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## ORIGINAL

# COMPARATIVE EFFECTS OF DIFFERENT DIETARY SUPPLEMENTS ON PHYSICAL PERFORMANCE AND MUSCLE RECOVERY

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### ABSTRACT

Dietary supplements play a reactive role in the human body; they perform the role of signaling molecules, which are important for the immune system, expression, and regulation of signal pathways. Conversely, depending on many parameters such as age, physical activity duration, training condition, intensity, and genetic summary can be a reason for the amassing and overproduction of oxidants/anti-oxidants, leading to muscle distress and structural impairment. The research was based on primary data analysis to determine whether the study used SPSS and AMOS software and generated results between them. Additionally, many sports happen in pre-seasons, and athletes have their training session on the same day, which leads to the formation of nitrogen and Oxygen reactive and inflammatory constituents. Therefore, there is a need for some ways to reduce these effects and increase the performance and recovery of athletes. There is an existing indication that using dietary supplements and dietary sources like fruits, cereals, and vegetables can reduce oxidative stress, post-exercise swelling, and immune defects and improve metabolic recovery and strength of muscles, thus all advantageous to what sports and athletes demand. Overall, the result was a direct and significant impact of dietary supplements on physical performance and muscle recovery.

**KEYWORDS:** Dietary Supplements (DS), Physical Performance (PP), Muscle Recovery (MR)

### 1. INTRODUCTION

Medical science has given us awareness that every type of dietary

supplement is related to a specific function in the human body. For example, the dietary supplement protein helps in better growth and strength of muscles. Carbohydrates help store energy in the body. The lipids help in bodybuilding. The vitamin is necessary for normal growth and immunity of the body. This introduction will discuss how different dietary supplements affect physical performance and Muscle Recovery in athletes (Rahbek, Farup, de Paoli, & Vissing, 2015). As we know, athletes plan set plan is quaree different comp from those of laymencoverly in athletes must be swift. To improve all of these aspects, there should be a diet for athletes that will help in better performance and swift recovery. It has been proved by medical science that there is a formation of free radicals in the muscles of athletes, which can cause fatigue, cramps, soreness, and inflammation. To reduce free radical production in the body, there is a need to uptake antioxidants such as vitamin C, vitamin E, coenzymes, and others. However, studies have also shown that these antioxidants only reduce the free radical production in the body and are not directly involved in improving the performance of muscles in athletes (Lam et al., 2019). The other Dietary Supplement is arginine, which acts as the main substrate of creatinine protein. The main function of arginine is to increase the flow of Oxygen and nutrients to skeletal muscles. The blood flow also increases to skeletal muscles by arginine. The other important function of arginine is that it increases the production of growth hormones in the human body, which, in turn, helps in the better growth and development of skeletal muscles. It has also been seen that creatinine content in skeletal muscles increases by increasing arginine to some extent (Mielgo-Ayuso & Fernández-Lázaro, 2021). The studies have also proved that arginine does not affect increasing blood flow or vasodilation. If we talk about the dietary supplement of beetroot juice, it has been proved by recent studies that beetroot juice helps in increasing vasodilation, improves blood flow, reduces the use of Oxygen in muscles, and also promotes oxygen production in the body. The other benefit of beetroot juice is that it helps provide energy in high-intensity sports for a short interval of time. Some substances in muscles act as buffers. The buffers are those solutions that resist any change in pH (Doma, Gahreman, & Connor, 2021). If there is any change in pH in muscles, it may result in fatigue, muscle cramps, and inflammation. It has been proved by scientific studies that beta-alanine helps in the production of carnosine, which is a dipeptide that acts as a buffer in muscles. However, it has also been observed that beta-alanine is only better for short intervals and cannot help for those sports that last for more than half an hour. The nitric oxide level in muscles and water retention have been of main concern related to muscle health. These two aspects are also related to creatinine content in muscles. Medical studies have proved that betaine helps in the production of creatinine protein, retention of water in muscles, and maintain the level of nitric oxide in muscles (Pasiakos et al., 2015). As we know, the mitochondria are the basic unit of the cell that provides energy to a cell. That is why it is also called the powerhouse of a cell. The intake of branched amino

