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Acute and Chronic Effects of a Nine-Herb Beverage (Aloe vera) on Selected Physical Fitness and Respiratory Parameters in Physically Active University Students

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Abstract

Introduction: A primary focus for athletes, coaches, and sports professionals is to maximize athletic performance and reach peak ability, which remains one of the main concerns in the field. Incorporating herbal extracts into sports drinks can serve as a safer and more effective strategy to combat fatigue and enhance sports performance. Therefore, the aim of this study is to investigate the acute and chronic effects of a 9-plant drink (Aloe vera) on physical fitness indicators and respiratory capacity in active students.

Methods: This study was conducted as a semi-experimental design, involving 40 participants (20 female and 20 male students). The participants were divided into two equal groups. For one month, they engaged in practical sports classes five days a week. Drink packs containing 75 milliliters were prepared, including both the 9-plant drink and a placebo drink with water and mint-flavored essence, packaged similarly to the 9-plant drink. At the start of the period, groups consumed the drinks (the 9-plant drink and the placebo) 15 minutes before the tests; subsequently, body weight, body fat percentage, respiratory capacity, aerobic and anaerobic power, maximum power, reaction speed, acceleration, agility, and lower limb muscle strength were assessed over two consecutive days. Over the following month, both groups regularly consumed these drinks 15 minutes before their first daily sports activity. Twenty-four hours after the last dose, they again consumed the respective drinks 15 minutes before the tests, and the assessments were conducted over two days using the same procedure. Statistical analysis was performed using repeated-measures ANOVA in SPSS version 26 (significance level $p < 0.05$) to determine differences in mean indices between the groups.

Results: Statistical analysis showed that after one month of use, drinking 75 ml 15 minutes before exercise significantly improved mean expiratory flow (PEF) (P=0.002). Also, between-group changes in weight (P=0.043), body mass index (P=0.049), body fat percentage (P=0.003), acceleration (P=0.002), agility (P=0.001), and lower limb muscle strength (P=0.001) were significant, but the post-test did not show any difference between the two groups at two times before and after the research period.

Conclusions: It seems that regular and daily consumption of 75 ml of a 9-herb drink can have a positive effect on short-term consumption and improve some respiratory indicators, physical fitness, and body composition that affect motor performance in active students.

Key Words: Physical fitness, respiratory capacity, active students, aloe vera

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1. Introduction

Athletes, coaches, and sports scientists continually seek to maximize athletic performance and achieve optimal physical capacity, making performance enhancement one of the primary concerns in sports science (1). Nutrition is recognized as a fundamental determinant of athletic performance and constitutes an essential component of sports performance optimization. The fields of nutrition and sports nutrition have evolved rapidly in recent years (2), and the importance of appropriate nutritional strategies in sport is now well established. Evidence indicates that optimal nutrition enhances athletic performance, facilitates recovery, and reduces the risk of sports-related injuries (3).

Sports nutrition refers to the provision of nutrients through foods and beverages that support exercise performance and enhance the body's physiological capacity (4). Dietary strategies aimed at improving athletic performance include optimizing the intake of macronutrients, micronutrients, and fluids, as well as their composition and timing throughout the day (5). These nutritional components provide the metabolic foundation required by individuals who engage in regular physical activity and contribute to the maintenance and enhancement of exercise performance (4). Furthermore, athletes' knowledge of sports nutrition can directly influence their dietary choices and, consequently, their overall athletic performance (6).

In recent years, interest in the use of herbal extracts has increased considerably, largely because of their potential to enhance physical performance, promote health, and prevent disease, as well as their widespread availability, relatively low cost, and lower incidence of adverse effects compared with synthetic drugs (7). Nutritional interventions have become one of the most effective strategies for minimizing exercise-induced physiological stress and reducing the adverse consequences associated with physical activity. Given the potential side effects of synthetic medications, the use of medicinal plants and herbal products has attracted increasing attention as a safer alternative (8).

