds may play in disease prevention, including cardiovascular, neurodegenerative, cancer, and other chronic pathologies [36]. With respect to metabolic syndrome, strawberries attenuated high-fat-diet-induced oxidative stress and inflammation and post-prandial hyperglycemia and hypercholesterolemia in individuals with cardiometabolic risk factors [37]. In an animal trial to determine the benefits on obesity specifically, anthocyanins from blueberries were tested against a high-fat diet. Animals lost significant body weight and reduced blood lipid content with the blueberry supplementation. Researchers noted that these anthocyanins affected the hepatic and glucose metabolic pathways for beneficial results [38].

Diabetes can lead to endothelial inflammation and vascular disease. In multiple cellular trials using healthy human endothelial cells versus diabetic endothelial cells, anthocyanins from blueberries significantly protected healthy cells and reversed damage in the diabetic cells to near control levels [39, 40].

Apple has powerful anti-microbial and digestive health benefits that make it a superior fruit to consume daily. Combating *S. aureus* and *Listeria* in cellular trials, apple may be useful to fight bacterial invasion [41]. Apple is also a powerful anti-inflammatory fruit, specifically targeting inflammation in the bowels and intestines. Animal trials have confirmed the anti-oxidant and anti-inflammatory action of apple in the intestines by lowering inflammatory cytokines and regulating cellular signaling pathways to alter gut microbiota [42]. This could have benefits for reducing inflammatory bowel disorders in humans.

Apple also contains compounds that may benefit endothelial function and lower blood pressure. In a randomized, controlled-crossover trial on healthy men and women, researchers showed that apple supplementation could lower pulse pressure and systolic blood pressure and increase flow-mediated dilation [43].

Wheatgrass, Barleygrass, Kale and Spinach

The important contribution of plants to the modern medical world is very well-known. Since wheat has become a dietary staple in the civilized world, it has been analyzed for medical benefits. Researchers



have identified nearly 300 proteins that occur in young wheatgrass, with a majority of them involved in preventing disease and oxidative stress and improving energy metabolism [44].

Barley has a rich history of research as well, demonstrating efficacy for promoting sleep, antidiabetic properties, blood pressure, immunity, acne prevention, with researchers concluding that it may be one of the most beneficial function food for chronic disease prevention [45]. It contains high amounts of beta glucans; however, research trials have shown the whole barley provides more benefits than beta glucan alone [46]. In fact, whole barley contains flavonoids, lignans, tocopherols, phytosterols and folate, all phytochemicals that exhibit cholesterol lowering, and antiproliferative/ antioxidant properties [47]. Research attribute some of these benefits to the modulation of healthy microbiota in the gut through the undigestible carbohydrates (fibers) in whole barley [48].

Kale, a cultivar of cabbage, contains high concentrations of phytochemicals beneficial for human health that deem it a superfood [49]. These include high amounts of dietary fiber and polyphenolics [50]. This fiber in particular improves the excretion of bile acids which is directly linked to cholesterol-lowering through the better elimination of cholesterol [51].

Spinach contains phytonutrients that go beyond the scope of basic nutrition as well. Studies have shown these phytonutrients to be potent free radical scavengers, but in respect to the metabolic syndrome, spinach helps secrete appetite-modulating hormones to curb the consumption of excess calories [52]. Spinach is also one of the best natural sources of magnesium, an essential mineral that is involved in more than 300 cellular processes in the human body. It is critical for protein synthesis, cellular energy production, DNA and RNA synthesis, and stabilizing mitochondrial membranes. Low magnesium levels have been associated with migraines, Alzheimer's Disease, stroke, hypertension, cardiovascular disease, and type 2 diabetes [53].

Maca (gelatinized)

Maca (*Lepidium meyenii*) is a plant native to the Andes and is a member of the mustard family of flowering plants. Indigenous people have used it for centuries to improve sexual dysfunctions, including libido, energy, depression, and overall reproductive health. Recently it has been studied to confirm many of these historical uses. In animal studies, extracts from maca have increased spermatogenesis and improved male sexual performance with both acute and chronic treatment [54, 55]. In double-blind



clinical trials on healthy men, maca improved perceived symptoms of erectile function without affecting any reproductive hormone levels including testosterone [56, 57].

