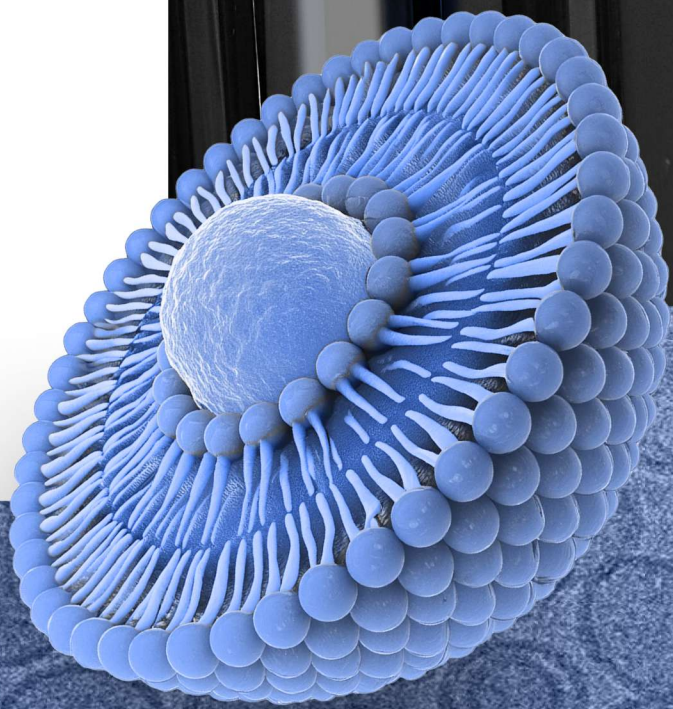
Brain market

Human Clinical Study on the Comparative Bioavailability of Various Curcumin Supplementation Forms



Summary of the Study[1]

Abstract

The purpose of this study was to compare the bioavailability of Curcumin in liquid liposomal supplementation form BrainMax Liquid Liposomal Curcumin with other non-liposomal tablet form provided by competitor. Twenty metabolically healthy volunteers were enrolled in the study.

Overall, **the BrainMax Liquid Liposomal Curcumin supplement had the highest bioavailability, up to 46 times more,** compared to other non-liposomal Curcumin in tablet supplementation form tested.

KEYWORDS: Curcumin, Curcuminoids, Turmeric, Liposomes, Bioavailability, Dietary Supplements, Biohacking.

Product Groups

LLC
Liquid Liposomal Curcumin 250 mg

Manufactured for Brainmarket

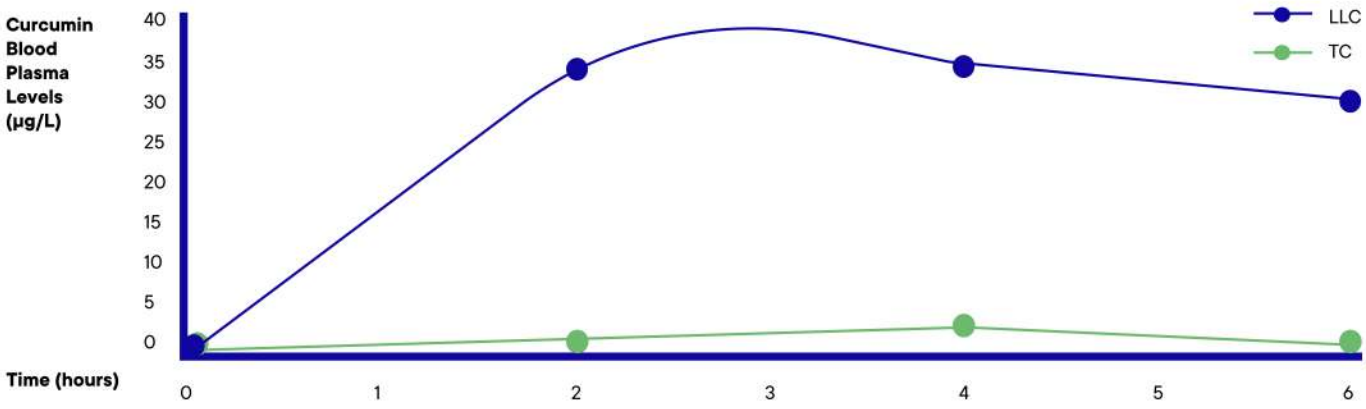
TC
Non-liposomal tablet Curcumin 250 mg

Manufactured by Competitor in the Netherlands

Results

During the study, Curcumin and demethoxycurcumin (curcuminoid) blood plasma levels were measured over time after the intake of curcuminoids 250 mg in two supplementation forms, namely LLC, and TC.