Herbal extracts, recognized for their natural antioxidant properties and nutritional benefits, exhibit a wide range of biological effects, including enhancement of immune function, improvement of cardiovascular health, and reduction of fatigue. Consequently, the incorporation of herbal extracts into sports beverages may provide a safer and more effective strategy for combating fatigue and enhancing athletic performance (9).

Aloe vera is a medicinal plant with antioxidant properties. Approximately 95% of its weight consists of moisture, while only 5% is dry matter (10). It contains polysaccharides, organic acids, steroids, proteins, minerals, enzymes, and vitamins (11). Aloe vera also contains several amino acids, including isoleucine, leucine, arginine, glycine, and others. Among these, arginine, as a growth hormone stimulant in combination with other essential amino acids, may play an important role in muscle development and strength enhancement. In addition, Aloe vera contains several vitamins, including vitamin A, which contributes to bone growth and growth regulation; vitamin C, which delays the onset of fatigue; and vitamin E, which inhibits the production of free radicals. Therefore, this plant may contribute to cellular activities and improve exercise performance (12).

Cinnamon is another medicinal plant whose constituents include calcium, sugars, vitamin C, and minerals such as iron, manganese, and zinc. Evidence suggests that cinnamon contains phenolic flavonoids and also possesses anti-inflammatory propertie (4).

Ginger has been widely used throughout the world as both a culinary spice and a medicinal plant (13). For many years, ginger has been used therapeutically to alleviate nausea and vomiting, joint and muscle pain, indigestion, and symptoms associated with the common cold (14, 15).

Ginseng can be introduced as one of the medicinal plants that may influence athletic performance. This plant is native to North Korea, northeastern China, and eastern Siberia. Long-term consumption of ginseng has been used as an ergogenic aid, and its effects on muscular endurance and the immune system have been continuously evaluated and discussed. A daily dose of 200 mg has been recommended for athletes. Through mechanisms such as improving blood circulation, increasing antioxidant capacity, and optimizing energy metabolism, ginseng has been shown to enhance athletes' physiological performance and reduce exercise-induced stress (16, 17). It has also been demonstrated that the active constituents of ginseng enhance exercise performance by altering substrate metabolism (18). Evidence indicates that the long-term use of ginseng or its active components affects psychomotor performance and exercise performance. In recent years, numerous studies have investigated ginseng supplementation and have reported a wide range of benefits, including delayed fatigue, reduced blood lactate concentration, improved physical performance, enhanced aerobic capacity, reduced muscle damage, antioxidant effects, enhanced immune function, and increased testosterone levels (8, 19, 20).

Mint is an aromatic plant that has traditionally been used as an appetizer. It also possesses antibacterial, anti-inflammatory, antispasmodic, decongestant, and antioxidant properties and has been reported to reduce excitability (21). Ten days of mint consumption has been shown to have significant effects on exercise performance, spirometric parameters, blood pressure, and respiratory rate in male university students (22).

Among the studies conducted in this field is the research by Bagherpour et al. (2022), who compared the effects of six weeks of creatine and ginseng supplementation on aerobic power, anaerobic power, and muscular strength in male athletes of the Iranian national fencing team. Their findings demonstrated that creatine supplementation was more effective than ginseng supplementation in improving muscular strength and anaerobic power (22). Rabiei et al. (2016) investigated the effects of peppermint essential oil inhalation on respiratory capacity and aerobic performance in basketball players. Their results showed that inhalation of peppermint essential oil increased respiratory capacity and improved aerobic performance (21).

The beverage used in the present study contains a combination of several medicinal plants, including Aloe vera, ginseng, mint, cinnamon, rose water, thyme, olive, ginger, and ajwain. This product has been approved by the Iranian Food and Drug Administration and has received the national Health Certification ("Health Apple") and is manufactured by Kimia Company (Sabzevar, Razavi Khorasan, Iran). To the best of our knowledge, this is the first original study to investigate the functions claimed for this product. Therefore, in the Discussion section, reference is made to studies investigating beverages or supplements containing at least one of the active ingredients included in this sports beverage.

