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Role of Chia Seeds in Fitness

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Abstract

Sports drinks typically contain high levels of carbs, which are a useful energy source. Sports drinks also help to keep the body in balance, enhance performance, and include several electrolytes that, when taken before or during intense activity, can enhance performance. Sports drink formulations should take into account the individual energy, nutritional, fluid, and electrolyte requirements of athletes, taking into account the phase of exercise (before, during, or after). A balanced, healthy diet that includes chia seeds and regular exercise can help athletes meet their performance objectives while also maintaining their general health.

Keywords: Chia, Athlete, Antioxidant, Omega 3, Beverage.

Introduction

The cornerstone of health is food. Particularly athletes who aim for maximum performance should pay attention to what they eat. To go about their daily lives, people tend to their physical needs and maintain good health. The advantages of chia seeds for athletes are covered in this article. Chia seeds have large concentrations of omega-3 and 6 fatty acids. Minerals, vitamins (especially those in group B), fiber, protein, amino acids, and other nutrients are abundant in them. Being a major part of antioxidants, they may mitigate the damage that free radicals inflict.

Chia, or *Salvia hispanica*, is a herbaceous annual plant that is a member of the Lamiaceae family. This plant has a maximum height of one meter. According to Munoz L.A. et al. (2013), the plant has oppositely oriented, serrated leaves that measure 5-8 cm in length and 3–5 cm. Its bisexual, 2-4 mm white or At the tips of the shoots, blue flowers develop in whorls. Chia overblowing results in circular fruits with many tiny oval seeds that are 1 mm wide and 2 mm long. The seed surface is shiny, smooth, and has black specks that are organized erratically. The color range of the seed is white, grey, and brown (Munoz L.A et al. 2013, Ali.N.M et al. 2012). Chia was first cultivated in tropical and subtropical regions. Currently, it is expanding globally, mostly in Australia, Bolivia, Ecuador, Mexico, Peru, Paraguay, Ecuador, Peru, Ecuador, and Guatemala. According to Coates (2011), Munoz L.A. et al. (2013), and Huxley A.J. (1992), it is grown in greenhouses in Europe. Chia is not resistant to frost. It is typically seen growing in mountainous areas in nature (Coates W. 2011, Averza R., Coates W. 2005). In soils with clay and sandy loam that drain effectively, *Salvia hispanica* grows appropriately.

The seed yield from a few commercial fields in Argentina and Colombia is claimed to be between 450 and 1250 kg/ha; however, given favorable experimental conditions, the output might be significantly more than 2000 kg/ha (Averza.R., Coates.W. 2009). The chia plant, *Salvia hispanica*, produces the seeds, which the Aztecs and Mayans used as a staple diet. It is utilized as a main course. Some examples of bioactive molecules are fatty acids, dietary fiber, probiotics, prebiotics, polyphenols, carotenoids, phytoestrogens, sterols, stanols, vitamins, and bioactive peptides (Kulczyński B et al.2015, Liu R.H.2013, Shashirekha M.N.2015). Given that food has been shown to promote health in recent years, there has been a significant interest in plant-based products, which have been the subject of numerous research [Graf B. L. et al. 2010, Kris-Etherton P.M. et al. 2002, Kulczyński B et al. 2016, Gramza-Michalowska A et al. 2019]. *Salvia hispanica*, also known as chia, is one example of a raw material whose qualities are seen to be highly intriguing by dietitians and food technologists. The Nahuatl term “chian” or “chien,” which means “oily,” is adapted into Spanish as “chia.” For thousands of years, the herbaceous plant chia has also been used medicinally (Cahill J, 2003, Coates W. 20011, Suri S et al 2016, Munoz L. A et al 2013). At the moment, chia seeds are eaten as additives or ingredients in a wide variety of foods, including salads, baked goods, dairy drinks, muesli, and fruit smoothies (Iglesias-Puig E., Haros M. 2013, Inglett G.E et al 2014, Pizarro P.L et al 2013, Steffolani E et al 2014). They are also added to soups and sauces to thicken them. This article’s goal is to provide up-to-date information on the possible applications of chia seeds in the food business, with an emphasis on the nutritional value and chemical makeup of the seeds themselves.