In women, gelatinized maca has been shown to alleviate symptoms of menopause by decreasing FSH and increasing LH levels in menopausal women [58, 59]. Extracts of maca have also shown a prevention of bone loss associated with menopause [60]. In women suffering sexual dysfunction due to low energy, libido was significantly enhanced with maca, usually due to increased energy and reduced depressive symptoms [61].



Inulin-efficacy

Inulin is a dietary fiber that belongs to a class of fibers called fructans. It is derived from plants, most often chicory and is a group of polysaccharides found in the roots and rhizomes of these plants. Years of research have produced contradictory results regarding inulin and appetite control, since historically this has been a qualitative not quantitative measurement [62]. Research has advanced, and new mechanisms of action have been identified, allowing satiety and appetite control to be quantifiable endpoints, showing great benefits for inulin in weight management.

SCFA Production for Appetite Control

Dietary fibers are considered prebiotics because they are fermented by the gut microbiota in the colon, producing short-chain fatty acids (SCFAs) and secreting satiety-related peptides. Type of fiber directly impacts the production of SCFAs which could impact satiety potential. Inulin rapidly ferments in the gut, yielding very high amounts of the SCFA propionate, which appears to be one of the best for producing satiety and appetite suppression, as demonstrated in animal trials [63].

Further animal trials attempted to solve the paradox of SCFAs: on one hand, they seem to improve satiety, but on the other hand, they are fatty acids which should provide additional energy and potentially promote obesity development. In this trial, researchers fed inulin or placebo along with a high-fat diet to animals. A reduction in fecal fat excretion was seen in the inulin group but not the placebo, suggesting energy extraction occurred in the intestines. There also was no increase in body weight even though they were following a high fat diet. This confirms that the SCFAs produced by the fermentation of inulin has positive benefits for lipid metabolism [64].

To confirm these results in humans, a single-blind randomized crossover study was conducted on healthy unrestrained eaters (meaning they could eat as they normally would with the addition of inulin being the only variable). Using the expulsion of breath hydrogen as a measurement of colon fermentation, they determined that inulin was rapidly and significantly fermented in the colon, producing SCFAs [65]. Another single-blind crossover trial on 11 healthy individuals confirmed this increase in breath hydrogen with inulin supplementation [66]. Since the publication of these trials, the production of SCFAs by inulin in the human gut are now commonly acknowledged [67].



Several clinical trials have been conducted to measure the satiety potential once SCFAs are produced by inulin. One trial used thirty overweight or obese individuals aged 18 to 70 years in a randomized controlled design for four weeks. Stool and blood samples were collected to quantify satiety-hormone production as well as gut fermentation of the inulin into SCFAs. Compared to placebo, the test group had greater increases in satiety hormones and fecal SCFAs. In a qualitative comparison, test subjects reported greater increases in appetite control over placebo [68].

Similar findings were had when healthy subjects consumed biscuits with and without inulin; however, the satiety-modulating hormone ghrelin was measured rather than SCFAs. Inulin significantly lowered the ghrelin response to the inulin-containing biscuit versus the placebo biscuit, an advantage for improving satiety [69].

In three sequential clinical assays on healthy individuals, inulin added to test meals provided significant satiety resulting in a decrease in energy intake versus placebo. They also showed a positive post-prandial variation in the plasmatic levels of ghrelin and insulin in relation to the control meal, demonstrating inulin's positive role in stimulating healthy eating habits [70].

In a parallel, triple-blind, placebo-controlled intervention trial on fifty-five overweight or obese adults, snacks containing inulin as oligofructose significantly decreased reported hunger values, reduced prospective food consumption, and reduced thirst over placebo [71]. In another trial on forty-five obese men and sixty obese women, inulin was dosed just before their largest meal for 12-weeks. The female group lost weight and showed a greater increase in the fasting desire to eat versus placebo. They also showed a greater decrease in food cravings and a decrease in the Beck Depression Inventory score over baseline. The male group showed the same results with the added increase in fasting fullness (satiety) and cognitive restraint. These researchers concluded that appetite control may be impacted by the gut-brain axis, which in turn may be positively impacted by inulin supplementation [72].

