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Improved sleep outcomes and next-day cognitive function in adults following clinical testing of a powder -based drink containing Mulberry leaf extract and a natural source of Tryptophan

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Sleep requirements change across the lifespan and quality of sleep declines as we age[(1)]. Poor sleep across adulthood has been associated with ramifications on subjective health, quality of life[(2)] and advancement of cognitive decline and dementia[(3)]. Among the modifiable factors that are posited to contribute to sleep quality, diet and nocturnal metabolism are thought to be strong predictors of sleep quality[(4)].

The aim of the current study was to evaluate the effectiveness of nutritional formulation (delivered in a powdered- based drink) containing 0.75 g Mulberry Leaf Extract (0.75g) and a natural source of Tryptophan (120mg) consumed concurrently with an evening-meal (Glycemic load of 55 ± 10%) to promote better sleep and next-day mood and cognitive performance in healthy adult poor sleepers.

The clinical trial was a double-blind, controlled, randomized, 2-arm, sequential groups cross-over design (ClinicalTrials.gov Identifier: NCT05372900). Adult (aged 25–50), self-identified poor sleepers (confirmed by Pittsburg Sleep Quality Index >5 and <85% mean sleep efficiency over 14-days at screening) received standardized meals and concurrent daily intake of the nutritional formulation or placebo approximately 4 hours before bedtime. Intervention phases lasted 14-days with a 28- to 42-day washout period in-between. Primary outcomes were Sleep Efficiency (SE) and Sleep Onset Latency (SOL) measured by actigraphy. Secondary outcomes included inter alia: mood (Brief Mood Introspection Scale), sleep quality (Karolinska Sleepiness Scale) and objective cognitive performance measures (Psychomotor Vigilance Task, 2-back task, NASA Task Load Index) taken at breakfast, lunch and dinner time (1–1.5- hours, 6- and 12-hours post-wake respectively).

Linear mixed model analysis was conducted with intention-to-treat, adjusting for baseline and treatment order for sleep, mood, and cognitive outcomes. Consumption of the active treatment resulted a significant improvement in SOL (actigraphy= -3.48 mins, $p = .026$; self- report =−16.7mins, $p = .031$) compared to control. There was no significant effect on SE ($p = .230$). Sleep and mood self-report measures showed that participants felt significantly less sleepy ($p = .041$) and more aroused ($p = .026$) the next morning. Interestingly, cognitive performance was improved on several tests throughout the next day at breakfast, lunch and dinner assessment points: For psychomotor vigilance, reaction time ($p = .598$, $p = .051$, $p= .024$ respectively) and number of lapses, where lapses are characterized as those made within 698 ms (2x median reaction time for the cohort) showed significant improvement ($p = .027$, $p = .005$, $p = .004$ respectively). Participants also reported actively feeling these performance improvements (performance dimension of NASA TLX) following treatment compared to control conditions ($p = .014$, $p = .063$, $p = .010$, respectively).Our findings demonstrate that sleep onset, quality and next day cognitive performance can be ameliorated by a daily dinner time supplemental nutritional intervention and may represent a convenient strategy to support the betterment of sleep and mood and cognitive benefits in adult populations.

References

1. Madrid-Valero JJ, Martínez-Selva JM, Couto BRD *et al.* (2017) *Gac sanit* **31**, 18–22.
2. Magee CA, Caputi P & Iverson DC (2011) *Sleep med* **12**(4), 346–50.
3. Hudon C, Escudier F, De Roy J, *et al.* (2020) *Neuropsychol Rev* **30**, 558–79.
4. St-Onge MP, Mikic A & Pietrolungo CE (2016) *Adva nutr* **7**(5), 938–49.