Considering that this beverage contains a combination of the active constituents of the nine aforementioned medicinal plants and that its potential synergistic effects in conjunction with physical activity and exercise have not yet been investigated, answering the following questions may provide new insights for the sports community as well as for the consumer market of this product: Can consumption of this beverage produce acute effects on respiratory capacity and selected physical fitness parameters in physically active university students? Does its long-term consumption influence changes in these parameters when the beverage is consumed before exercise? In other words, can at least one month of regular daily consumption of this product modify the physiological responses to its pre-exercise consumption with respect to selected indices of respiratory capacity and physical performance?

2. Methods

2.1. Participants

The study population consisted of physically active students enrolled in the Department of Sport Sciences at Hakim Sabzevari University. The sample included 40 participants (20 females and 20 males), who were recruited using a convenience sampling method and randomly assigned to two equal groups. Their anthropometric characteristics are presented in Table 1. The participants attended their practical sports classes for one month, three days per week. The 9 Plant Drink group consisted of 20 participants (10 females and 10 males), and the placebo group was similarly allocated (23).

2.2. Study design

This study used a semi-experimental (quasi-experimental) design. Both groups consumed their assigned beverage 15 minutes before the performance tests, after which the corresponding outcome measures were assessed.

Participants then consumed either the 9 Plant Drink or the placebo beverage daily for one month, 15 minutes before the start of their first daily physical activity (practical sports classes). After completion of the intervention period, the physical fitness indices and respiratory capacity were reassessed under the same conditions as at baseline.

2.3. Nutritional intervention / Supplementation protocol

In this study, the 9 Plant Drink (Aloe vera) contained a combination of Aloe vera, ginseng, mint, cinnamon, rose water, thyme, olive, ginger, and ajwain (Kimia Company–Gol Chakeh, Sabzevar, Iran). The product was manufactured under an official production license and had received the Health Apple certification from the Food and Drug Administration of Sabzevar. The beverage was provided in 75-mL packages. A matching placebo beverage, containing water and a flavored essence and packaged identically to the 9 Plant Drink, was also prepared. Both groups consumed their assigned beverage 15 minutes before the performance tests.

Participants then consumed either the 9 Plant Drink or the placebo beverage daily for one month, 15 minutes before the start of their first daily physical activity (practical sports classes).

2.4. Exercise protocol

Participants attended their regular practical sports classes three days per week throughout the one-month intervention period. No additional exercise program was prescribed, and participants continued their routine practical class activities during the study.

2.5. Outcome Measures

2.5.1 .Anthropometric measurements

To assess body composition, participants' height was measured using a SECA stadiometer (Germany) with a precision of 5 mm, and body weight was measured using a digital scale (China) with a precision of 0.1 kg. Body mass index (BMI) was calculated by dividing body weight (kg) by the square of height (m^2). Body fat percentage was measured using an InBody body composition analyzer (Germany).

2.5.2 .Physical fitness assessments

Anaerobic power was assessed using the 30-second Wingate Anaerobic Test performed on a cycle ergometer (24). Participants completed a 5-minute warm-up on the cycle ergometer without resistance before performing the test, followed by a 1- to 2-minute cool-down period. Power output was calculated using the following formula:

$$\text{Power (W)} = \text{Body mass (kg)} \times \text{Distance (m)}^2 / \text{Time (s)}^3$$

Finally, the fatigue index was calculated using the following formula:

$$\text{Fatigue Index } (W \cdot s^{-1}) = (\text{Peak Power} - \text{Minimum Power}) / \text{Peak Power}$$

Aerobic capacity was assessed using the Cooper 12-minute run test. After warming up, participants ran continuously around a handball court for 12 minutes, and the total distance covered was recorded. Maximal oxygen uptake (VO_2max) was then estimated using the following equation (25).

$$VO_2max = (\text{Distance covered} - 504.9) / 44.73$$

Explosive power of the lower-limb muscles was assessed using the Sargent Vertical Jump Test. In this test, each participant stood beside a wall on the side of the dominant leg and, with the arm fully extended, marked the initial standing reach height. The participant then performed a maximal vertical jump and marked the highest point reached. The difference between the two marks was recorded as the jump height, and the best performance of three trials was used for analysis (26).

