

Publication:

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LifeSense Products provided C8 MCT oil.
Study conducted: Univ British Columbia

Note: NLRP3 activation is a molecular component of the innate immune system, that contributes to normal inflammatory responses following microbial infection and cellular damage

Research Article

Examining the Effect of Consuming C₈ Medium-Chain Triglyceride Oil for 14 Days on Markers of NLRP3 Activation in Healthy Humans

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Abstract

- Single-arm pilot trial to determine if consuming 15 mL of C8 medium-chain triglyceride (MCT) oil, which induces mild elevation of BHB, twice daily (30 mL total) for 14 days would suppress markers of NLRP3 inflammasome activation in young, healthy humans consuming their habitual diet.
- **Single dose of 15 mL (1 Tbsp) of LifeSense C8 MCT oil significantly raised blood betahydroxybutyrate (BHB) levels from fasting at 60- and 120 min post ingestion ($P < 0.05$).**

Note: Material in Slide deck was extracted from the original publication to emphasize findings related to MCT- effects on blood BHB levels. Text edited slightly from original for readability.

1. Introduction

- Various dietary manipulations, including fasting, very low carbohydrate high-fat ketogenic diets, and supplements containing ketones or their precursors can raise plasma β HB in humans.
- **MCT oil is one such ketogenic supplement demonstrated to elevate blood BHB to levels achieved in mild ketosis.** MCTs are defined as fatty acids between 6-10 carbons in length (C12 is as a medium- or longer chain fatty acid), with C8 having greatest ketogenic effect [12].
- **Upon consumption, MCTs are absorbed quickly and liberated fatty acids are oxidized in liver for energy or metabolized into β HB by liver, increasing circulating BHB.**

2.3 Study Design

- Participants consumed 15 mL of C8 MCT oil supplement 2X/day 2–3 hrs after breakfast and lunch.
- Supplement was consumed with a light snack as recommended by the manufacturer to reduce chances of adverse gastrointestinal reactions.
- Finger prick BHB levels collected at 1- and 2- hrs after C8 MCT oil supplement, a total of 8X during 14-day trial (2X/day-visits 3–6) to verify C8 MCT oil raised blood BHB levels.

2.4 Study Design: C8 MCT oil

- **C8 MCT oil supplement (KetoMCT, Lifesense® Products) consisted of 97–99% C8 triglycerides, with remainder as C10 (decanoic) triglycerides, with glycerol and fatty acid components derived from coconut oil.**
- One serving (15 mL) contained 15 g MCTs. MCT oil supplements can induce gastrointestinal distress in some individuals; to minimize likelihood of adverse events, dose was gradually increased from 5 mL 2X/day on days 1-2 to 10 mL 2X/day on days 3–4, to 15 mL 2X/day for remainder of study.
- Prior to beginning trial, participants completed 3-day dietary recall. Participants met with a researcher to review diet logs, and instructed to maintain their habitual diet while aiming for macronutrient distribution of **40–50% of energy from carbohydrates, 30–40% of energy from fats (excluding MCT oil supplements), and 20–25% of energy from proteins**

3.1 Results: Participants

- Participant characteristics were unchanged from baseline to end of 14-day C8 MCT oil supplementation (Table 1). Based on baseline 3-day diet records, participants consumed average of 2265 kcal/day, with 21% energy from protein, 42% energy from carbohydrates, and 37% energy from fats. Based on self report diet record during intervention, average calories (excluding C8 MCT oil) were 2202 kcal per day ($P=0.802$ vs. baseline), with 23% energy from protein, 41% energy from carbohydrates, and 36% energy from fat. C8 MCT oil added 270 kcal, with 30 g of fat per day, so **including supplement, calories consumed were 2472 kcal ($P=0.183$ vs. baseline), with 21% energy from protein, 36% energy from carbohydrates, and 44% energy from fats.**

TABLE 1: Anthropometrics at baseline (Pre-) and Post-MCT oil supplementation.

	Pre	Post	<i>P</i> value
Age (yrs)	23 (3)	—	—
Height (m)	1.74 (0.08)	1.74 (0.08)	—
Weight (kg)	75.9 (12.6)	76.6 (12.4)	0.88
BMI (kg/m ²)	25.0 (2.5)	25.3 (2.5)	0.78
Waist circumference (cm)	83.1 (7.2)	82.6 (7.4)	0.84

Data are means (SD); $N=15$.

3.2 Results: Blood BHB

- Blood BHB was measured at fasted baseline and post intervention, and at 60- and 120-min after single dose of C8 MCT oil. Blood BHB was significantly raised from fasting value (0.10 mM) at both 60- (0.2 mM; $P < 0.001$) and 120 min (0.16 mM; $P < 0.001$) after single dose C8 MCT oil (Figure 4).