Chia seeds’ abundance of nutrients could result into an excessive number of health advantages. Sports drinks are made to assist athletes in refueling their bodies with nutrients, fluids, electrolytes, and energy following physical activity. Sports drinks typically contain high levels of carbs, which are a useful energy source. Additionally, sports drinks help to keep the body in balance, enhance performance, and include a number of electrolytes that can enhance performance when taken prior to or during intense activity (Gujar M. V., Gala M.B. 2014, Nugraha C et al. 2016). Sports drink formulations should take into account the individual energy, nutritional, fluid, and electrolyte requirements of athletes, taking into account the phase of exercise (before, during, or after). Chia seeds (*Salvia hispanica* L.) are one of the food items used to provide energy and minerals in sports drinks. Chia seeds are often brown, black, or grey with minuscule white specks. They have a somewhat ovoid form. Chia seeds have the ability to swell in water and release a clear, white mucous. Chia seeds are frequently utilized as additives in the production of specific food items, functioning as stabilizers, thickeners, or emulsifiers (Kulczyński B et al. 2015, Liu R.H 2013). According to Shashirekha M.N. et al. (2015) and Graf B.I. et al. (2010), Chia seeds are high in fiber and protein, abundant in vitamins and minerals, gluten-free, high in omega-3 fatty acids, and contain antioxidants (polyphenols, tocopherols, and isoflavones).

Since athletes are expected to consume high-calorie drinks with minimal fluids, adding chia seeds to sports drinks can boost their energy content while decreasing their fluid content. High-intensity endurance athletes are not allowed to drink too much water while working out because this can upset their stomach (Kris- Etherton P.M et al. 2002, Kulczyński B et al. 2016).

It’s simple to include chia seeds in your diet for sports and they have a lot of advantages for your general health and performance. Here are some ideas for adding chia seeds to your meals. An athlete’s diet can benefit from the inclusion of chia seeds. Thus, keeping this in mind, the following goals were set for the study:

1. Examine the nutrients that Chia seeds contain.
2. Create a recipe utilizing chia seeds.

Review of Literature

Chia seeds are hydrating in terms of water balance and hydration. a fantastic choice for athletes since they provide some advantages that can help them meet their needs, both mentally and physically. Chia seeds come in black-and-white variants, yet they are essentially equal in terms of nutrition. Here are a few advantages of chia seeds that are covered.

Benefits of Chia Seeds

1. Nutritional Powerhouse

Chia seeds are a great source of fiber, protein, calcium, antioxidants, and omega-3 fatty acids, among other important minerals. These nutrients can enhance general health, aid in workout recovery, and enable athletes to perform at their peak.

2. Energy Booster

Because chia seeds are abundant in fiber, protein, and a special kind of carbohydrate called oligosaccharides, they can help increase energy and endurance. These oligosaccharides help athletes perform at their peak for extended periods of time by controlling blood sugar levels and delaying exhaustion.

3. Hydrating Properties

Chia seeds are a great snack to help athletes stay hydrated since they can absorb up to 12 times their weight in water. Performance can suffer from dehydration, but eating chia seeds can help avoid this.

4. Supports Weight Management

Chia seeds are an excellent choice for athletes trying to control their weight because they are a high-fiber, low-calorie snack. Furthermore, chia seeds’ protein might aid in the growth and repair of muscle, which is crucial for athletes.

5. Improved Blood Sugar Control

For best health, blood sugar levels must be within normal ranges. Chia seeds lower insulin resistance and enhance blood sugar regulation, which are important risk factors for heart disease, type 2 diabetes, and metabolic syndrome, according to animal research. Human research indicates that chia seed-based bread lowers blood sugar response when compared to regular bread.

Benefits of Chia Seeds for Athletes

It has been demonstrated that chia seeds have a number of advantages that can improve sports performance. Chia seeds can be an important part of an athlete’s diet since they improve hydration, enhance muscle recovery, naturally boost energy levels, and regulate blood sugar. These are the specific advantages of chia seeds for sportspeople.

1. Chia Seeds as a Natural Energy Booster

Chia seeds are a great source of fiber and protein, which can help provide sustained energy throughout the day. They also contain a unique type of carbohydrate called oligosaccharides that can help regulate blood sugar levels and delay fatigue, providing a natural energy boost during physical activity.

2. Chia Seeds Can Improve Hydration Levels

Because they can absorb up to 12 times their weight in water, chia seeds are well known for their ability to keep people hydrated. This can help athletes stay hydrated during intense physical activity, which is essential for optimal performance.

3. Chia Seeds Support Muscle Recovery

Protein, which is essential for muscle growth and repair, is abundant in chia seeds. After an exercise, chia seeds can assist supply the body with the nutrients it needs to rebuild and repair muscle, which can eventually increase athletic performance.

They also contain a lot of fiber, which contributes to the stabilization of energy. Since chia has been recognized for hundreds of years as one of the best and most stable endurance foods on the planet, some athletes who are not accustomed to utilizing chia seeds are worried that the seed's high fiber content would create digestive problems.

4. Chia Seeds Boost Bone Health

Chia seeds are almost as high in calcium as milk, containing 158g every 25g intake. They also contain high levels of magnesium and phosphorus, two minerals that support bone density.