Agility was assessed using the Illinois Agility Test, which consisted of running through a 9.2-m course with four cones positioned 3.1 m apart in a zigzag pattern. Upon hearing the command "Go," participants completed the course as quickly as possible, and the completion time was recorded to the nearest 0.01 s (27).

Acceleration and running speed were evaluated using the 50-Yard Sprint Test. Participants completed the 50-yard course marked by cones on three occasions, with 3-minute rest intervals between trials, and the fastest time was recorded (28).

2.5.3 .Pulmonary function assessment

Pulmonary function was assessed using a spirometer. The spirometric variables measured included forced vital capacity (FVC), forced expiratory volume in one second (FEV_1), the ratio of forced expiratory volume in the first second to forced vital capacity (FEV/FVC), and forced expiratory flow at 25–75% of forced vital capacity (FEF25–75) (29).

2.6. Statistical analysis

The collected data were analyzed using SPSS software (Version 26.0). After confirming the normality of the data using the Shapiro–Wilk test and the homogeneity of variances using Levene's test, one-way repeated-measures analysis of variance (ANOVA) was used to compare both between-group and within-group mean values. Statistical significance was established at P < 0.05. When significant differences were detected, Bonferroni post hoc tests were performed to determine the location of the differences.

3. Results

3.1. Participants' characteristics and compliance

The descriptive and anthropometric characteristics of the participants are presented as mean ± standard deviation (SD) in Table 1. In the 9 Plant Drink group, the mean body weight and body mass index (BMI) were 59.80 ± 8.59 kg and 21.30 ± 3.47 kg/m², respectively. In the placebo group, the corresponding values were 59.80 ± 8.47 kg for body weight and 22.30 ± 3.90 kg/m² for BMI.

3.2. Primary outcomes

According to the results of the one-way repeated-measures analysis of variance (ANOVA) (Tables 1 and 2), significant between-group differences were observed for peak expiratory flow (PEF) (P = 0.043), acceleration (P = 0.002), agility (P = 0.001), and lower-limb muscle power (P = 0.001).

In contrast, significant between-group differences were found for peak expiratory flow (PEF), acceleration, agility, and lower-limb muscle power. The post hoc analysis demonstrated that the 9 Plant Drink group achieved significantly higher scores than the placebo group for PEF (P = 0.017), acceleration (P = 0.005), agility (P = 0.001), and lower-limb muscle power (P = 0.022).

3.3. Secondary outcomes

According to the results of the one-way repeated-measures analysis of variance (ANOVA) (Tables 1 and 2), significant between-group differences were observed for body weight (P = 0.043), body mass index (BMI) (P = 0.049), and body fat percentage (P = 0.003).

However, based on the Bonferroni post hoc test, no significant between-group differences were observed in body weight, BMI, or body fat percentage at either the pre-intervention or post-intervention assessments (P > 0.05).

Table 1 Comparison of Within-Group and Between-Group Changes in Anthropometric Variables.

Time x Group	Group	Time	P	F	Placebo (Mean ± SD)	Beverage (Mean ± SD)	Period	Variable
0.043*	0.122	0.548	0.008	0.365	59.92 ± 8.47	59.59 ± 8.01	Short-term	**Weight (kg)**
					56.30 ± 33.67	61.7 ± 53.59	Long-term	
0.049*	0.293	0.590	0.006	0.294	22.13 ± 3.90	21.99 ± 3.47	Short-term	**BMI (kg/m2)**
					20.20 ± 82.58	22.3 ± 74.67	Long-term	
0.003*	0.180	0.085	0.060	3.086	15.33 ± 6.53	17.07 ± 4.39	Short-term	**Body fat (%)**
					16.70 ± 1.89	12.32 ± 5.22	Long-term	

