

# Phytochemical study of ingredients of *Nagaradi Yoga*

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## Abstract:

**Introduction:** *Nagaradi Yoga* indicated in Childhood *Atisara* (diarrhea). It is well described in *Vrindmadhava*, *Chakradatta* and *Bhaishjya-Ratnavali* under *Balarogadhikar*. It contains five ingredients, *Nagar* (*Zingiber officinale*), *Aitvisha* (*Aconitum heterophyllum*), *Mustaka* (*Cyperus rotundus*), *Indrayava* (*Holarrhena antidysenterica*) and *Balaka* (*Pavonia odorata*). In this study, the attempt was made to detect the presence of various phenolic compound in ingredient of methanolic as well as aqueous extracts of *Nagaradi Yoga*. **Materials and Methods:** By using HP-TLC to detect the presence of phenolic compound in alcoholic as well as aqueous extract of different ingredient of *Nagaradi Yoga*. **Result:** *Alcoholic as well as aqueous extract of all ingredient of Nagaradi Yaga contains Gallic acid.* **Conclusion:** In this present phytochemical study, alcoholic as well as aqueous extract of all ingredients of *Nagaradi Yoga* contains Gallic acid as a phenolic compound. Gallic acid have antimicrobial as well as anti-diarrheal property, so it can be used in diarrhea (*Atisara*).

**Key words:** *Atisara*, Diarrhea, Gallic acid, *Nagaradi Yoga*, Phenolic compound, Phytochemical study etc.

## Introduction:

*Nagaradi Yoga* is an ayurvedic drug. It is described in *Vrindmadhava*<sup>1</sup>, *Chakradatta*<sup>2</sup> and *Bhaishjya-Ratnavali*<sup>3</sup> under *Balarogadhikar*. It's decoction indicated in Childhood *Atisara* (diarrhea). *Nagaradi yoga* have five ingredients, *Nagar* (*Zingiber officinale*), *Aitvisha* (*Aconitum heterophyllum*), *Mustaka* (*Cyperus rotundus*), *Indrayava* (*Holarrhena antidysenterica*) and *Balaka* (*Pavonia odorata*). In this present study we detect the presence of phenolic compound (Gallic acid) as aqueous extract of ingredient of *Nagaradi Yaga*. Gallic acid in Alcoholic extract is a secondary polyphenolic metabolite of plant<sup>4</sup>. It is a natural antioxidant so it prevent oxidative damage by scavenging the reactive oxygen species. Gallic acid have anti-microbial, anti-fungal, anti-inflammatory<sup>5</sup> and anti-diarrheal property. It also have anti-cancer<sup>6</sup>, anti-hyperlipidemic, anti-

hypertensive and anti-diabetic property. Presence of anti-microbial and anti-diarrheal property of Gallic acid in all ingredient of *Nagaradi yoga*, suggest that it may be used in childhood *Atisara* (diarrhea).

## Materials and methods:

### Plant Materials:

Dried rhizomes of *Nagar* (*Zingiber officinale*), *Aitvisha* (*Aconitum heterophyllum*), *Mustaka* (*Cyperus rotundus*), dried seed of *Indrayava* (*Holarrhena antidysenterica*) and dried whole plants (*panchanga*) of *Balaka* (*Pavonia odorata*) were collected from Haridwar, Uttarakhand. All dry drug sample was identified and authenticated by the Professor N. K. Dubey, department of Botany, BHU, Varanasi, with their voucher specimen number given below:

1. ***Zingiber officinale* Roscoe** (Voucher specimen no. Zingiber, 2018/2)
2. ***Aconitum heterophyllum* Wall. ex Royel** (Voucher specimen no. Ranunculus, 2018/1)
3. ***Cyperus rotundus* L.-** (Voucher specimen no. Cypera, 2018/1)
4. ***Holarrhena antidysenterica* (Roth) Wall. ex A.DC.** (Voucher sp. Apocyna. no. 2018/1)
5. ***Pavonia odorata* Willd.** (Voucher specimen no. Malva. 2018/1)

### Preparation of Extracts:

Dry extract of each research drug (ingredient of *Nagaradi yoga*) was extracted in Dravyaguna departmental laboratory, faculty of Ayurveda, IMS BHU. Alcoholic (Methanolic) as well as aqueous extract of each research drug was extracted by Soxhlet operates, under the supervision of Prof. K. N. Dwivedi. The dry extract of each research drug was collected in different sterile beaker and stored at 4<sup>0</sup>C temperature.