acids may result in better energy production in muscle cells by mitochondria. The muscle mass and muscle strength have also been improved by taking more branched-chain amino acids through diet. Caffeine has always been used by athletes to increase the body's alertness and improve the condition of muscles. It has been proved by scientific studies that pain perception is reduced to a much lower level by the use of caffeine(Nissen & Sharp, 2003). Different types of diets are suggested to be used by athletes to enhance the performance and endurance of the body. One of these diets is a carbohydrate enriched diet, which can help increase the glycogen storage in the body, thus improving the condition of muscles to work well and perform better in high-intensity sports. The other type of diet is the Mediterranean diet which is based on fruits, vegetables, and other protein sources. It has been proved that the Mediterranean diet helps increase the body's endurance level during sports(Liao et al., 2024). The diet type that has gained much importance in recent years for athletes is a plant-based diet, which is totally and wholly dependent upon plant-based resources to get a diet such as fruits, vegetables, and plant-based oils. The main benefit of plant-based food is that it does not undergo processing; thus, it is more nutritious for the body. There are also some naturally occurring antioxidants in plant-based diets that help to reduce the content of free radicals in the body(Bishop, 2010). There are also some anti-inflammatory substances present in plant-based diets that help reduce inflammation in muscles and reduce the risk of fatigue and muscle cramps. Some sports need high energy and protein content in the body. For this purpose, a protein-based diet is suggested, such as meat, beef, milk, dairy products, legumes, butter, and others. These types of diets increase the strength and endurance levels of muscles, especially skeletal muscles(Ana C Gonçalves et al., 2022). The best diet that is suggested for swift recovery and healing is the Paleo diet, which is based on the idea of eating unprocessed and natural food to avoid any contamination in the body. If there is injury to muscles or joints, a mostly protein-enriched diet is suggested, but if there is low production of energy in the body, then a carbohydrate-enriched diet is suggested for the body. The diet plan that has had much importance in recent years is the raw food diet, in which athletes use more uncooked and unprocessed food. These types of food plans are effective for athletes under specific conditions and particular sports(Oliveira et al., 2022; Pasiakos, Lieberman, & McLellan, 2014).

### **1.1 Research Objective**

The main objective of this research is to understand the role of different dietary supplements in enhancing the performance and recovery of athletes. This study has explained to what extent the diet plan affects these factors. The research study measures the Comparative Effects of Different Dietary Supplements on Physical Performance and Muscle Recovery. The research paper is divided into five sections. The first portion represents the introduction and includes the objective of the research study. The second portion describes

the literature review, and the third section also represents a method of research. The fourth section describes the result and its descriptions related to the Comparative Effects of Different Dietary Supplements on Physical Performance and Muscle Recovery. The last portion summarises the overall research study and presents recommendations about the topic.

## 2. Literature Review

Studies explain that to give a precise and complete examination of writing, inspecting the speculation that albumin addenda improve recuperation of muscle capability and actual execution by weakening brawn harm and irritation pursuing a past episode of activity. But, until this point, when albumin addenda are given, intense modifications in post-practice albumin blend and steroid subcellular flagging have not brought about quantifiable decreases in sinew harm and upgraded recuperation of sinew capability (Pasiakos et al., 2014). This study aims to sum up and examine the ongoing information on the impacts of nutritional polyphenols on actual execution and recuperation in competitors and athletics professionals. Generally, the study reveals that Phenolic applies significant advantages on working prompted brawn harm and shows a natural job in actual execution (Ana C Gonçalves et al., 2022). Researchers reveal that a carefully planned nutriment is the establishment whereupon ideal preparation and execution might be created. However, in case serious games have occurred, competitors have endeavored to work on their presentation by swallowing different materials. Last, recounted records propose that group activity competitors frequently consume in excess of one nutritional enhancement & minimal significant awareness of the possible unfavourable impacts of consuming different addenda. Addendas that seem to be protected and strong when consumed alone may have antagonistic impacts when joined with different enhancements (Bishop, 2010). Studies suggest that maturing-related muscle-wasting has hurtful effects on bulk, power, and actual portability. Albumin sub junction has been shown to expand the adequacy of opposition preparation in older.

