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The possible effects of cinnamon on memory and learning

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Cinnamon, the well-known aromatic spice that many of us use to bake cakes and cook savory dishes, is derived from the inner bark of Cinnamomum trees. These are evergreen trees found in the Himalayas and other mountain areas, as well as in rainforests and other forests in southern China, India and Southeast Asia.

In addition to its unique flavor, cinnamon could have other beneficial properties for humans. For instance, studies suggest that cinnamon has anti-inflammatory, antioxidant, and anticancer properties, and can also boost the immune system.

Some works also showed that its bioactive compounds could boost brain function, particularly memory and learning. Yet the validity of these findings is yet to be established with certainty.

A team of researchers at Birjand University of Medical Sciences in Iran recently reviewed several past studies exploring the effects of cinnamon on cognitive functions. Their analysis, outlined in *Nutritional Neuroscience*, highlights the potential value of cinnamon for preventing or reducing memory or learning impairments.

"This study aimed to systematically review studies about the relationship between cinnamon and its key components in memory and learning," Samaneh Nakhaee, Alireza Kooshki and their colleagues wrote in their paper. "Two thousand six hundred five studies were collected from different databases in September 2021 and went under investigation for

eligibility. Forty studies met our criteria and were included in this systematic review."

Nakhaee, Kooshki and their colleagues reviewed hundreds of studies stored in several online research databases, including PubMed, Scopus, Google Scholar and Web of Science. They then narrowed down their analysis to 40 of these studies, those that were most pertinent to their topic of interest.

Among these 40 studies, 33 were carried out in vivo (i.e., examining real living organisms, such as humans, rodents, or other animals). Five of them were conducted in vitro (i.e., outside of living organisms, for instance by analyzing cells or post-mortem tissue), and two were clinical studies (i.e., with medical patients).

The researchers extracted data relevant to all these studies, including their author, year of publication, compound or type of cinnamon used, the study population and sample sizes, doses of cinnamon or its bioactive components used, gender and age of participants, duration and method of consumption, and the results obtained. They then assessed the quality and reliability of the studies looking at their design, sample size, inclusion criteria, and other methodological aspects.

Finally, they analyzed and compared the results of the 40 relevant articles they selected. Overall, most of the studies they looked at suggested that cinnamon could positively impact both memory and cognitive function.

"In vivo studies showed that using cinnamon or its components, such as eugenol, cinnamaldehyde, and cinnamic acid, could positively alter cognitive function," Nakhaee, Kooshki and their colleagues wrote in their paper. "In vitro studies also showed that adding cinnamon or cinnamaldehyde to a cell medium can reduce tau aggregation, Amyloid β

and increase cell viability."

Out of the two clinical studies analyzed by the researchers, one was conducted on adolescents and the other on pre-diabetic adults who were 60 years old or younger. The first study asked the adolescents to chew cinnamon gum, while the latter asked participants to eat 2g of cinnamon on white bread.

The study on adolescents yielded positive results, suggesting that chewing cinnamon gum improved memory function and reduced anxiety. In contrast, the clinical study on pre-diabetic adults found no significant changes in cognitive function following the consumption of cinnamon.

"Most studies reported that cinnamon might be useful for preventing and reducing cognitive function impairment," the researchers wrote in their paper. "It can be used as an adjuvant in the treatment of related diseases. However, more studies need to be done on this subject."

Overall, the systematic review paper by Nakhaee, Kooshki and their colleagues suggests that cinnamon and some of its active components could have positive effects on the functioning of the human brain, boosting memory and learning. In the future, this review could inspire other teams of researchers to further examine the impact of cinnamon on the brain, which could potentially promote its use to preserve brain function and slow down cognitive impairment.

More information: Samaneh Nakhaee et al, Cinnamon and cognitive function: a systematic review of preclinical and clinical studies, *Nutritional Neuroscience* (2023). DOI: 10.1080/1028415X.2023.2166436