5. Chia Seeds Maintain Healthier Weight Management

39% of the daily required amount of fiber is present in one ounce of chia seeds. When a person consumes the seeds, their soluble fiber absorbs water, which causes the seeds to expand in the stomach and heighten the sensation of fullness. Chia seeds help people feel fuller even when they eat less, which can aid in maintaining a healthy weight.

History of Chia Seeds

Between 1500 and 900 B.C., chia was farmed in central Mexico as a commercial crop, and there is evidence that chia seeds were initially consumed as food as early as 3500 B.C. from 2600 BC. You could eat chia seeds by themselves or combined with other grains. They were occasionally drunk as a beverage. Between 1500 and 900 B.C., chia was farmed in central Mexico as a cash crop. Evidence suggests that chia seeds were first eaten as food as early as 3500 B.C., dating back to 2600 BC. A Person can eat chia seeds by themselves or in a grain mixture. When pounded into flour, they were occasionally consumed as a beverage by mixing them with water. In Aztec medicine, chia is a fundamental component. Lastly, utilized as a foundation for body and face paints

Consumption of Chia Seeds

Chia seeds are a nutritious addition to a variety of beverages, including milkshakes, juices, and protein smoothies.

- **Chia Sprouts** - To make cakes or cookies without butter, add soaked chia seeds to the mixture. Consuming chia seeds that have sprouted has many advantages.
- **Condiment** – It can also sprinkle chia seeds over different dishes for breakfast, lunch, and dinner.
- **Dressing** - They can be used as a dressing on salads or added to eggs to create a nutritious omelet.
- **Porridge** – : To make a nutritious porridge, add a few chia seeds to a cup of milk and bring to a boil. Finally, used as a base for face and body paints.
- **Chia Powder** – You can powder the chia seeds and add it to flour, milk, and yogurts.
- **Thickening Agent** – Chia seeds have a thickening effect and can be added to stews.

Materials and Methods

The supplies and techniques employed in the inquiry are described in great depth. We bought the chia seeds from the Trichy local market. When needed, more materials, including perishable goods, were bought at the neighbourhood market. Spoons, ladles, and other flat-bottom stainless steel dishes were employed. The gas utilized for heating was LPG.

Study about Chia Seeds

Research suggests that chia seeds may help avoid chronic illnesses such as diabetes, obesity, heart disease, and cancer. Human study findings indicate that chia seeds may:

- Reduce the level of inflammation
- Enhance blood sugar regulation
- Decreased hypertension
- Increase the blood concentration of omega-3 fatty acids.
- Cut back on triglycerides
- Blood sugar levels might be improved

Incorporating Chia Seeds in Athletic Diet

Chia seeds have several advantages for general health and performance and are simple to include in your sports diet.. Here are some suggestions for including chia seeds in your diet. The exact amount of chia seeds you should consume to reach your athletic goals will depend on your own needs and aspirations. As a general guideline, start with 1-2 teaspoons per day and gradually increase as your body adjusts. It’s important to consider other dietary sources and not merely depend on chia seeds for your nutrients.

Before making any significant dietary changes, it is usually advisable to consult a doctor or trained nutritionist. They can help figure out how much chia seeds is best for each person based on their unique needs and goals.

Chia seeds were soaked in milk for six hours, then added to the pulp of orange and pineapple separately. Honey was added to enhance the sweetness of the mixture.

Table 1 Development of Chia Seeds Drink for Athletes

Treatment	T ₀	T ₁	T ₂
Ingredients	Chia seeds + Milk	Chia seeds + Milk + Orange	Chia seeds + Milk + Pineapple
Chia seeds	10 g	10 g	10 g
Milk	100 ml	100 ml	100 ml
Honey	10 ml	10 ml	10 ml
Orange	-	80 g	-
Pineapple	-	-	80 g

After soaking in milk for six hours, chia seeds were added to the pulp of orange and pineapple separately, with honey added to boost the sweetness.

Organoleptic Evaluation

Ten untrained judges used a four-point hedonic rating scale (4-1) to organoleptically assess the value-added goods for appearance, color, flavor, texture, taste, and overall acceptability.

Results and Discussion

In the present investigation, a product was developed using chia seeds and organoleptic qualities were studied. The data obtained were analyzed and discussed below.

Nutrient Content of Chia Seeds and its Potent Health Benefits – A Review

Micronutrients – Iron, calcium, magnesium, zinc, and other minerals required for running can be found in good amounts in chia seeds. Hydration – Chia seeds are excellent for staying hydrated since they absorb water. They make a fantastic complement to a breakfast for runners because of this.

Healthy fats – Omega 3 fatty acids, which are included in chia seeds in about 60% of their fat content, have been shown to provide anti-inflammatory, anti-cholesterol, and cardiovascular health benefits.

Protein – With only about 5 grams of protein per ounce, chia seeds are a fantastic source of complete protein and a great way for vegetarians to gain protein. More information about protein’s advantages for runners can be found here.