This research contrasts the general impacts of various albumin addenda on bulk, power, & portability results in moderately aged & more seasoned people going through resistance training. Scholars propose that albumin harvests the ideal enhancements to combat muscle wasting in more established people undergoing resistance training (Liao et al., 2024). This research aimed to evaluate which nutritional enhancements expand muscle density and power benefits throughout RT. It appears to be natural that extra supplements might be over serious opposition workout to take into account the highest "articulation" of brawn and power boosted. The utilization of common and explicit nutritional addenda is far and wide between the two critical and easygoing competitors, with a few hundred explicit recipes being promoted (Nissen & Sharp, 2003). Researchers inspected the impacts of

organic product nutrients on lists of brawn harm and actual execution estimates perusing brawn-harming workout conventions. Natural product addendum limited the degree of a few biological indicators of brawn harm, irritation, and aerobic pressure, whereas it worked on strong compressibility over times of Exercise-Induced Muscle Damage. These discoveries show how organic product enhancements might be utilized as recuperation methodologies from exhausting activity meetings(Doma et al., 2021). Scholars suggest that the obliteration of bony brawn strands drives a provocative reaction that diminishes the competitor's actual work limit and athletics execution. In this manner, brawn recuperation turns fundamental and has turned into a need for world-class competitors in various game conditions. To accomplish ideal brawn recuperation, competitors frequently consolidate extra recuperation systems (natural, therapeutic, automatics, and wholesome) in the expectation of working on corporal reactions and cutthroat execution(Mielgo-Ayuso & Fernández-Lázaro, 2021). The discoveries of this study assist the viability and security of Whey protein supplements as a convenient help in competitors' game execution and recuperation. The general nature of medical proof was viewed as legitimate and solid from the complete pursuit procedure & Risk of Bias appraisal(Lam et al., 2019). Studies elaborate that post-practice nutritional addendum might give a procedure to speed up the pace of power recovery by influencing systems connected with brawn albumin overturn. Researchers summarize that unique nutritional addendum forms didn't create contrasts in motioning for brawn overturn under recuperation from brawn-harming practice(Rahbek et al., 2015). Studies claim that numerous competitors' nutrients with cell reinforcements conviction will decrease brawn harm, resistant brokenness and weariness, & will subsequently further develop execution, whilst few proofs propose it disables preparing variations. Restricted proof proposes goutweed upgrades perseverance execution (A.C Gonçalves et al., 2022; Peake, Neubauer, Della Gatta, & Nosaka, 2017). Based on Vitamin E & N-acetyl cysteine surveys, intense admission of cell reinforcements will probably be useful. But, constant admissions of most cell reinforcements destructively impact execution(Braakhuis & Hopkins, 2015).

This research was led to inspect the potential impacts of ajagandha stem removal utilization on bulk and power in sound juvenile fellows who participated in opposition preparing. This research informed that the Ajagandha addendum is related to critical expansions in bulk and power and recommends that the Ajagandha addendum might be helpful in preparing an obstruction project(Wankhede, Langade, Joshi, Sinha, & Bhattacharyya, 2015). Scholars explain that active work and game play a fundamental part in advancing corpse improvement and keeping up with ideal well-being levels two in the long and short haul. However, a durable, weighty preparation might advance a few impeding corporal alterations, involving fleeting safe framework glitch, expanded irritation, and aerobic pressure, which are evident as workout-initiated brawn harms. The medical advantages of marrow have been deeply