The results have shown that the BrainMax liquid liposomal Curcumin supplement (LLC) has **46.79 times** higher bioavailability than the competitor's non-liposomal tablet Curcumin (TC). Liposomal Curcumin also **maintained elevated plasma levels throughout the entire study period,** proving sustained highest concentrations during daily supplementation.



[1] See the full study from page 2.

Introduction

Curcumin has low bioavailability, due to poor water solubility and quick elimination from the body, which limits its pharmacological benefits.[2] Liposomal encapsulation is widely recognized as an effective drug delivery system for enhancing Curcumin bioavailability and unlocking its full therapeutic potential.[3] [4] The current study confirms that the unique advanced liposomal technology LipoSone™, used in BrainMax maximizes Curcumin bioavailability, outperforming conventional supplementation forms such as tablets.

Method

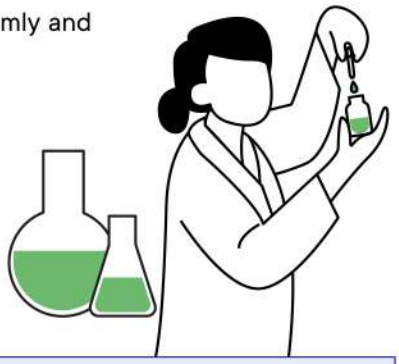
The current study was a randomized, controlled, two-group trial investigating the effect of Curcumin 250 mg in two different formulations: liquid liposomal Curcumin (LLC) and non-liposomal Curcumin in tablet form provided by competitor (TC).

Participants

Twenty (20) metabolically healthy volunteers were enrolled in the study. They were randomly and evenly assigned to one of the two supplementation groups.

Exclusion criteria for participants were:

- ✖ <20 and >50 years of age
- ✖ Any diagnosis of chronic condition(s)
- ✖ BMI outside of the normal category range (18.5–24.9kg/m2)
- ✖ Presence of acute illness
- ✖ Use of drugs or dietary supplements on a frequent and/ or mandatory basis



Measurements	LLC*	TC*
Age (years)	27.10 (5.00)	27.90 (7.00)
Females (%)	38.00	32.00
BMI (kg/m2)	21.60 (1.50)	21.50 (16.80)
Systonic BP (mmHg)	120.90 (15.90)	119.20 (16.80)
Diastolic BP (mmHg)	74.60 (8.90)	74.90 (8.90)

Table 1. Participant Anthropometric Data

** Mean standard deviation n=10*

Active Substances & Supplementation Groups

a. Liquid liposomal Curcumin (LLC): BrainMax Liquid Liposomal Curcumin

b. Non-liposomal tablet Curcumin (TC): Competitor's Curcumin 250 mg in tablet form, manufactured in the Netherlands.

Dosage and Blood Collection

Participants in the designated supplement groups, while in a fasted state, received **a 250 mg oral dose of Curcumin.** Blood samples were taken initially before the supplement was consumed (baseline) and then at intervals of 2, 4 and 6 hours following the intake. These samples were microcentrifuged for 12 minutes, cooled to 2°C, and analysed for plasma Curcumin and demethoxycurcumin (curcuminoid) levels by Liquid Chromatography and Mass Spectrometry (LC/MS-MS) techniques.

Data

All participants successfully completed the study. They were predominately in their late twenties, with an equal distribution of males and females. All were characterized by healthy Body Mass Index (BMI) and blood pressure levels, detailed by both systolic and diastolic measurements. Participant anthropometric data is provided in **Table 1.**

Each group's average blood plasma Curcumin levels over time are graphically represented in **Figure 1**. Pharmacokinetic parameters, such as the peak plasma concentration of Curcumin (C_{max}) and the time to reach this peak (T_{max}), are documented in **Table 2**.

The area under the concentration-time curve (AUC_{0-t}) was calculated from dosing to the last measurable concentration using the trapezoidal rule, indicating the total exposure to the active ingredient over time. The incremental area under the curve (iAUC) adjusts the AUC for baseline variations. The Oral Bioavailability Value (OBV) was determined by comparing the liposomal and non-liposomal $iAUC_{0-t}$ values.

