



# STUDY ON THE MEMORY ENHANCING ACTIVITY OF TRADITIONAL NUTRACEUTICAL BEVERAGE OF TAMIL NADU- “SUKKU MALLI COFFEE”

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## Abstract:

This study was aimed at the determination of memory enhancing activity of traditional nutraceutical beverage of Tamil Nadu- “Sukku malli coffee”. Sukku malli coffee is a herbal decoction containing dry ginger, coriander seeds and black pepper. Sukku malli coffee also helps in the treatment of common cold, throat pain, cough, nasal congestion and head ache. It helps to cure indigestion and eliminates toxins from the body. Memory enhancing activity of Sukku malli coffee has been determined by using digit letter substitution test method. Digit letter substitution test is conducted using a data sheet. The parameters observed during this test are total number of letters, number of attempts, number of not attempts, number of correct attempts, number of wrong attempts, percentage of error and percentage of

accuracy. In this study the test is performed by using 14 members, before and after consumption of Sukku malli coffee and found that memory enhanced after consumption of this decoction. From the results of experiment, it is clear that sukku malli coffee have the CNS stimulant property.

**Key words:** Memory enhancing activity, Sukku malli coffee, Dry ginger, Coriander, Black pepper, Digit letter substitution test.

### **Introduction:**

Most of the herbal extracts have been used in traditional medicine for the treatment of several disorders such as wounds, obesity, diabetes, stomach ulcer, rheumatoid arthritis including neurological diseases. For better maintenance of health and prevention of diseases, traditional medicines have a prolonged effect particularly for the treatment of chronic diseases. Traditional medicines utilizing medicinal plants and plant extracts have been practiced for centuries as similar to modern western medicine. In South America, Africa and Asia, 60% of seed plants are used for medicinal purposes. The major difference between the traditional medicinal plant system and novel drug development is, traditional medicinal plant system is based on social, ritual and traditional or cultural continuity and practical observed findings, whereas research associated strategies and scientific validation in preclinical and clinical trials is the foundation for novel drug developmental process<sup>[1, 2]</sup>.

Medicinal plants also target the central nervous system. Both G-protein coupled receptors (GPCRs) and ion channels play important role in the central nervous system. There are various studies demonstrating direct effect of plant extracts or their molecules on GPCRs and ion channels in the CNS, this makes attractive targets for drug development in parallel to conventional drug moieties<sup>[3,4]</sup>. Memory is the potential of a person to recollect the events and information happened in their life. This ability differentiates human beings from other animals. Natural remedies have long been used to enhance memory in humans. In Indian system of medicine, Ayurveda is the India's traditional health care system has a treasury of memory enhancing drugs. In today's fast paced, competitive and stressful world, forgetfulness and difficulty in remembering are the major problems.

Memory enhancing agents are also known as “Nootropic” or “smart drug” or “brain booster”.

Nootropic herbs: These herbs are acting on the brain, it enhances the memory and increases the blood circulation in the brain also improves the mental functions such as memory, attention and concentration.

According to Indian system of Medicine,

Intelligence = Power of Acquisition + Power of Retention + Power of Recollection

#### Power of Acquisition

It is the ability to understand or to catch or grasp something new.

#### Power of Retention

It deals with the short term memory. It is the ability to retain what has been understood or grasped.

#### Power of Recollection

It deals with long term memory. It is the ability to remember or recall the past things.

Mental exercises improve memory where as good nutrition and drug therapy improves mental health and increase blood flow to the brain [5,6].

In Ayurveda, certain herbs are used to improves intellection and retention such herbs are known as Medhya herbs. Herbal formulations of these herbs also have learning and memory enhancing activity [8].