grounded and have been widely checked into somewhere else, albeit a developing lot of reviews inaugurate a critical constructive outcome of marrow particles on practice execution and recuperation of brawn capability(di Corcia et al., 2022). Studies show that nutritional enhancements in athletics are turning out to be progressively well known. The vital and mindful utilization of a couple of enhancements and athletics food sources, ideally in participation with a game's sustenance trained professional, might be valuable to specific competitors in specific conditions. Randomly assigned, hybrid, dominated detached examinations utilizing a gathering of athletics enhancements should be expected to survey whichever get this multitude of enhancements prospective preferable over taking only one or two in cooperative energy. Moreover, it is similarly advantageous to direct personalized examinations on the utilization of various games nutrients in light of person contrasts(Wang, Wang, & Wu, 2023). Scholar studies reveal that it ought to be noticed that the examinations remembered for this survey are restricted in example size & need techniques to manage towards jumbling impacts of the monthly series, adding to expanded change in concentrate on outcomes. Hence, an absence of massive contrast in the consequences of introduced examinations doesn't be guaranteed to imply that the pertinent nutritional enhancements make no difference, yet focuses to the requirement for bigger example sizes & best plan manage (for example., chemicals) to make ends in light of more grounded factual practice(Murphy, Rushing, Sumner, & Hackney, 2022). Scholars reveal that addendum with specific cell reinforcements is significant for truly dynamic people to rush recuperation from weariness & to forestall practice harm.

The utilization of wholesome enhancements related with work out, fully intent on further developing wellbeing, upgrading preparing or further developing games execution, is a logical worry that urges several exploration programs as well as produces extraordinary assumptions in the area of their uses in bacteriology. Taking into account the outcomes saw in the writing, & as a finish of this orderly survey, researchers be able to state that it is a fascinating particle with regards to athletics execution(Drobnic, Lizarraga, Caballero-García, & Cordova, 2022). Researchers suggest that substantial aquation under athletic action is a specific one most outstanding marks of wellbeing in competitors & might be a restricting variable for athletic execution. For sure, parchedness firmly diminishes sport execution unless it is a gamble to wellbeing. With respect to different supplements, every one of them is accounted for to help competitors' necessities the two within the actual work or potentially in the post exercise. In this review, scholars survey the ongoing information on nutriment-improved useful drinks in athletic considering the competitors' wellbeing, athletics execution, & recuperation(Orrù et al., 2018). Scholars elaborate those nutritional enhancements, particularly albumin, are utilized by competitors to accomplish the activity and preparing everyday requests, & have been getting survey center around their job in regards to recuperation & execution. Albumin nutrients are liked over customary albumin origins due to

their simplicity of accessibility & usage. As well as absorbing a total albumin nutrient, for example, serum albumin, the digestion of an enhancement including just polypeptides has been of concern for advancing striated brawn digestion and excellent weight reduction (Master & Macedo, 2021). Researchers explored the speculation that nourishing addendum of the eating routine in mean-corporeal-working more established people with an uncommonly formed organization in light of fundamental polypeptides should work on actual capability when contrasted with addendum with a similar measure of serosity albumin. Scholars infer that nutritional addendum with an essential amino acids-supported piece might be a gainful treatment in more established people with downcast actual useful limit (Azhar et al., 2021). Scholars identify the viability of chlorella algae addendum in improving isobaric brawn force & perseverance in prepared and undeveloped people. Chlorella algae for a long time is powerful in expanding the isobaric brawn force & isobaric brawn perseverance. Chlorella algae addendum with preparing was viewed as best compared to the chlorella algae just & preparing just in expanding brawn power however no gathering was viewed as better in expanding solid perseverance (Sandhu, Dheera, & Shweta, 2010). The purpose of this study will be to methodically assess a portion of the home-grown nutrients that are utilized as apoptogenic & enhancing physical supports in athletic. The study will remember accessible information for Robiola rose, Wathena somniferous, Tibullus terrestrosin, Vitus Lambrusco, Citron uranium, & additional. Their belongings, dynamic fixings also could be expected unfriendly impacts will be talked about with extraordinary spotlight on detached investigations (Zovko Koncic & Tomczyk, 2013). Scholars claim that there is strong proof that demonstrate absorbing albumin pre as well as post-exercise prompts a critical ascent in brawn albumin combination. It ought to be important, although, that complete everyday calorific & albumin consumption above the drawn out assume the utmost essential nutritional parts in working with transformations to work out. Hence, in view of execution and recuperation impacts, apparently the judicious methodology is have competitors ingest albumin post preparing & post contest (Cintineo, Arent, Antonio, & Arent, 2018). Studies explain that declivitous racing is related with filament harm, irritation, postponed beginning brawn touchiness, & different utilitarian shortfalls.

