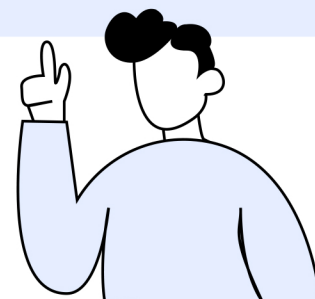




**Human Clinical Study
on the Comparative
Bioavailability of
Various **Vitamin B12**
Supplementation Forms**

Summary of the Study^[1]



Abstract

The purpose of this study was to compare the bioavailability of vitamin B12 in liquid liposomal supplementation form provided by Brain market with other non-liposomal pill form provided by competitor. Eleven metabolically healthy volunteers were enrolled in the study.

Overall, **the Brain market liposomal vitamin B12 supplement had the highest bioavailability, up to 4 times more**, compared to other non-liposomal vitamin B12 in pill supplementation form tested.

KEYWORDS: Vitamin B12, Cobalamin, Liposomes, Bioavailability, Dietary Supplements, Biohacking.

Product Groups

LLB

Liquid Liposomal
Vitamin B12
2500 µg

Manufactured by Brain market
in Hamburg, Germany

PB

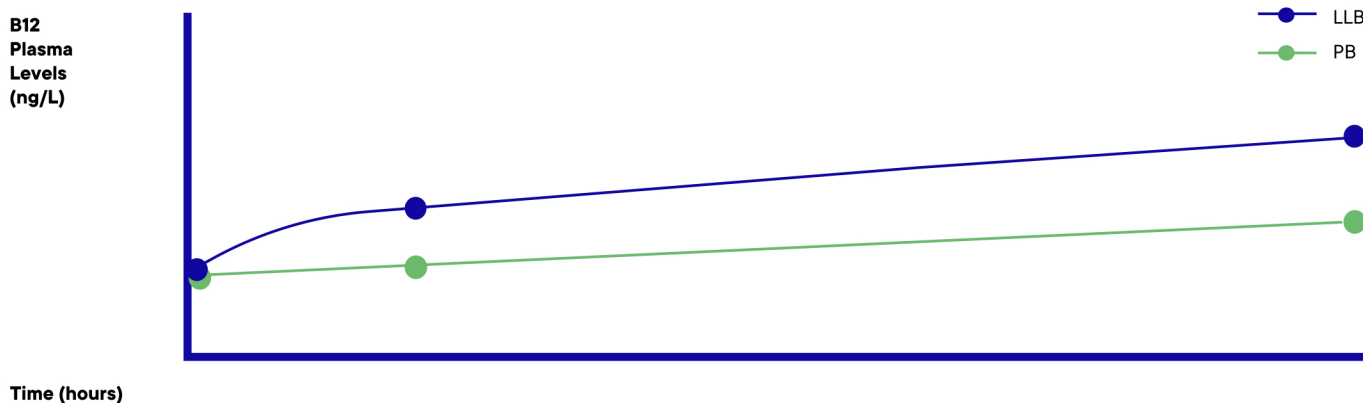
Non-liposomal pill
Vitamin B12
2500 µg

Manufactured by Competitor
in Germany

Results

During the study, cobalamin and holo-transcobalamin, the biologically active forms of vitamin B12, plasma levels were measured over time after the intake of vitamin B12 2500 µg in two supplementation forms, namely LLB, and PB.

The results have shown that the Brainmarket liquid liposomal vitamin B12 supplement (LLB) has **4 times** higher bioavailability than the competitor's non-liposomal vitamin B12 in pill form (PB) and leads to **42% increase of plasma cobalamin levels** compared to only 10% of the competitor's pill. Liposomal vitamin B12 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

This study investigates methylcobalamin, the active form of vitamin B12, which plays a crucial role in neurological and cardiovascular functions.^[1] The bioavailability of B12 depends on both free cobalamin and its transport protein, holo-transcobalamin, which facilitates its uptake into the bloodstream.^[2] Since B12 is primarily found in animal-derived foods, deficiencies are commonly observed in individuals following vegetarian or vegan diets. However, increased B12 supplementation does not lead to enhanced bioavailability.^[3] Given its generally low bioavailability,^[4] research has focused on novel supplementation methods to improve absorption.^[5] Liposomal technology has emerged in scientific literature as an effective strategy to encapsulate, protect, and deliver B12 for pharmaceutical applications.^[6] Brain market has developed **liquid liposomal formulation to successfully encapsulate vitamin B12**, optimizing its application in the dietary supplement industry. The current study confirms that **Brainmarket's unique advanced liposomal technology, LipoSone™**, maximizes B12 bioavailability, outperforming conventional supplementation forms such as pills.

Method

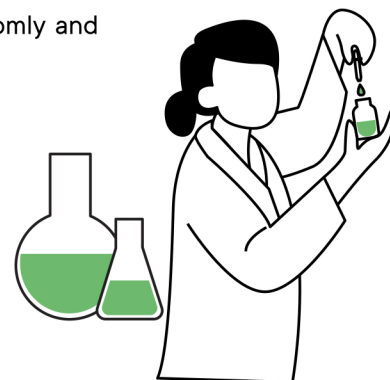
The current study was a randomized, controlled, two-group trial investigating the effect of vitamin B12 2500 µg on plasma cobalamin and holo-transcobalamin levels in two different formulations: liquid liposomal B12 provided by Brain market (LLB) and non-liposomal B12 in pill form provided by competitor (PB).