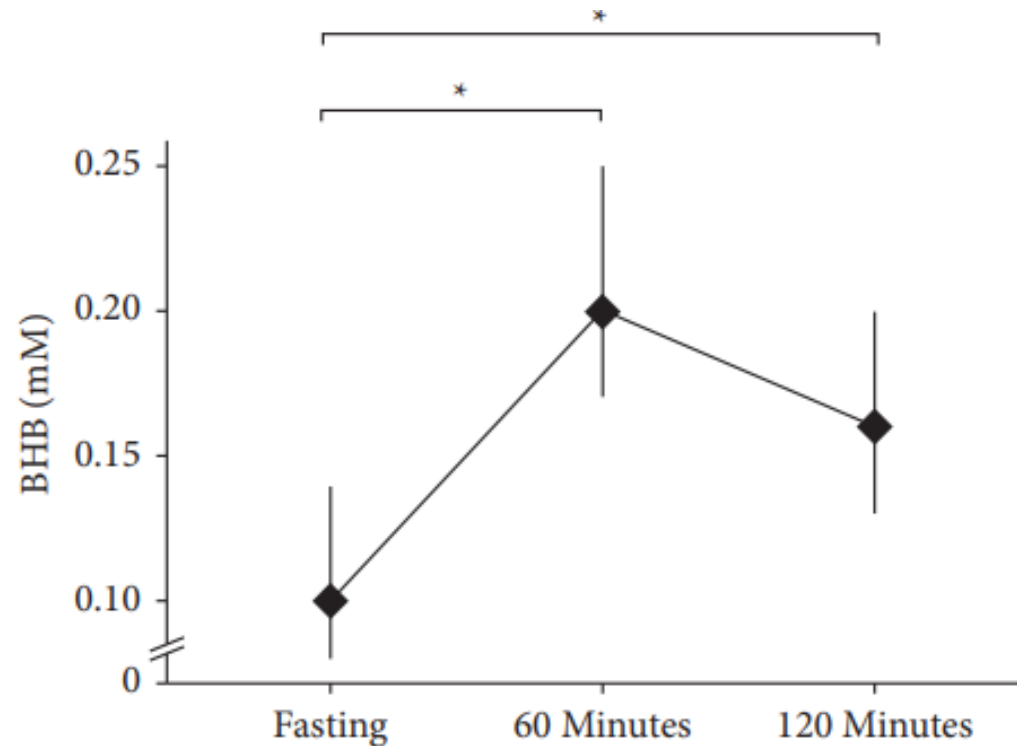


FIGURE 4: Beta-hydroxybutyrate (β HB) measured from capillary blood. β HB measured at fasting, and 60, and 120 minutes after one dose of C8 MCT oil throughout the 14-day trial. Data are estimated marginal means from a linear mixed effects model plotted with a 95% confidence interval. β HB was significantly higher at 60 and 120 minutes compared to fasting values. * $P < 0.05$; $N = 15$.

3.7 Results: Gastrointestinal Distress Scores

- GI distress scores for belching, bloating, cramping, nausea, and urge to vomit were assessed 60- and 120 min on 4 days.
- There were a wide range of scores with some participants reporting no symptoms (scores of 0) and some reporting severe symptoms (scores of 5). Median score each for belching, bloating, and cramping was 0 at 60 and 120 min, ranging from 0 to 5 (N = 11).
- Median score each for nausea and urge to vomit was 0 at 60 and 120 min, ranging from 0 to 4 (N = 11).

5 Conclusion

- **Consuming 15 mL C8 MCT oil 2X/d for 14 days in young, healthy individuals induced mild ketosis (elevated BHB), even when diet contained 40 % calories as carbohydrate.**

Comments: Dr Alvin Berger, Co-Founder LifeSense Products-1

- Study was designed to assess effects of our C8 MCT oil on markers of inflammation as a primary endpoint. C8 MCT oils are previously published to be the most potent amongst MCT oil types for increasing blood BHB (better than coconut oils and C8/10 varieties). The authors did not observe changes to inflammatory markers for reasons described in publication text.
- **The authors did however find that consuming a single dose of 15 mL of our C8 MCT oil statistically significantly raised blood BHB from fasting levels, at 60 min (2X increase) and 120 min (1.6 X increase) post ingestion. This represents a rapid increase in BHB that was sustained even after 120 min (longer time points not assessed). A higher dose of MCT oil (30 mL in single or multiple servings) was not evaluated, which may have further increased blood BHB.**
- This increase in BHB indicates C8 MCT oil is efficiently converted to BHB, and the BHB in turn provides benefits such as: energy for brain, muscle, and other organs; and numerous other physiological benefits. Additionally, C8 MCT oil is also efficiently burned for rapid energy without being stored in adipose tissue (not shown presently).

Comments: Dr Alvin Berger, Co-Founder LifeSense Products-2

- Note that the increase in blood plasma BHB was achieved in 15 healthy subjects (6 F, 9 M), 18-30 years of age, normal to overweight (BMI=18.5-29.9 kg/m²). **This represents one subset of customers consuming MCT oil, but “normal” (and non-keto adapted) subjects may not be the most sensitive population to observe increases in BHB following MCT oil consumption.**
- Subjects consumed about 36% energy from carbohydrates, 21% energy from proteins, and 44% energy from fats (including 30 g MCT oil/d). **Thus, increased blood BHB was achieved with a high carb background diet; and may have been greater on a high healthy fat-low carb (Dr. Berger’s HHF-LC) diet, as we encourage our customer to consume.**
- Authors reported some instances of gastrointestinal upset under their experimental conditions. In our experience, we are able to mitigate most or all of this problem with careful adaptation to our C8 MCT oils; having customer consume MCT oils with foods: and providing customized programs for sensitive individuals. MCT oils are consumed globally in diverse populations, and clearly gastrointestinal upset is an issue successfully managed in sensitive individuals.

Comments: Dr Alvin Berger, Co-Founder LifeSense Products-3

- Last, there are many MCT oils sold on Amazon and other platforms. The descriptions of these oils are often inaccurate claiming to be “organic” when they are not; claiming to be “Pharmaceutical grade” when they are not; and claiming to be “100%” C8 MCTs when they are not (these are just some examples). Sometimes even coconut oil is claimed to be an “MCT” oil, when it is not.
- For the above reasons, it **cannot** be assumed that all products sold commercially will generate increases in blood BHB as demonstrated in this clinical trial; and some of the key benefits of MCT oils are derived via their conversion in our bodies to BHB.
- **We are very proud to be the ONLY commercial MCT oil developed by an academically renowned nutritionist and lipid expert, now shown in a formal, peer-reviewed, published clinical trial to increase blood BHB.**