This survey analyzed the impacts of safranin on irritation & recuperation of racing execution pursuing declivitous racing in rats. These outcomes encourage the speculation that safranin might decrease aggravation & counterbalance a portion of the presentation shortfalls related with capricious activity incited brawn harm (Davis et al., 2007). Researchers claim that to contrast at the viability of antelope milk for working on nourishing station, bulk & actual execution in addition of a financially accessible vocal healthful enhancement in more seasoned ladies. Gauge healthful station & body mass index might regulate nourishing station, bulk & actual execution reaction to deer milk as contrasted with oral nutritional supplement, recommending deer milk

might work on wholesome status & actual execution in ladies in danger of lack of healthy sustenance or potentially with diminish body mass index, and further develop bulk in ladies with a greater body mass index(Kruger, Mazahery, Mugridge, Turner, & von Hurst, 2023). This deliberate audit meant to investigate the impacts of various nutritional addendum procedures on the preparation transformations, cell reinforcement station and execution of beach Volleyball athletes completely. Amid the explored nutrients, espresso revealed the better encouraging information to upgrade actual execution and readiness. N-acetyl cysteine & grape seed extract might further develop cancer prevention agent status. Furthermore, exploration is expected to evaluate other enhancements' viability in beach Volleyball Athletes(Hernández-Landa et al., 2024). The fundamental point of the exploration is to decide a similar examination connected with nutritional propensities and actual wellness in Argentine & Chilean competitors. The examination distinguishes regions that could profit from more review, for example, what these wholesome contrasts mean for competitors' exhibition and the way in which every nation changes with its one of a kind climate(Erin, Raleene, Kiraati, & Mark, 2023; Renton, 2024).

### 3. Methodology

The research study determines the Comparative Effects of Different Dietary Supplements on Physical Performance and Muscle Recovery. The research based on primary data analysis for determine the data used SPSS and AMOS software and run result related to the physical performance and muscle recovery. According to the research It is stated that elite sports players use more dietary supplements as compared to non-elite sports players and 80% of prevalence has been seen in men and women for using nutritional supplements. Some studies focused on how nutritional supplements like dietary nitrates, sodium bicarbonate and  $\beta$ -alanine help athletes for better performance in sports and competitions. In comparison, other researchers focused on how these supplements boost energy in athletes instead of how their effects can be long-lasting. These supplements might adapt according to the demands of the body during training in terms of acid-base balance, oxidative stress and complete training load. For instance, the use of sodium bicarbonate dietary supplements causes changes in blood buffering ability and  $\beta$ -alanine supplements cause muscle buffering ability. Some researchers suggest the use of combined supplements affects changes in training (Rothschild & Bishop, 2020).

Dietary supplements are used extensively to improve performance and quick exercise and sports recovery. Mechanical stress is produced due to long duration and high-intensity physical activity characterized by inflammatory responses, oxidative stress and cytokine formation. Hence, using dietary supplements with anti-inflammatory and anti-oxidative properties can prevent athletes from muscle soreness, and loss of muscle strength and also reduce



the chances of muscle damage. However, only a few supplements are effective to use from all available dietary supplements (Irawan, Sulistyarto, & Rimawati, 2024).

