Inhibitory effect of curcuminoids on acetylcholinesterase activity and attenuation of scopolamine-induced amnesia may explain medicinal use of turmeric in Alzheimer's disease

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Alzheimer's disease (AD) is a progressive neurodegenerative disease with progressive loss in memory characterized by the deposition of the senile plaques mainly composed of β-amyloid (Aβ) fragment and neurofibrillary tangles. Very few treatment options are available in spite of enormous research, thus demand for newer drugs is higher. Medicinal plants have started gaining importance now due to their potential role in protection against dementia.

Traditionally turmeric has been known for its role in wound healing, inflammation, asthma, epilepsy, gall bladder stones, abdominal cramps, high cholesterol, congestion and AD. However, exact mechanism of action in most disorders, including AD is yet to be ascertained.

There are some evidences showing that consuming turmeric in curry form is associated with better cognitive function, particularly in old age; but there is lack of scientific evidence supporting the use of turmeric in AD.

Objective:

To evaluate whether curcuminoids possess acetylcholinesterase (AChE) inhibitory and memory enhancing activities.

Study Design:

- *In vitro* AChE activity was conducted by using modified Ellman's method
- *Ex vivo* AChE activity was carried out in different regions of the rat brain
- Behavioral study involved Morris water maze test as described previously by Morris (1984)

Results and Discussion:

- Curcuminoids showed a dose-dependent *in vitro* AChE activity inhibition with an IC_{50} value of 19.67 µM
- Curcuminoids also showed *ex vivo* AChE activity inhibition at the doses of 3 and 10 mg/kg in the frontal cortex as well as in hippocampus
- A significant reversal ($p<0.001$) in scopolamine-induced dementia was evidenced with Curcuminoids mixture or the individual components (10 mg/kg), with no clear difference in activity amongst all the test compounds ($p<0.05$)
- This clearly indicated that all compounds possessed comparable memory enhancing effect in this model

Conclusion:

Curcuminoids mixture was found to be exhibiting a wide range of pharmacological activities beneficial for AD, and thus may be considered as a potential therapeutic option.