### HP-TLC Machine and their setup condition:

HP-TLC of Alcoholic (Methanolic) and Aqueous extract of research drug was done by CAMAG Linomat-5 TLC Scanner Instrument. Mobile phase used in this process in ratio of Ethyl acetate: Toluene: Acetone (4.5:4:0.5). Methanol used as sample solvent, dosage speed is 150nl/s and pre-dosage volume is 0.2µl. Application position 8.0 mm, Scanning speed of instrument is 20 mm/s. In this instrument wavelength used for scanning is 254 nm. Lamp D2 & W, Slit dimensions of instrument is 4.00 x 0.30 mm and data resolution 100µm/step. Mode of measurement is Absorption and dryer is used as drying device and temperature of the setup is 60 °C.

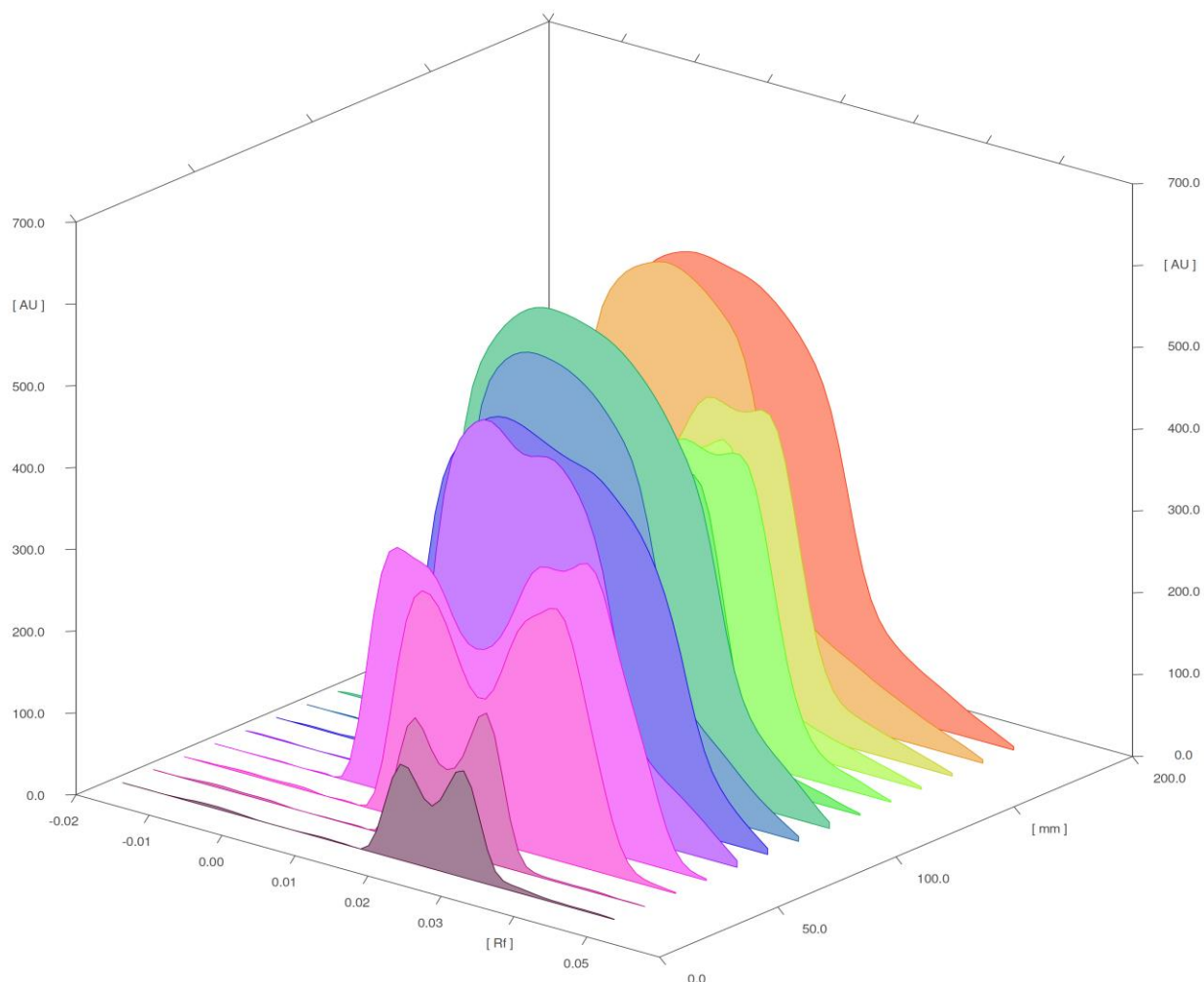


Fig. No. 1: HP-TLC graph plate showing the presence of Gallic Acid (scanned at 254 nm) in alcoholic (methanolic) as well as aqueous extract of all ingredient of *Nagaradi Yoga*.

