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File: ■ Bacopa (*Bacopa monnieri*)
■ Cognitive Performance
■ Cardiovascular Activity

HC 021355-474

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RE: An Acute 320-mg Dose of Bacopa Improves Cognitive Performance

Downey LA, Kean J, Nemeh F, et al. An acute, double-blind, placebo-controlled crossover study of 320 mg and 640 mg doses of a special extract of *Bacopa monnieri* (CDRI 08) on sustained cognitive performance. *Phytother Res*. December 19, 2012; [epub ahead of print]. doi: 10.1002/ptr.4864.

In Ayurvedic medicine, Brahmi or bacopa (BM; *Bacopa monnieri* syn. *B. monnieria*) is a valued memory-enhancing, anti-amnesic, anxiolytic, sedative, and anti-epileptic treatment. In vitro and in vivo studies have provided evidence suggesting several possible mechanisms for these effects; and over a dozen clinical trials have confirmed the positive effects of BM on learning, memory, information processing speed, and anxiety, as well as its antidepressant and cardiovascular effects. However, the majority of clinical trials have investigated the effects of chronic BM treatment; to date only 1 study has assessed its acute nootropic or cognitive-enhancing effects. The purpose of this double-blind, placebo-controlled, crossover study was to evaluate the effects of 2 dosage levels of BM on mood, cardiovascular activity, and cognitive performance.

Healthy volunteers (n = 24; aged 18-56 years, with a body mass index of 15.4-32.7 kg/m^2) participated in this study conducted in Australia. Pre-screening exclusion criteria were as follows: smoking; any history of psychiatric disorders or neurological diseases; endocrine, gastrointestinal, or bleeding disorders; chronic illness and infection; pregnancy or lactation; and taking any medications or herbal supplements.

Subjects received a single acute dose of placebo (4 x 160 mg capsules of inert plant-based materials), 320 mg of BM, and 640 mg of BM (KeenMind® [CDRI 08]; Flordis; St. Leonards, NSW, Australia) in a 3-arm crossover design. Each treatment was separated by a 1-week washout period. The 50% ethanol BM extract was prepared from stems, leaves, and roots of a cultured variety of BM collected from West Bengal and standardized to 55% total bacosides.

Each subject attended 4 sessions; 1 practice visit and 3 study visits. On each study visit, tests were conducted prior to the acute dose (baseline) and then 2 hours after dosing. The tests included a cognitive demand battery (CDB) and assessments of blood

pressure, arterial stiffness, and cerebral blood flow. The CDB was comprised of a subjective assessment of stress and mental fatigue on a visual analogue scale (VAS), Serial 3s and Serial 7s subtraction tests (counting backwards from a given number by 3s or 7s), and the Bakan Rapid Visual Information Processing task (identifying 3 consecutive series of odd or even numbers in a random series, evaluated for both accuracy and reaction time). Each CDB took 10 minutes and was conducted 7 times per visit; 1 test before ingestion of the study medication and then 6 continuous tests starting 2 hours after ingestion.

Compared with placebo, 320 mg of BM significantly improved performance of the Serial 3s subtraction test at the first ($P = 0.05$) and fourth repetition ($P = 0.02$). For all groups, there was a significant improvement over time on the Serial 3s test ($P < 0.001$). There were no other significant findings for the Serial 3s test.

For the Serial 7s subtraction test, the only significant change was an improved performance of the 640 mg dose of BM compared with the 320 mg dose at the first repetition ($P < 0.05$). For all groups, there was a significant improvement over time on the Serial 7s test ($P < 0.001$).

There were no significant changes in the Bakan Rapid Visual Information Processing task. The CDB significantly increased the subjective ratings of stress and fatigue ($P < 0.01$); none of the treatments attenuated these effects. There were no significant changes in the cardiovascular assessments. No adverse events occurred.

The authors hypothesize that greater cognitive enhancement could have occurred prior to the 2-hour post-treatment assessment, which may explain why the improvements took place during the earliest repetitions. The authors conclude that the acute nootropic effect of BM may be limited to early windows of activity (i.e., < 2 hours post-dosing).

It cannot be ruled out that any statistical significance may be due to chance, since there were 6 post-dosing tests conducted, and few showed any alterations. Another point to consider is that not all extracts are created equally, and other BM extracts may behave differently in this paradigm.

—Heather S. Oliff, PhD

The American Botanical Council has chosen not to reprint the original article.