

The Analgesic Effects Of Ginger-Juice (Zingiber Officinale Roscoe) On Wistar Albino Rat

S.S.Prasad*, R.R.Pathak**, Anupama Desai***, S.K.Vajpeyee****, V.H. Bhavsar*****

*Associate Professor, Department of pharmacology, GMERS Medical College, Gandhinagar, -382012, Gujarat, India, **Associate Professor, GMERS Medical College, Dharpur, Patan, Gujarat, ***Associate Professor, Department of Pharmacology, SMIMER, Surat, **** Professor & Dean, ***** Professor and HOD, Department of Pharmacology, Govt. Medical College, Surat-395001, Gujarat, India.

Abstracts: **Background:** In the view of contradictory reporting concerning analgesic effect, it was planned to investigate the analgesic effect of ginger-juice (*ZINGIBER OFFICINALE ROSCOE*) on wistar albino rat. **Methodology:** Wistar albino rats (n=6-12) were administered ginger juice (GJ) at doses (4ml/rat, p.o) as single administration (single dose) and repeated dose over a period of 7 days. Effect of treatment with G.J single and repeated (7days) dose was assessed. Parameter used during assessment was licking of paw after placing the rate on analgesiometer heated up to 50°C. **Results:** The single and repeated administration of GJ (4ml/rat,p.o for 7 days) did not indicate analgesic effect on hot plate model. **Conclusion:** administered itself did not show analgesic effect on hot plate model. [Prasad S NJIRM 2015; 6(6):47-50]

Key Words: Ginger-juice, analgesic, hot plate analgesiometer, licking of paw, time lag.

Author for correspondence: Dr. S. S. Prasad, Department of Pharmacology, GMERS Medical College, Gandhinagar – 382012. E- mail: shambhuprasad94@yahoo.com

Introduction: Ginger is cultivated in many tropical countries and is produced all over India from ancient times. It is also a well prized spice and very common ingredient of Indian and Chinese food since the time immemorial. Because of differences in soil composition, climatic conditions, cultivation pattern, harvesting technique and methods of storage or preservation, it's commercial value as well as medicinal actions differ seasonally.

It is identified by different names in the languages of different regions and countries. Locally known as ShunThi (Sanskrit) or Sonth (Hindi), the sun-dried rhizomes of *Zingiber officinale* ROSCOE (family Zingiberaceae) have many medicinal uses ascribed in traditional empirical home remedies as well as established Ayurvedic literature. Outside India, Chinese, Tibetan or even unrelated Tibb (Unani) medicine used it amply. Ginger has been widely used to treat stomachache, nausea, asthma, toothache, gingivitis and arthritis.

It is widely consumed almost all over the world, but in tropical countries or warm regions like Asia, it is more popular (FarshidRayati, 2011).¹ Because of its typical taste and a pleasant odor it's widely used as carminative and flavoring agent in numerous food recipes, beverages, pickles, and many popular soft drinks (Pereira, 2010).²

From the ancient times it is included in many traditional medicinal systems for treatment of number of diseases. It is widely claimed as a Stomachic, aromatic, carminative, aphrodisiacs, diaphoretic,

antiemetic, allergic rhinitis and gastric stimulant and for treating migrane headache. It is also used an antispastic against intestinal colic. Ginger oil is used in mouthwashes and liquors³.

Recent researches revealed that ginger constituents inhibit arachidonic acid metabolism via the cyclooxygenase (COX) and lipooxygenase (LOX) pathways having fewer side effects than conventional NSAIDs and now are being investigated as a novel class of anti-inflammatory compounds.²

Many animal studies have shown that oral dried ginger extract reduced inflammation in paw and joint swelling produced by different chemical agents, lung inflammation induced by lipopolysaccharides (LPS) and arthritis induced by collagen. Clinical studies also support the use of ginger for other chronic inflammatory conditions osteoarthritis³ or even abnormal regeneration reactions of cancers.²