Values are presented as Mean ± Standard Deviation (SD).
Significance level: P < 0.05

Table 2 Comparison of Within-Group and Between-Group Changes in Study Variables

Time x Group	Group	Time	P	F	Placebo (Mean ± SD)	Beverage (Mean ± SD)	Period	Variable
0.001*	0.005	0.054	0.075	3.905	7.89±0.87	8.04±1.10	Short-term	**Acceleration (s)**
					8.26±0.43	7.06±071	Long-term	
0.001*	0.001	0.001	0.858	289.42	19.41 ±0.98	19.93±0.86	Short-term	**Agility (s)**
					18.13 ±0.23	16.35 ±0.60	Long-term	
0.001*	0.022	0.001	0.226	13.991	271.03 ±17.94	250.03 ±18.31	Short-term	**Lower-limb muscular power (cm)**
					252.04 ±8.87	251.83 ±17.71	Long-term	
0.566	0.834	0.593	0.006	0.289	30.46±4.21	30.94±3.19	Short-term	**Aerobic power (mL/kg/min)**
					30.51±6.47	29.51±9.41	Long-term	
0.566	0.005	0.001	0.316	22.139	22.54 ±7.47	19.30 ±5.38	Short-term	**Reaction speed (cm)**
					16.75 ±2.15	14.80 ±2.99	Long-term	
0.671	0.051	0.732	0.002	0.118	459.49 ±91.62	421.94±62.04	Short-term	**Maximal power (W)**
					458.58 ±81.36	430.34 ±30.39	Long-term	
0.615	0.214	0.002	0.185	10.925	223.63 ±42.86	216.87 ±29.97	Short-term	**Minimal power (W)**
					241.09 ±26.60	229.70 ±15.93	Long-term	

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0.185	0.081	0.001	0.201	12.097	0.51 ±0.05	0.48 ±0.40	Short-term	**Fatigue index**
					0.46 ±0.04	0.46 ±0.03	Long-term	

Values are presented as Mean ± Standard Deviation (SD).
Significance level: P < 0.05