**Table No. 1: Phytochemical study result of Alcoholic extract:**

Sr. No.	Alcoholic extract	Phenolic compound
1.	<i>Nagar</i>	Gallic acid
2.	<i>Ativisha</i>	Gallic acid
3.	<i>Mustaka</i>	Gallic acid
4.	<i>Indrayava</i>	Gallic acid
5.	<i>Balaka</i>	Gallic acid

**Table No. 2: Phytochemical study result of Aqueous extract:**

Sr. No.	Aqueous extract	Phenolic compound
1.	<i>Nagar</i>	Gallic acid
2.	<i>Ativisha</i>	Gallic acid
3.	<i>Mustaka</i>	Gallic acid
4..	<i>Indrayava</i>	Gallic acid
5.	<i>Balaka</i>	Gallic acid

**Result:**

This study showed that all ingredients of *Nagaradi yoga*, alcoholic (methanolic) as well as aqueous extract contains Gallic acid as a phenolic compound (fig. No. 1) and (Table No. 1 & 2).

**Dicussion:**

Study showed that alcoholic (methanolic) as well as aqueous extract of research drug (*Nagar, Ativisha, Mustaka, Indrayava and Balaka*) contains Gallic acid. Gallic acid a phenolic compound also known as 3, 4, 5- trihydroxy benzoic acid. Gallic acid can be used to treat gastroenteritis. Gallic acid alters the charge and permeability of plasma membrane of bacteria. So the hydrophobicity of plasma membrane is changed and results in formation of local pores in plasma membrane, which leading to cause the death of microbes or bacteria. Gallic acid also implicated as antimicrobial, antimutagenic, anticarcinogenic, antiangiogenic and anti-inflammatory agents.<sup>7</sup>

**Conclusion:**

In present phytochemical study of ingredients of *Nagaradi Yoga*, alcoholic as well as aqueous extract of all ingredients of *Nagaradi Yoga* contains Gallic acid as a phenolic compound. Gallic acid have antimicrobial as well as anti-diarrheal property, so it can be used in diarrhea (*Atisara*).

**References:**

1. Vrindamadhava or Siddhyoga Edited & Translated by Dr. (Km.) Premvati Tewari and Dr. Asha Kumari, Chaukhambha Vishvabharati, Varanasi, Part – II, 1st Edition 2006, Siddha Yoga 66 / 23, P- 849.
2. Chakradatta “Vaidha Prabha” Hindi Commentary by Indradeva Tripathi, Edited by Prof. Ramanath Dwivedi, Chaukhambha Sanskrita Bhawan Varanasi, Reprint 2010, Balroga Chi. 64/ 33, P-396
3. Bhaisajya Ratnavali, of Govinda das Sen, Edited & Enlarged by Shri Brahmshankar Mishra ‘Vidyotini’ Hindi commentary by Shri Ambikadatta Shastri, Chaukhambha Sanskrit Sansthan, Varanasi, Vol. III, 1<sup>st</sup> Edition-2006, Balrogadhikar 71 / 52, P- 435
4. Anand A. zanwar et. al., Polyphenol in Human and Disease, Science Direct journal, 2014, Vol. 2, chapter 80, Role of Gallic acid in Cardiovascular Disorder, P-1045-1047
5. Elain Cruz Rosas et. al., Bioactive food as Dietary interventions for arthritis and related inflammatory Disease, Science Direct journal, 2019, , chapter 28, P- 489-505.
6. Renata Nowak et. al., Polyphenol in Human and Disease, Science Direct journal, 2014, Vol. 2, chapter 97, Plant Polyphenol as Chemo-preventive Agents, P-1289-1307.
7. Pradhan AK, An Effective Bioactive microbial compound against gastroenteritis is Gallic Acid. J Biomol Res Ther, 2018, 7: e157.