**Table 1:** Result of Descriptive Statistics

<b>DESCRIPTIVE STATISTICS</b>					
	<b>N</b>	<b>MINIMUM</b>	<b>MAXIMUM</b>	<b>MEAN</b>	<b>STD. DEVIATION</b>
<b>DIETARY SUPPLEMENTS 1</b>	50	1.00	3.00	1.6000	.60609
<b>DIETARY SUPPLEMENTS 2</b>	50	1.00	3.00	1.6000	.63888
<b>DIETARY SUPPLEMENTS 3</b>	50	1.00	3.00	1.6000	.60609
<b>PHYSICAL PERFORMANCE 1</b>	50	1.00	3.00	1.5800	.60911
<b>PHYSICAL PERFORMANCE 2</b>	50	1.00	3.00	1.7200	.60744
<b>MUSCLE RECOVERY 1</b>	50	1.00	3.00	1.5200	.57994
<b>MUSCLE RECOVERY 2</b>	50	1.00	3.00	1.5600	.57711
<b>VALID N (LISTWISE)</b>	50				

The above result shown in table 1 represent that descriptive statistical analysis result describes that minimum value, maximum value, the mean rate and standard deviation rate related to variables. the dietary supplements 1,2 and 3 these are all factors consider as independent variables according to the result its mean values are 1.6000, the standard deviation rate is 60%, 63% deviate from mean. According to the result overall minimum value is 1.000 the maximum value is 3.00. the result also describes the number of observations according to the result total number of observations is 50. The physical performance 1, and 2 both consider as dependent variable result shows that its mean values is 1.5800, and 1.7200 its present positive average value of mean. The standard deviation rate is 60% and 57% deviate from mean values. The muscle recovery 1, and 2 both are present that another dependent variable according to the descriptive statistical analysis its mean value is 1.5299 and 1.5600 the standard deviation rate is 57% respectively.

**Table 2:** Result of Paired Samples Correlations

<b>PAIRED SAMPLES CORRELATIONS</b>						
				<b>N</b>	<b>CORRELATION</b>	<b>SIG.</b>
<b>PAIR 1</b>	Dietary Supplements 1	&	Physical Performance 1	50	.254	.075
<b>PAIR 2</b>	Dietary Supplements 2	&	Physical Performance 2	50	-.347	.014
<b>PAIR 3</b>	Dietary Supplements 3	&	Physical Performance 2	50	.188	.190
<b>PAIR 4</b>	Dietary Supplements 1 & Muscle Recovery 1			50	-.325	.021
<b>PAIR 5</b>	Dietary Supplements 2 & Muscle Recovery 2			50	.066	.647

The above result shown in table 2 represent the correlation coefficient analysis result shows that correlation rate and significant rate of different pairs. The first pair is dietary supplements 1 and physical performance 1 result shows that its correlation rate is 0.254 shows that 25% positive rate the significant value is 7% significantly level between them. the pair 2 is dietary supplements 2 and physical performance 2 result shows that its correlation rate is -0.347 the significant rate is 0.014 its shows 14% significantly level.

The third pair shows 21% significantly level also that fourth pair in between dietary supplements 1 and muscle recovery 1 its shows that -0.325 and 0.021 respectively. According to the result the last pair is dietary supplements 2 and muscle recovery 2 result shows that correlation value is 0.066 and its significant rate is 64% respectively.

**Table 3:** Result of Model Summary

<b>MODEL SUMMARY</b>				
<b>MODEL</b>	<b>R</b>	<b>R SQUARE</b>	<b>ADJUSTED SQUARE</b>	<b>RSTD. ERROR OF THE ESTIMATE</b>
1	.587 <sup>a</sup>	.345	.270	.49548

a. Predictors: (Constant), Physical Performance 2, Dietary Supplements 1, Dietary Supplements 3, Dietary Supplements 2, Physical Performance 1

The above result shown in table 3 describe that model summary result shows R value, R square value, the adjusted R square rate also that estimated error of the estimate value. According to the result R rate is 58%, R square value is 34%, the adjusted R square rate is 27% also that estimated error of the value is 49% respectively. The use of supplements for enhancing performance is a common trend but not a new one for humans. Many substances are available nowadays that reduce inflammation, increase the ability to perform better during physical activity and enhance recovery, these substances were earlier used as stimulants or anabolic agents. Hence, the enhancement in performance can be a combination of improvement in efficiency and effectiveness to achieve the desired goal. In the sports field, the enhancement in performance can be measured as the achievement of desired goals because the skills are improving in this process.