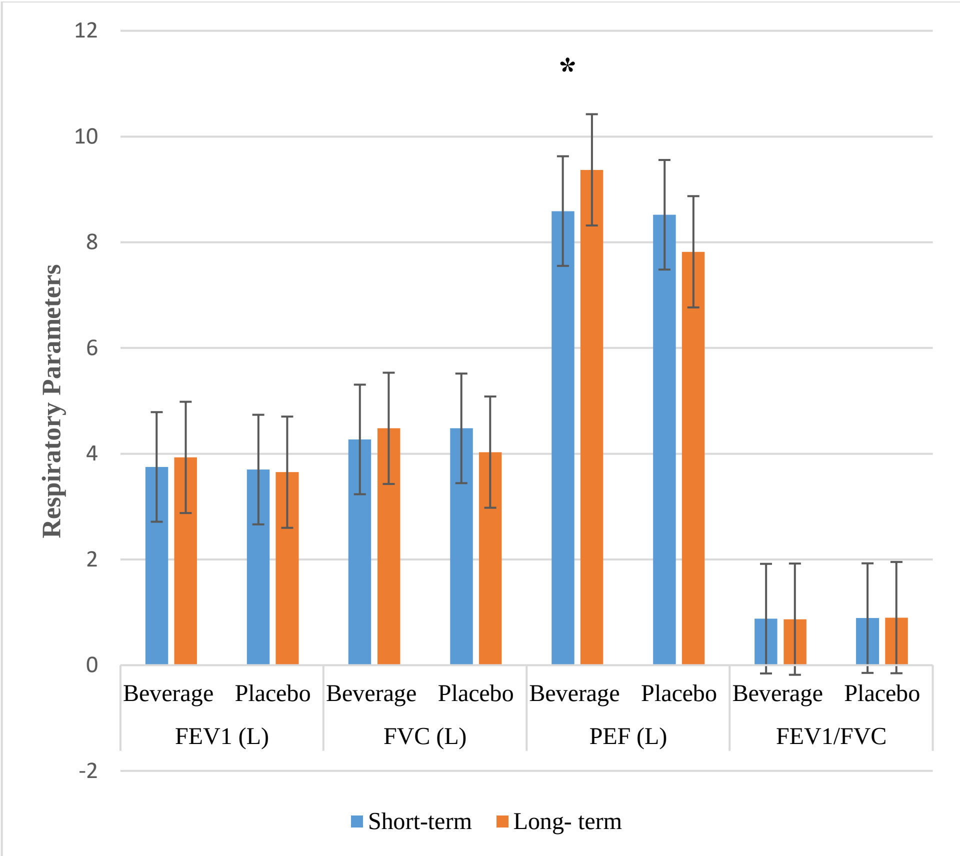

Figure 1. Comparison of respiratory parameters (FEV_1, FVC, PEF, and FEV_1/FVC) between the Beverage and Placebo groups in the short-term and long-term periods. Data are presented as mean ± SD. * Indicates a significant difference between groups (P < 0.05).

Table 3 Bonferroni Post Hoc Test Results.

P-value	Mean Difference	Group Comparison	Variable
0.122	0.42	9 Plant Drink vs. Placebo	**Weight (kg)**
0.548	0.809	Baseline vs. After 1 month	
0.293	0.886	9 Plant Drink vs. Placebo	**BMI (kg/m2)**
0.590	0.277	Baseline vs. After 1 month	
0.180	−1.319	9 Plant Drink vs. Placebo	**Body fat (%)**
0.085	1.688	Baseline vs. After 1 month	
0.017*	0.809	9 Plant Drink vs. Placebo	**PEF (L)**
0.869	−0.037	Baseline vs. After 1 month	
0.005*	−0.519	9 Plant Drink vs. Placebo	**Acceleration (s)**
0.054	−0.303	Baseline vs. After 1 month	
0.022*	0.601	9 Plant Drink vs. Placebo	**Lower-limb muscular power (cm)**
0.001*	10.604	Baseline vs. After 1 month	
0.001*	−0.631	9 Plant Drink vs. Placebo	**Agility (s)**
0.001*	−2.431	Baseline vs. After 1 month	

4. Discussion

The present study aimed to investigate the acute and chronic effects of 9 Plant Drink (Aloe vera) consumption on physical fitness indices and respiratory capacity in physically active university students.

The findings of the present study demonstrated that consumption of this beverage had no significant effect on pulmonary function indices, including FEV_1, FVC, and the FEV_1/FVC ratio. However, after one month of consumption, a significant 9.8% increase was observed in peak expiratory flow (PEF).

Furthermore, the analysis of between-group mean changes demonstrated a statistically significant difference between the 9 Plant Drink group and the placebo group (P = 0.017).

Consistent with the findings of the present study, Rabiei et al. (2016) investigated the effects of peppermint essential oil inhalation on respiratory capacity and aerobic performance in basketball players. The participants were 12 female basketball players with a mean age of 22.5 years who were evaluated using a crossover design under placebo and peppermint essential oil conditions. Following 30 minutes of inhalation during the placebo phase, the first pulmonary function test was performed. Subsequently, the Yo-Yo Intermittent Recovery Test (Level 2) was conducted, followed by a second pulmonary function assessment. After a one-week washout period, the same procedures were repeated using peppermint essential oil instead of the placebo. Forced vital capacity (FVC), forced expiratory volume in one second (FEV_1), and the FEV_1/FVC ratio were assessed using spirometry. Their findings indicated that peppermint essential oil inhalation improved pulmonary function and aerobic performance; however, these changes were not statistically significant (21).

