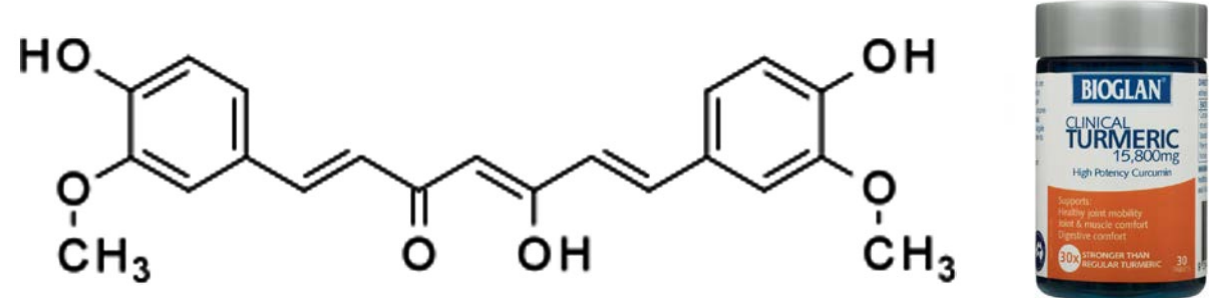


Effects of Curcumin Supplementation on Delayed Onset Muscle Soreness and Muscular Function Characteristics



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Introduction

- Delayed onset muscle soreness (DOMS) is the pain, tenderness or discomfort felt 24-72hrs after exercise (1).
- It is the result of muscle damage causing an inflammatory response within the body (1,2).
- DOMS has been seen to negatively impact performance in terms of strength, endurance increased injury risk (2).
- Curcumin is the active ingredient in turmeric which is known for its anti-inflammatory and anti-oxidant properties (3).
- The purpose of this study was to investigate whether reducing the extent of inflammation after exercise through the use of anti-inflammatory food such as curcumin would reduce the severity and impact of DOMS.

Methods

- A total of eight recreational athletes, one male and seven females, volunteered for this study, having at least one year of gym based or sport specific training.
- Participants blindly consumed either curcumin or a placebo for 5 consecutive days.
- On the 3rd day they completed a baseline maximal voluntary isometric contraction (MVIC) torque for five seconds on their non-preferred arm where mean and peak torque was measured. 4 x 10 eccentric bicep curls were then performed with 120% of their 1RM weight. Immediately after, a second MVIC was performed (4).
- Visual analogue scales to assess pain levels were filled at before testing, immediately after and 48hrs after.
- On the 5th day of testing, participants performed a final MVIC to assess changes in strength.
- A seven day wash out period was utilised followed by another five day testing period where participants followed the same protocol while completing the opposite trial.
- Comparisons of the changes in variables were analysed using the methods of Hopkins. These analyses allowed for Cohen effect sizes, 90% confidence intervals, and qualitative inferences to be presented (5).

Table 1: Muscle function and Soreness outcomes (mean ± standard deviation) and corresponding mean changes (%) for the curcumin and placebo supplementation groups and the net difference (% ± 90% confidence limits (CL)) of these changes.

	Mean ± Standard Deviation		Comparison	Change in Measurements (%)			
	Curcumin	Placebo		Curcumin % Diff, ± 90% CL	Placebo % Diff, ± 90% CL	Curcumin vs. PLA % Diff, ± 90% CL	
Peak Torque (N.m)	Pre	190.1 ± 62.7	178.8 ± 50.5	Post vs. Pre	-18.8, ±7.1*†	-25.5, ±19.0*††	8.9, ±19.9†
	Post	153.3 ± 46.5	130.4 ± 20.5	48hr vs. Pre	-4.4, ±6.4	-14.9, ±26.6†	12.3, ±27.6†
	48hr	82.5 ± 61.3	156.3 ± 58.1	48hr vs. Post	17.7, ±8.2*†	14.1, ±25.0†	2.3, ±26.2
Mean Torque (N.m)	Pre	167.1 ± 54.1	159.5 ± 55.3	Post vs. Pre	-28.9 ±2.9*††	-31.0, ±21.6*†††	3.1, ±21.9
	Post	119.8 ± 42.4	103.0 ± 16.7	48hr vs. Pre	-5.3, ±7.0	-15.6, ±23.3†	12.2, ±24.1†
	48hr	159.5 ± 55.3	131.9 ± 48.5	48hr vs. Post	33.2, ±9.3*††	22.4, ±25.4††	8.9, ±26.6
VAS (Score)	Pre	0.3 ± 0.5	0.3 ± 0.5	Post vs. Pre	2.3, ±1.0*††††	2.9, ±1.1*††††	-0.6, ±1.5 ††
	Post	2.7 ± 1.7	3.1 ± 1.5	48hr vs. Pre	3.9, ±0.8*††††	7.0, ±1.5*††††	-3.2, ±1.7*††††
	48hr	4.2 ± 1.4	7.3 ± 2.2	48hr vs. Post	1.6, ±0.9*††††	4.1, ±1.4*††††	-2.6, ±1.6*††††

Note: raw data was used for the VAS measurements, † small effect, †† Moderate effect, ††† Large effect size, †††† Very Large *Significant at p<0.05

Findings / Discussion

- Changes in the measured variables are shown in Table 1.
- The primary findings of this study were that curcumin causes a *large* significant decrease in the level of pain caused by DOMS following eccentric exercise immediately and 48hrs after when compared to the placebo.
- No significant changes for mean and peak torque were seen when supplementing with curcumin.
- However, small to moderate effect sizes were observed for both showing that curcumin may promote a faster return to recovery compared to the placebo.
- These changes and effects are believed to be the result of curcumins anti-inflammatory properties inhibiting the production of the enzymes responsible for the initiation of the inflammatory response (1,2).

Conclusion

- The present study demonstrated that the increases in pain and decreases in muscle strength in the form of peak and average torque after eccentric exercise were attenuated by supplementing with 600mg of curcumin for five days.
- Although these results were not all statistically significant, small to moderate ergogenic effects were seen when consuming curcumin. Therefore, these findings add to the body of literature which suggests that curcumin shows some beneficial effects on recovery of delayed onset muscle soreness after eccentric exercise.

Practical Applications

- Athletes who are training at high intensity with limited recovery time should consume 400-600mg of curcumin daily as it decreases muscular pain and may increase recovery rate. This would be beneficial in a tournament setting.
- The clinical population may also benefit from supplementing with curcumin as it may reduce the pain associated with DOMS that may result in higher exercise adherence.
- The effects on the long term usage of curcumin on hypertrophy needs to be explored to establish whether its potential role in the reduction of DOMS outweighs the advantage of greater loading.

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