High in fiber -Some runners may have trouble with digestion, so it’s good to know that chia seeds are high in fiber. One ounce contains approximately 10 grams of fiber, or roughly 33% of the daily recommended intake.

Table 2 Nutrient Content of Chia Seeds

Nutrients	Milligrams (mg) in 1 ounce of chia seeds	Daily value (mg)	Percent of daily value
Fiber	9.8	28	35%
Protein	4.7	50	9%
Magnesium	95	420	23%
Phosphorus	244	1250	20%
Calcium	179	1300	14%
Zinc	1.3	11	12%
Iron	2.2	18	12%
Thiamine (vitamin B1)	0.176	1.2	15%
Riboflavin (vitamin B2)	0.048	1.3	4%
Niacin (vitamin B3)	2.5	20	13%

Developed Product using Chia Seeds

Chia seeds were used to create products. Following the established formulas, goods like plain chia seeds, chia seeds with oranges, and chia seeds with pineapple drinks were made.

Organoleptic Evaluation

The created goods underwent organoleptic evaluation for every sensory attribute by a panel of ten judges using the 4-1-point hedonic scale. The results are shown in Table 3.

Table 3 Organoleptic Characteristics of Chia Seeds Drink

Quality Attributes	T ₀ Chia seeds + Milk	T ₁ Chia seeds + Milk + Orange	T ₂ Chia seeds + Milk + Pineapple
Appearance	Highly attractive (4.0) *	Highly attractive (4.0) *	Highly attractive (4.0) *
Color	White (3.6) *	Orange (4.0) *	Yellow (3.8) *
Flavor	Bland flavor (3.6) *	Orange flavor (4.0) *	Pineapple flavor (4.0) *
Texture/ Consistency	Soft (4.0) *	Soft (4.0) *	Soft (4.0) *
Taste	Highly acceptable (3.6) *	Highly acceptable (4.0) *	Highly acceptable (3.8) *
Overall acceptability	Highly acceptable (3.8) *	Highly acceptable (4.0) *	Highly acceptable (3.9) *

* The values in the parenthesis indicate the score value of each attribute

Sports beverages are designed to help athletes replenish their bodies with fuel, electrolytes, nutrients, and water after exertion. Sports drinks are usually rich in carbs, which are a good source of energy. For athletes to continue competing, they must have access to enough fuel, nutrients, and electrolytes. Sports drinks include various electrolytes that can improve performance when consumed before or during an activity at a specific intensity. They also aid to maintain body balance and improve performance. producing sports beverages that are high in energy, nutrients, and electrolytes, despite this. In 2014, Gala M.B. and Gujar M.V.

Sports drink recipes should consider each athlete’s unique needs for energy, nutrition, fluids, and electrolytes as well as the stage of exercise (before, during, or after). *Saltahispanica L.*, or chia seeds, is one of the foods added to sports drinks to provide them energy and minerals. Chia seeds frequently have tiny white spots and are dark, black, or grey in color. Their morphology is rather oval. When chia seeds are submerged in water, they expand and produce a clear, white mucus. Chia seeds are commonly used as ingredients in food preparations and can also be used as stabilizers, thickeners, or emulsifiers. (Atik et al., Silva Marinelli et al., and Coorey R et al., 2014)

Chia seeds contain antioxidants including polyphenols, tocopherols, and isoflavones, as well as being high in omega-3 fatty acids, gluten-free, high in fiber, and rich in vitamins and minerals (Kulczyński et al., 2019; Safari et al., 2016). Chia seeds can increase the energy content of sports drinks while lowering their fluid content, which is advantageous because athletes are supposed to take high-calorie drinks with few fluids. Drinking a lot of fluids during exercise is not advised for athletes who perform high-intensity endurance workouts since it can disrupt their digestive systems. (Letari et al., 2020; Shireffs, 2009)

Conclusion

In order to get the most out of chia seeds for sports performance, one needs to drink plenty of water, eat meals that improve performance in addition to them, and get enough exercise and physical activity. Though most people consider chia seeds to be safe, it’s still a good idea to start with a little amount and increase it gradually as your body adjusts. A physician should also be consulted prior to making any significant dietary adjustments. Athletes can achieve their performance goals and preserve their general health and well-being by following a balanced, healthy diet that contains chia seeds and engaging in frequent exercise.

Chia seeds are the best option for athletes to achieve their nutritional needs while exercising. If they are athletes or participate in sports, chia seeds must be included in their diet. Chia seeds offer several advantages for enhancing athletic performance. Chia seeds are a great addition to any athlete’s diet because they help with blood sugar regulation, hydration, muscle rehabilitation, and natural energy boost. In this article, we’ll examine the numerous health benefits of chia seeds for athletes and how this superfood can enable them to perform to their fullest capacity.

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