Results

A temporal analysis of Curcumin plasma levels reveals that:

At baseline, both the LLC and TC supplementation groups exhibit the same plasma levels.

After 2 hours, the LLC group achieves a Curcumin plasma level **30 times higher** than that of the TC group.

After 4 hours, both groups reach their maximum Curcumin plasma levels.

After 6 hours, the LLC group shows a slight decrease in plasma levels, while the TC group has reached baseline level.

Considering the **iAUC** values, the outcomes suggest:

The liposomal group has an OBV **46.79 times** greater than the tablet group.

Measurements	LLC	TC
C_{max} (µg/L)	32.75	0.86
T_{max} (hours)	4	4
AUC_{0-t} (µg*h/L)	161.44	3.45
OBV	46.79	

Table 2. Pharmacokinetic Parameters Data

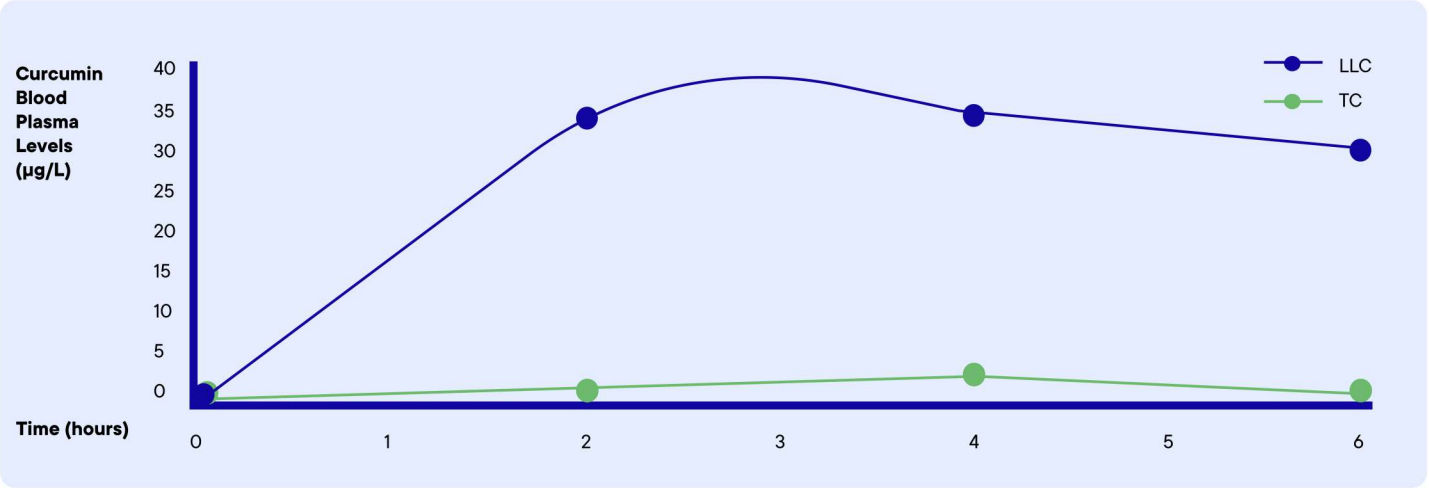


Figure 1. Curcumin blood plasma levels collected over time in two supplementation groups, namely LLC liquid liposomal form manufactured for Brainmarket, and TC tablet product manufactured by competitor.

Discussion and Conclusion

The present study demonstrates that BrainMax Liquid Liposomal Curcumin exhibits **the highest bioavailability** among the tested groups. Specifically, LLC has **46.79 times** higher bioavailability than the competitor's non-liposomal tablet form (TC).

After just two hours, Curcumin plasma levels in the liposomal group were **up to 30 times** higher than those in the non-liposomal group. Furthermore, the LLC group **maintained elevated plasma curcuminoid levels** throughout the **entire 6-hour** duration of the study. In contrast, the TC group showed no significant increase.

These findings underscore the substantial impact of liquid liposomes on Curcumin bioavailability and highlight the superior performance of Brainmarket's liposomal formulations.

Overall, the advanced liposomal technology LipoSone™, used in BrainMax supplements, is the most effective way to deliver Curcumin to the bloodstream while maintaining the highest blood plasma levels over 6 hours.

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