This was verified in a trial where inulin was added to yogurt, and appetite ratings versus energy intake were measured. Although inulin supplementation did not reduce energy intake itself, it was associated with a lower Desire to Eat and Prospective Food Consumption rating, demonstrating the potential to impact appetite [73].



Unfortunately, metabolic syndrome impacts children as well as adults. Since inulin is a safe dietary fiber, clinicals have been approved and run in children. In a double-blind, placebo-controlled trial, forty-two boys and girls ages 7-12 years with BMI greater than 85th percentile for age were supplemented with inulin or placebo for 16-weeks. The test group reported significantly higher feelings of fullness and lower Prospective Food Consumption ratings at week 16 versus baseline. In the older children (ages 11-12), energy intake at week 16 was also greatly reduced over baseline, and satiety-modulating hormones were statistically changed over placebo, potentially providing the appetite suppression seen in the test groups. This clearly demonstrated a safe and effective way to assist children in making healthier food choices [74].

For both adults and children alike, inulin has proven a useful tool in battling metabolic syndrome. Since the acknowledgement of the connection between metabolic syndrome components and gut microflora, multiple therapeutic strategies have been proposed to change the composition of the gut microbiota to promote optimal metabolic health. A meta-analysis analyzed all trials involving prebiotics and metabolic syndrome from 2013-2017 and concluded that daily supplementation with inulin could have beneficial effects on components of metabolic syndrome including diabetes [75]. From these positive results, prebiotics such as inulin will be more commonly recommended and even included in daily food products.



Vitamin B Complex- efficacy

Energy is the burning of calories, a metabolic process that occurs as a direct result of eating. When sufficient calories are not consumed, as in the case of dieting, the body turns to its stored fat to burn as usable energy. To help this process run more efficiently and keep our energy levels up without eating more calories, B vitamins can be added to the diet.

B vitamins are a group of water-soluble vitamins that are crucial for cellular metabolic processes. Although grouped together as a class of B vitamins, each one is chemically distinct, playing various roles in our cells. They are essential vitamins because each is a direct cofactor for a key metabolic process or a precursor to make one. B vitamins are mostly found in high abundance in meat, which is why reducing red meat or following a vegetarian type diet tends to deplete these vitamins. Deficiencies can range from fatigue and weakness, to anemia, memory loss, and cognitive decline.

While dieting or reducing calories, it becomes even more imperative to get enough B vitamins, since cellular metabolism is in hyperactivity, burning calories and stressing the body. Getting a high quality B vitamin complex is key when looking to improve energy levels.



Safety

Javita's Superfood Protein Complex was designed to be a healthy functional food product. It uses superior food grade whey protein as well as a blend of fruits, vegetables, vitamins and botanicals to support health. All ingredients are food grade products, and therefore, pose no direct risk in terms of overdose, as a medical drug might.

However, some of the ingredients do have the potential for allergies. Whey protein is derived from milk. Although not the same concentration of allergenic proteins as the casein portion of milk, it does still contain the potential for a protein-mediated allergy. Should this occur, discontinue use and consult your physician.

The grasses included in the superfood blend as well as the fruits also contain the potential for allergies. If a known allergy exists to any of the components of this blend, do not take it. If an unknown allergy occurs, discontinue use and consult your physician.



Usage Guidelines

Superfood Protein Complex was designed to assist in weight management. It was not designed as a meal-replacement product. It is intended to assist with feelings of fullness, helping you consume less calories during the day. Therefore, consuming it prior to the two largest meals should minimize the amount of calories consumed during that meal.

Superfood Protein Complex contains no caffeine but does contain a health blend of B vitamins. Since these help with energy metabolism, a perceived increase in energy levels should occur. This may make sleep difficult if consumed too close to bedtime. Therefore, consuming the drink earlier in the morning and afternoon is advised.

As with all nutritional supplements, pregnant and lactating women should not use without consulting their primary health care practitioner.

Children are not the intended consumers of this product, and it is therefore, not recommend for their use.

As with any nutritional supplement, should any negative side effects occur, discontinue use and consult your physician immediately.



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