#### **List of memory enhancing herbs:**

- *Bacopa monniera* (Brahmi) [Scrophulariaceae]
- *Zingiber officinalis* (Ginger) [Zingiberaceae]
- *Ginkgo biloba* (Ginkgo) [Ginkgoaceae]
- *Withania somnifera* (Ashwagandha) [Solanaceae]
- *Emblica officinalis* (Indian gooseberry) [Euphorbiaceae]
- *Coriandrum sativum L* (Coriander) [Apiaceae]

- *Celastrus paniculatus* [Celastraceae]
- *Rhodiola rosea* (Golden root) [Crassulaceae]
- *Piper nigrum* (Black pepper) [Piperaceae]
- *Rosmarinus officinalis* (Rosemary) [Lamiaceae]
- *Melissa officinalis* (Lemon balm) [Lamiaceae]
- *Centella asiatica* (Gotu kola) [Umbelliferae]
- *Mentha spicata* (Spearmint) [Lamiaceae]
- *Acorus calamus* (Sweet flag) [Acoraceae]
- *Tinospora cordifolia* (Guduchi) [Menispermaceae]
- *Foeniculum vulgare* (Fennel) [Umbelliferae] <sup>[7,9]</sup>

### **Sukku (Dry Ginger)**

*Zingiber officinale* [Family: Zingiberaceae] – rhizomes possess potent memory enhancement in scopolamine induced memory impairment by significantly increasing whole brain acetyl cholinesterase inhibition action. *Zingiber officinale* improves learning and memory.

Active constituents present are gingerols, shogaols, paradols, quercetin, zingerone, gingerenone-A and 6-dehydrogingerdione.

Pharmacological activities are anti-inflammatory, anti-oxidant, anti-emetic, anti-lipidemia, anti-arthritis, memory enhancement and protects against brain damage. The cognitive enhancing effect and neuroprotective effect of ginger is partly due to its anti-oxidant activity <sup>[10-16]</sup>.

### **Malli (Coriander)**

Coriander (*Coriandrum sativum L*) a member of the Apiaceae family, is one of the most widely used medicinal plant, showing nutritional as well as medicinal activities.

Coriander seed and herb essential oil have been actively investigated for their chemical composition and biological activities including anti-microbial, anti-oxidant, hypoglycemic, hypolipidemic, anxiolytic, anti-depressive, analgesic, anti-inflammatory, learning and memory improving, neuroprotective and anti-convulsant properties [17].

Active constituents present are essential oils, linalool, linoleic acid, geraniol, terpinen-4-ol,  $\alpha$ -terpineol, camphor, geranyl acetate and  $\gamma$ -terpinene.

Linalool has neuropharmacological and anti-Alzheimer's disease activities [18].

### **Black pepper**

Black pepper (*Piper nigrum*) is a flowering vine belonging to the family Piperaceae.

Active constituents present are Piperine, piperanine, piperylene, piperdardine, piperettine, alkaloids-chavicine, amides, phenols and flavonoids.

Pharmacological activities are anti-oxidant, anti-inflammatory, anti-mutagenic, anti-apoptotic, anti-tumor, anti-depressant, anti-genotoxic, anti-arthritis, antifungal, gastro protective and immunomodulatory activities [19,20].

Chavicine is an alkaloid present in black pepper which has memory enhancing activity. It improves memory in Aluminium chloride (AlCl<sub>3</sub>) induced neurotoxicity mouse models. Aluminium chloride is a neurotoxic agent which causes the oxidative stress [21].

### **Major Health Benefits of Sukku Malli coffee:**

1. It aids digestion process
2. As dry ginger is one of the ingredients, it provides relief from common cold, fever and body pain.
3. It removes toxins from the body, if consumed daily.
4. It solves liver related problems. Those who suffer from liver disease can take this Sukku malli coffee.
5. Drinking this Sukku malli coffee everyday instead of tea/coffee reduces the belly fat.



**MATERIALS AND METHODS:****Ingredients:**

Dry ginger powder - 5gm

Coriander - 5gm

Pepper powder - ¼ tea spoon

Jaggery - quantity sufficient

Water - 325 ml

**Methods of preparation:**

1. Water is boiled in a bowl.
2. A teaspoon of dry ginger powder, coriander powder and pepper powder were added to the boiling water and boiled until all the ingredients are extracted.
3. Powdered jaggery is added then mixed.
4. Allowed to boil for 4-5 minutes in medium flame.
5. Strained through a metal strainer and served hot.

**Direction for use:**

It is always good to have the Sukku malli coffee hot.

**Experimental studies:**

“Digit letter substitution test for memory enhancing”

- Participants of this study consist of 14 members from college of Pharmacy.
- All participants were speaker of English aged between 19-25 years.