There are wide ranges of nutritional supplements that are associated directly or indirectly with the improvement in training abilities. Nutritional supplements are used as an extra addition to a regular diet to help in various activities of daily life like more work than usual and help in physical activities such as sports. The main objective of using supplements is to improve athletic and physical performances to achieve the desired goals. In simple words, these are the supplements which are taken in addition to daily diet to improve health and get benefits (Drobnic et al., 2022).

**Table 4:** Result of ANOVA<sup>a</sup>

<b>ANOVA<sup>a</sup></b>						
<b>MODEL</b>		<b>SUM OF SQUARES</b>	<b>DF</b>	<b>MEAN SQUARE</b>	<b>F</b>	<b>SIG.</b>
1	Regression	5.678	5	1.136	4.626	.002 <sup>b</sup>
	Residual	10.802	44	.245		
	Total	16.480	49			

a. Dependent Variable: Muscle Recovery 1

b. Predictors: (Constant), Physical Performance 2, Dietary Supplements 1, Dietary Supplements 3, Dietary Supplements 2, Physical Performance 1

The above result shown in table 4 describe that sum of square value, the mean square value, the F rate also that significant value of each model included regression model and residual model. The regression model shows that sum of square rate is 5.678 the mean square value is 1.136 the F statistic rate is 4.62 also that significant value is 0.002 shows that 2% significant level between them. similarly, the residual value is 10.802 and mean square value is 24% respectively. Ergogenic supplements (dietary supplements) gaining popularity and importance in athletes for a few years. These supplements improve the physical and mental health of individuals; moreover, they also fulfil the nutritional deficiencies in the body, reduce body fat, lower the anxiety level, improve the mass of muscles and cognitive functions, improve immunity and increase recovery.

These supplements come in various forms such as tablets, droppers, pills, powders, and capsules that enclose a healthy diet and also harmful substances such as lead, mercury, and artificial color so; these supplements should be used in limited amounts. In past, many athletes used steroids and amphetamines as supplements but nowadays athletes use dietary supplements for maintaining energy balance and a healthy body (Chauhan, Chaudhary, & Singh, 2022). Curcumin is accepted as a safe compound by the FDA in addition, some trials are undergoing and assessed that a dose of up to 12g/day is safe and nontoxic for human use for three months. Consequently, one out of five studies determined its side effects (Dias et al., 2021).

**Table 5(a):** Result of Coefficients<sup>a</sup>

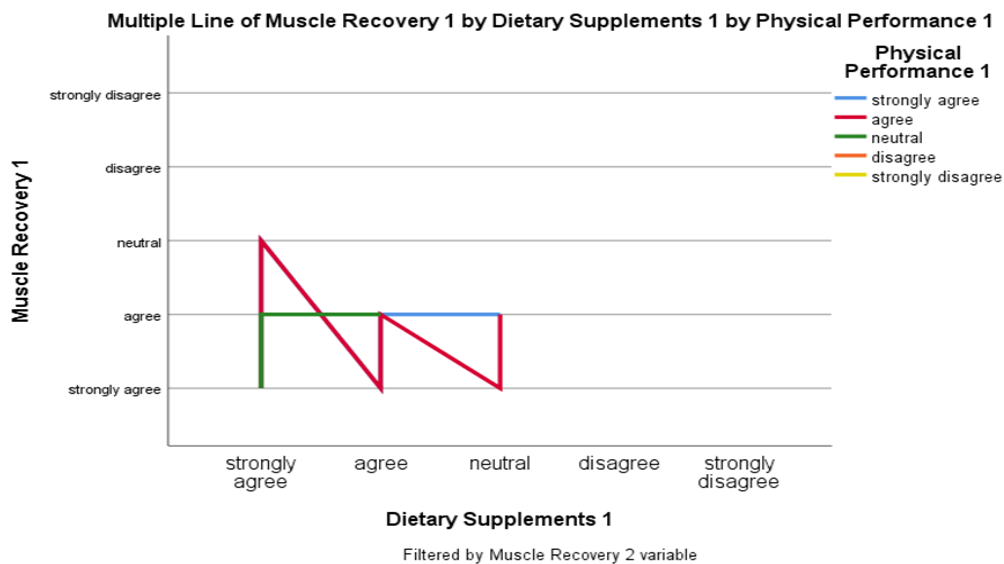
<b>COEFFICIENTS<sup>a</sup></b>						
<b>MODEL</b>		<b>UNSTANDARDIZED</b>		<b>STANDARDIZED</b>	<b>T</b>	<b>SIG.</b>
		<b>COEFFICIENTS</b>				
		<b>B</b>	<b>STD. ERROR</b>	<b>BETA</b>		
1	(Constant)	1.251	.511		2.448	.018
	Dietary Supplements 1	-.328	.122	-.343	-2.692	.010
	Dietary Supplements 2	.458	.120	.504	3.810	.000
	Dietary Supplements 3	-.001	.130	-.001	-.006	.995

