



DAVISCO
FOODS INTERNATIONAL, INC.®

Alpha-lactalbumin – Sleep and Performance

Alpha-lactalbumin is the purest source of bovine alpha-lactalbumin commercially available. **Alpha-lactalbumin** contains a minimum of 90% alpha-lactalbumin, on a protein basis. The typical content of tryptophan in **Alpha-lactalbumin** is 4.8g per 100g of protein, making it the highest natural source of tryptophan available (Table 1).

Table 1. Tryptophan Content for Various Protein Sources

Protein Source	g tryptophan/100g protein
Alpha-lactalbumin	4.8
BiPRO® (Whey Protein Isolate)	2.7
Whey Protein Concentrate 80%	2.1
Human Milk	1.9
Egg White	1.5
Calcium Caseinate	1.3
Sodium Caseinate	1.3
Wheat	1.3
Soy Protein Concentrate	1.3
Whole Egg	1.2
Acid Casein	1.1
Soy Protein Isolate	1.1
Beef	1.1
Turkey	1.1

Source: Genesis R&D Version 7.33

(USDA National Nutrient Database, ingredient manufacturers and reference data)

Application Formulas Available:

- AC 275C Chocolate Ready-to-Drink (RTD) Beverage contains 10g or 20g **Alpha-lactalbumin** per 11 fl oz serving.
- AC 288C High Protein Low pH Beverage contains 43.5g **Alpha-lactalbumin** per 16 fl oz serving.
- AC 288D High Protein Low pH Beverage contains 20g **Alpha-lactalbumin** per 12 fl oz serving.
- AC 277F **Alpha-lactalbumin** Mocha Protein Beverage Mix contains 20g **Alpha-lactalbumin** per 30g serving.
- AC 377C Vanilla Flavored Renal Beverage contains 9g **Alpha-lactalbumin** per 8 fl oz serving.
- AC 269B **Alpha-lactalbumin** Peanut Butter Bar contains 20g **Alpha-lactalbumin** per 71g bar.
- AC 323C **Alpha-lactalbumin** Lemon Crunch Snack Bar contains 20g **Alpha-lactalbumin** per 71g bar.
- For assistance with other application formulas, please contact Davisco Foods International, Inc.

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Evening Intake of Alpha-lactalbumin Increases Plasma Tryptophan Availability and Improves Morning Alertness and Brain Measures of Attention¹

Alpha-lactalbumin has been studied to investigate whether consuming alpha-lactalbumin in the evening may improve morning performance in subjects with sleep complaints.

Abstract

Background: Brain serotonin function is thought to promote sleep regulation and cognitive processes, whereas sleep abnormalities and subsequent behavioral decline are often attributed to deficient brain serotonin activity. Brain uptake of the serotonin precursor tryptophan is dependent on nutrients that influence the availability of tryptophan via a change in the ratio of plasma tryptophan to the sum of the other large neutral amino acids (Trp:LNAA).

Objective: We tested whether evening consumption of alpha-lactalbumin protein with an enriched tryptophan content of 4.8g/100g protein increases plasma Trp:LNAA and improves alertness and performance on the morning after sleep, particularly in subjects with sleep complaints.

Design: Healthy subjects with ($n = 14$) or without ($n = 14$) mild sleep complaints participated in a double-blind, placebo-controlled study. The subjects slept at the laboratory for 2 separate nights so that morning performance could be evaluated after an evening diet containing either tryptophan-rich alpha-lactalbumin (**Alpha-lactalbumin**) or tryptophan-low placebo protein. Evening dietary changes in plasma Trp:LNAA were measured. Behavioral (reaction time and errors) and brain measures of attention were recorded during a continuous performance task.

Results: Evening alpha-lactalbumin intake caused a 130% increase in Trp:LNAA before bedtime ($P=0.0001$) and modestly but significantly reduced sleepiness ($P=0.013$) and improved brain-sustained attention processes ($P=0.002$) the following morning. Only in poor sleepers was this accompanied by improved behavioral performance ($P=0.05$).

Conclusion: Evening dietary increases in plasma tryptophan availability for uptake into the brain enhances sustained alertness early in the morning after an overnight sleep, most likely because of improved sleep.

Reference

¹Markus, C. R., L. M. Jonkman, J. H. C. Lammers, N. E. P. Deutz, M. H. Messer, and N. Rigtering. 2005. Evening Intake of Alpha-lactalbumin Increases Plasma Tryptophan Availability and Improves Morning Alertness and Brain Measures of Attention. *American Journal of Clinical Nutrition* 81: 1026-33.