Similarly, Jaradat et al. (2016) investigated the effects of inhalation of citrus flower and peppermint essential oils on exercise performance and pulmonary function in two groups of physically active male university students. Participants were randomly assigned to either the peppermint group or the citrus group (10 participants in each group). One group inhaled citrus flower oil, whereas the other inhaled peppermint leaf oil at a concentration of 0.02 mL/kg body mass, diluted with 2 mL of normal saline, for five minutes before performing a 1,500-m running test. The authors reported significant increases in FEV_1 and FVC following inhalation of both essential oils. In addition, a significant reduction in mean running time was observed in both groups. Furthermore, running time decreased significantly in both the citrus flower and peppermint leaf inhalation groups (30).

Previous studies have also shown that inhalation of different peppermint species is effective in reducing pain and muscle fatigue and may produce muscle-relaxant effects (30). Peppermint extract contains approximately 50% menthol, 20% methyl ester, and 12% menthone. Menthone has been reported to promote bronchodilation and improve respiratory capacity (31).

Therefore, it can be suggested that the peppermint extract present in this beverage may enhance pulmonary capacity in athletes and consequently improve their exercise performance. Aloe vera, through its anti-inflammatory constituents aloin and bradykinase, which reduce inflammation of the respiratory tract, accelerate post-exercise recovery, and regulate body fat metabolism (32), may also contribute to optimal pulmonary function. Furthermore, oleuropein, hydroxytyrosol, and oleic acid, the major bioactive compounds present in olive, possess antioxidant properties and play a role in regulating lipid metabolism (33). These compounds may have contributed to improved pulmonary function and reduced body fat percentage by decreasing oxidative damage to the lungs and reducing visceral adiposity. In addition, ajwain and thyme, which are also included in this beverage, contain carvacrol, a bronchodilator, terpinene (from thyme), a respiratory stimulant, and thymol, which possesses antispasmodic and antibacterial properties (34). Likewise, cinnamaldehyde, the principal active constituent of cinnamon, exerts anti-inflammatory effects and stimulates blood circulation, while eugenol has antispasmodic properties that may also contribute to these beneficial effects (35).

Ginseng may also have contributed to these effects by enhancing Nitric oxide (NO) production and through the anti-fatigue properties of ginsenosides, thereby potentially improving pulmonary blood circulation (36). In addition, citronellol, a major constituent of rose water, possesses calming properties, while geraniol exhibits anti-inflammatory activity and may play an important role in reducing bronchial smooth muscle spasm (37). Finally, gingerol, the principal bioactive compound in ginger, has well-documented anti-inflammatory properties, whereas shogaol has been reported to improve blood circulation. Collectively, these compounds may enhance oxygen delivery and, together with the other bioactive constituents of the beverage, may exert synergistic effects on respiratory function and body composition (38).

The findings of the present study demonstrated that consumption of the 9 Plant Drink resulted in significant improvements in several indices of physical performance. For acceleration, the intervention group exhibited a significant reduction in completion time, corresponding to a 12.18% change, and the between-group analysis also revealed a statistically significant difference between the intervention and placebo groups (P = 0.005).

Similarly, for agility, the 9 Plant Drink group demonstrated a significant reduction in completion time, corresponding to a 17.96% change, compared with the placebo group. The between-group analysis showed a significant difference between the 9 Plant Drink and placebo groups (P = 0.001). In addition, a

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significant difference was observed between the acute and chronic intervention periods (P = 0.001).

Furthermore, lower-limb muscle power increased significantly in the 9 Plant Drink group, showing an 8.38% improvement compared with the placebo group. The between-group analysis also demonstrated a statistically significant difference between the 9 Plant Drink and placebo groups (P = 0.022).

Consistent with the present findings, Abadi et al. (2018) investigated the effects of eight weeks of Aloe vera gel supplementation on selected physical fitness components and body composition in male bodybuilders (12). The study included 25 male bodybuilders with at least two years of continuous resistance-training experience, who were recruited by convenience sampling and randomly assigned to either a supplement plus training group (n = 13) or a placebo plus training group (n = 12). The training protocol consisted of eight weeks of resistance training, performed five sessions per week. The authors reported that Aloe vera gel supplementation significantly improved muscular endurance (12).