Participants

Eleven (11) 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 (18.5–24.9 kg/m²)
- ✗ Presence of acute illness
- ✗ Use of drugs or dietary supplements on a frequent and/or mandatory basis



Active Substances & Supplementation Groups

a. Liquid liposomal B12 (LLB): Brainmarket's B12 (Methylcobalamin) 2500 µg in liposomal liquid form, manufactured in Hamburg, Germany.

b. Non-liposomal pill B12 (PB): Competitor's B12 (Methylcobalamin) 2500 µg in pill form with sublingual application, manufactured in Germany.

Data

All participants successfully completed the study.

Each group's cobalamin and holo-transcobalamin plasma levels over time are graphically represented in **Figure 1**.

Holo-transcobalamin plasma levels were analyzed in 4 individuals of the LLB group at baseline and after 1 hour.

Cobalamin plasma levels were measured after 1 hour in 4 individuals of the LLB group, and after 5 hours in both the LLB and PB groups.

Results

A temporal analysis of the cobalamin and holo-transcobalamin plasma levels reveals that:

At baseline, both the LLB and PB supplementation groups exhibit the same plasma levels.

After 1 hour, the LLB group achieved **19% higher** cobalamin and **37% higher** holo-transcobalamin plasma levels compared to the baseline.

After 5 hours, the LLB group achieved **42% higher** cobalamin plasma levels, while the PB group only increased by 10%.

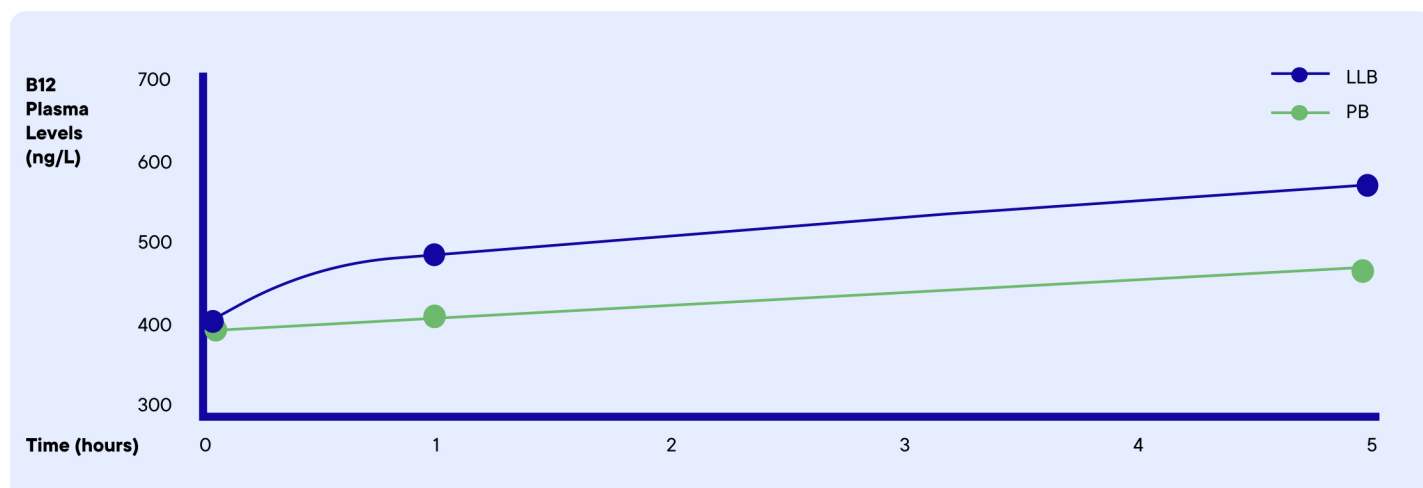


Figure 1. Cobalamin and holo-transcobalamin blood plasma levels collected over time in two supplementation groups, namely LLB liquid liposomal form manufactured by Brainmarket, and PB pill product manufactured by competitor.

Discussion and Conclusion

The present study demonstrates that Brainmarket's liposomal B12 supplement exhibits **the highest bioavailability** among the tested groups. Specifically, LLB increased cobalamin plasma levels **by 42%** from baseline, whereas the competitor's pill form (PB) achieved only a 10% increase, despite containing the same active ingredient concentration per daily dose.

The cobalamin and holo-transcobalamin plasma levels following daily liposomal supplementation show an almost linear increase over time. Even **after 5 hours**, the trend remains upward, suggesting that liposomes sustain elevated and stable cobalamin plasma levels for an extended period. In contrast, the non-liposomal group exhibited only a slight increase in plasma levels after 5 hours.

To further validate the long-term effectiveness of liposomal vitamin B12 supplementation, an extended study with additional sample collection beyond 5 hours is recommended. Additionally, a larger sample size of healthy individuals would provide deeper insights into the broader effects of liposomal B12 supplementation.

The findings suggest that daily liposomal vitamin B12 supplementation ensures superior bioavailability and enhanced daily coverage compared to traditional pill-based supplements. This underscores the significant impact of liquid liposomal technology on vitamin B12 absorption and retention, positioning Brainmarket's formulations as **the superior choice for vitamin B12 delivery**.

Overall, Brainmarket's unique advanced liposomal technology, LipoSone™, is the most effective way to deliver vitamin B12 to the bloodstream while maintaining the highest blood plasma levels over 5 hours.



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