**Table 5(b):** Result of Coefficients<sup>a</sup>

COEFFICIENTS <sup>a</sup>					
MODEL	UNSTANDARDIZED COEFFICIENTS		STANDARDIZED COEFFICIENTS	T	SIG.
	B	STD. ERROR	BETA		
	Physical Performance 1	-.040	.134		
Physical Performance 2	.073	.128	.076	.570	.572

a. Dependent Variable: Muscle Recovery 1

The above result shown in table 5 describe the linear regression analysis in between independent and dependent variables. the result describes that unstandardized coefficient values, standard error rate, the beta values, the t statistic values also that significant values of each independent variable. the first factor is dietary supplements 1 its shows that t statistic rate is 2.448 the significant value is 0.010 shows that 10% significant level between them. the physical performance shows that positive and significant rate between them.



**Figure 1:** Multiple Line of Muscle Recovery 1 by Dietary Supplements 1 by Physical Performance 1

The above graph shown in figure 1 represent that relation between dietary supplements and physical performance 1 result shows that horizontal side present strongly agree, agree, neutral, disagree and strongly disagree factors. The vertical side present that muscle recovery the above lines shows link between the dietary supplements and physical performance.

#### 4. Conclusion

Over a few decades, more attention has been given to the addition of bioactive constituents obtained from therapeutic plants in pharmaceuticals,

dietary supplements and nutraceuticals. This is a common belief that their ingredients are safe, they are less expensive; toxic-free have no side effects and more operative as compared to synthetic medicines. Among all types of supplements, phenolic dietary supplements studied by many researchers for a few decades. These supplements consist of plants' secondary metabolites and form the largest group derived from phenylpropanoids. They possess various health-related properties like anti-inflammatory, antimutagenic, and antioxidants and have a vasodilator effect, due to the existence of chemical structures like methoxy, pyrogallol group and catechol. These all characteristics add beneficial values for athlete's performance and recovery. For instance, curcumin dietary supplements have gained interest among researchers due to their various beneficial effects. The overall research concluded that direct and positive effect between the physical performance and muscle recovery with supplements. It was observed that curcumin possesses different biological activities such as anti-inflammatory that are beneficial for the regulation of immune response, cardio and HEPA-protective responses, positive impact on diabetic patients and improved cognitive abilities. Furthermore, it also provides beneficial effects to athletes and experts, a clinical trial for using curcumin supplements showed that in both genders after having eccentric physical activity supplemented with curcumin supplements and results showed that there is reduced exercise-induced muscle damage (EIMD) and creatine kinase (CK) level thus leads to better recovery after long exercise. One more study revealed that curcumin dietary supplements also reduce CK levels and pain in muscles in men having muscle injury physical activity. Moreover, curcumin supplements also improve muscle performance and damage by regulating the NF- $\kappa$ B and erythroid 2-like 2 (Nrf2) pathways

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