In contrast, Hosseini et al. (2020) investigated the effects of eight weeks of resistance training combined with ginseng supplementation on body composition, muscular strength, and oxidative stress in physically active men. Thirty participants were randomly assigned to two groups of 15 participants each. Both groups completed the training program for eight weeks, with three training sessions per week. Although muscular strength increased in the ginseng plus training group, the improvement was not statistically significant. The authors concluded that ginseng supplementation combined with resistance training did not provide additional benefits over resistance training alone with respect to the study outcomes (39).

Ahmadi et al. investigated the effects of six weeks of resistance training combined with ginseng supplementation on the aerobic and anaerobic capacities of inactive male university students. The participants were allocated to the following groups: resistance training plus placebo, resistance training plus ginseng supplementation, ginseng supplementation alone, and placebo. Their findings showed that mean anaerobic power, minimum anaerobic power, and fatigue index did not differ significantly among the four groups (40).

More recently, Lee et al. (2025) conducted a study to investigate the acute effects of wild ginseng extract on exercise performance, cognitive function, and fatigue recovery. They concluded that acute supplementation with wild ginseng exerted a positive effect by preserving muscular power while reducing reaction time (41).Ginseng has also been reported to increase fatty acid oxidation during prolonged physical activity, thereby enhancing the preservation of muscle glycogen stores (42).

Aloe vera contains the enzyme lipase, which may play an important role in lipid metabolism. It also contains essential trace minerals, including copper, potassium, phosphorus, and sodium. Copper is involved in the formation of red blood cells and functions as a cofactor for iron-transfer enzymes, thereby contributing to oxygen transport and hemoglobin synthesis. Potassium helps maintain fluid balance, whereas phosphorus plays a fundamental role in bone formation and energy metabolism. Sodium also contributes to fluid homeostasis and is directly involved in the normal function of nerves and muscles (12).

Factors influencing fatigue are multifactorial and depend on variables such as exercise intensity and duration, environmental conditions, nutritional status, physical fitness level, muscle fiber composition, ionic balance, and glycolytic enzyme activity (43).Therefore, the absence of significant differences in the power-related variables and fatigue index observed in the present study may be attributable to one or more of these factors.

One limitation of the present study was the absence of separate exercise-only and herbal supplement-only control groups. In addition, the lack of strict control over participants' dietary intake and physical activities outside the intervention may have influenced the study outcomes. A major strength of this study is that it is the first to evaluate a commercially available herbal product that has entered the consumer market while simultaneously investigating both its acute effects and the influence of one month of regular consumption. Another strength is the use of the minimum recommended dose, thereby minimizing the potential risk of adverse reactions to the beverage's bioactive constituents.

The findings of the present study suggest that the effects of the 9 Plant Drink require a longer duration to influence motor and muscular performance. This may be attributable to the cumulative effects of its bioactive phytochemical constituents and/or the neuromuscular adaptations associated with their regular consumption.

5. Conclusion

Based on the findings of the present study, it may be concluded that physically active young adults who consume 75 mL of the 9 Plant Drink (Aloe vera) daily for at least one month may benefit from the acute physiological effects of its bioactive constituents, thereby helping to maintain and improve selected indices of respiratory function and physical fitness, which may ultimately contribute to enhanced athletic performance.

6. Highlights

Drinking 75 mL of this nine-plant (Aloe vera–containing) beverage daily, 15 minutes before training, for at least one month may help active individuals move faster off the mark, react more quickly in agility drills, and jump higher; practical gains for sports that depend on speed and explosive power.

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Conflicts of Interest

The authors declare that they have no conflict of interest.

Authors' Contributions

All authors contributed substantially to the conception and design of the study, data collection, data analysis and interpretation, manuscript preparation, and critical revision of the manuscript. All authors read and approved the final version of the manuscript.

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