- Digit letter substitution test was administered as a part of cognitive capabilities of human using recognize word during reading.
- The test was conducted twice:
  - ✓ Before drinking Sukku malli coffee
  - ✓ After drinking Sukku malli coffee
- The data sheets were given to participants.
- The data sheets presents the substitution key on the top of the page
- The key shows the numbers, which are all paired with a different letter or digit.
- The substitution test items are printed beneath the key.
- The participants were instructed to fill down the appropriate digits/letters in the blank spaces under the digits within the given time.
- Score was calculated based on the parameters,
  - Total number of letters
  - Number of attempts
  - Number of no attempts
  - Number of correct attempts
  - Number of wrong attempts
  - Percentage of error
  - Percentage of accuracy

### Calculation:

Percentage of error:

$$= (\text{Number of wrong attempts} / \text{Total number of attempts}) \times 100$$

Percentage of accuracy:

$$= (\text{Number of correct attempts} / \text{Total number of attempts}) \times 100$$

**Instruction of the test:**

1. Substitute the digits with corresponding letters/numbers as per the given key.
2. Substitute as many as possible within the given time.
3. Start and stop only when told

**OBSERVATION:**

Calculation of the Percentage of error & Percentage of accuracy for each data sheet

Table 1: Before Sukku Malli Coffee administration

*Sl. no	Total Number of Letters	Number of no attempts	Number of wrong attempts	Number of correct attempts	Percentage of error	Percentage of accuracy
1	42	24	-	18	0%	42.85%
2	42	23	-	19	0%	45%
3	42	18	-	24	0%	57.14%
4	42	18	-	24	0%	57.14%
5	42	14	-	28	0%	66.7%
6	42	14	-	28	0%	66.66%
7	42	11	-	31	0%	73.8%
8	42	10	-	32	0%	76.1%
9	42	8	-	34	0%	80.95%
10	42	7	-	35	0%	83.33%
11	42	7	-	35	0%	83.33%
12	42	7	-	35	0%	83.8%
13	42	6	-	36	0%	85.71%
14	42	6	-	36	0%	85.71%



\*Sl.no indicates number of individuals

Table 2: After Sukku Malli Coffee Administration

Sl.no	Total number of letters	Number of no attempts	Number of wrong attempts	Number of correct attempts	Percentage of error	Percentage of accuracy
1	42	17	-	25	0%	59.52%
2	42	9	-	33	0%	78.57%
3	42	5	-	37	0%	88.09%
4	42	2	-	40	0%	95.23%
5	42	2	-	40	0%	95.23%
6	42	1	-	41	0%	97.61%
7	42	-	1	41	2.38%	97.61%
8	42	1	-	41	0%	97.61%
9	42	-	-	42	0%	100%
10	42	-	-	42	0%	100%
11	42	-	-	42	0%	100%
12	42	-	-	42	0%	100%
13	42	-	-	42	0%	100%
14	42	-	-	42	0%	100%

## RESULTS AND DISCUSSION:

In this present study, the memory enhancing action of traditional nutraceutical beverages of Tamil Nadu Sukku malli coffee was assessed by using recognize data sheets during reading.

### Before drinking Sukku malli coffee:

The percentage of accuracy was found to be 42.85%, 45%, 57.14%, 57.14%, 66.66%, 66.7%, 73.8%, 76.1%, 80.95%, 83.33%, 83.33%, 83.8%, 85.71% and 85.71%.

The percentage of error was found to be zero percent for all.

### After drinking Sukku malli coffee:

The percentage of accuracy was found to be 59.52%, 78.57%, 88.09%, 95.23%, 95.23%, 97.61%, 97.61%, 97.61%, 100%, 100%, 100%, 100%, 100% and 100%.

The percentage of error was found to be 2.38% for one number.

From this it was observed that, after drinking Sukku malli coffee the percentage of accuracy was increased more than before drinking Sukku malli coffee.

## CONCLUSION:

From the above result it was observed that, the accuracy was increased after drinking Sukku malli coffee. Therefore sukku malli coffee enhanced the memory power of participants. It produces a short term memory within a few minutes after drinking Sukku malli coffee.

In addition it gives a great relief to coughing, common cold, throat pain, nasal congestion and headache. It helps to cure the indigestion and eliminates toxins from the body.

Now a days sukku malli coffee which increases the memory power is not known by many people but in future we hope it may be used to improve the memory power for many human beings.

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