Many varieties of ginger are found such as processed, coated or unscraped, unbleached (natural) and bleached ginger having different types of active principles present in the ginger. Many scientists have investigated the ginger oil and found about 50 constituents, mainly aroma, Starch, Volatile oil, Zingiberene, Gingerol, Oleoresin (Gingerin), Zingiberol, Zingerone, Shagaol etc. The acetone extract of ginger contains Zingerberone and ether extract contain Zingerone (Pungent principles) (Germplasm Resources Information Network, 2015).⁴

Additional to many medicinal properties ascribed to ginger as already quoted³, there are contradictory reports on the analgesic effect. While some reports support the analgesic property (Akram, 2011; Otunola, 2010; van Breemen, 2011)⁵⁻⁷, others downplay it (Umeh, 2013)⁸.

In addition to alleviating pain, ginger extract has been reported to decrease joint swelling. In some of these trials it was reported that ginger relieved pain and swelling to varying degrees in patients with osteoarthritis and rheumatoid arthritis as well as those with muscular pain without causing any adverse effects during a period ranging from 3 months to 2.5 years. The primary aim of this study was to investigate the ability of Ginger-juice as analgesia.

In account of the available literature, we presumed that crude form contains majority of active principles unimpaired, though may be in very low concentrations. We have carried out animal experiments to investigate the effects of GJ on the analgesia.

Material and Methods: A keeping in view the aims and objectives, experiments were planned to study the effects of ginger in different physiological function.

Preparation of GJ:

The commercially available ginger was obtained from the local market and identity was confirmed with botanist. The rhizome of ginger, after cleaning and scrapping the superficial skin, it was cut into small pieces. With the help of mixer-grinder, the pieces were made into a paste. The paste was taken on a white clean cloth and the liquid was squeezed out as GJ. The stock of GJ was kept in a refrigerator for a maximum period of 15 days and the required quantity was used for the experiments after removing particulate matter from it.

500gm ginger rhizomes yielded about 250ml GJ. 250ml GJ was filtered which yielded about 120 - 150ml filtrate. The portion thus obtained looked like yellowish hazy opalescent liquid. It was administered orally in a single dose or repeated dose. The doses were 4 ml per rat in single dose as well as in repeated dose (for 7 days).

To assess the analgesic activity, the rats were divided into following groups, each group consisting of 6 rats.

Control group:

Each rat received 4ml normal saline orally in the morning around 10.00 AM. After 1 hour, rats were placed on hot plate analgesiometer (Temperature 50°C). The analgesic activity was studied on hot plate analgesia meter (Model 39D) IITC NC. Life Science Instrument, USA. Time in second when the rat started licking the paw was noted as the end point.

Test group:

(a) Effect of single dose treatment of GJ:

Each rat received 4ml of GJ orally in the morning around 10.00 AM. After 1 hour rats were placed on hot plate analgesia meter (Temperature 50 degree Celsius). Time lag for licking of paw was noted as described earlier.

(b) Effect of repeated treatment of GJ:

Each rat received GJ 4ml in the morning around 10.00 AM for 7 days. After 24 hours of last dose of GJ rat was placed on hot plate analgesia meter (Tem. 50 degree Celsius) and time lag for licking of paw as recorded. Enhancement of time lag for licking of the paw indicated analgesic activity.

Results:

Analgesic activity:

1. Time of onset of licking paw in various group of rats were as under:

(a) Vehicle treated control group:

The mean onset of licking paw in this group was 14.35 ± 1.51 seconds. The results are expressed in table-1.

(b) Effect of single dose treatment of GJ on analgesic activity in rats.

In GJ treated group, the mean onset of licking paw was 10.00 ± 2.19 seconds. The difference between mean of both groups are not significant statistically as compared to the control group. This reflects that single dose treatment of GJ has no effects on this parameter of analgesic activity. The results are depicted in table-1.

(c) Effect of repeated treatment of GJ (4ml/rat for 7 days) on analgesic activity in rats:

In repeatedly GJ treated group, the mean onset of licking paw was 14.66 ± 1.34 seconds, the difference between mean is not significant statistically. It proves that 7 days treatment of GJ has no effects on this parameter of analgesic activity in rats. The results are shown in table-1.

Results indicate no analgesic or analgesic effect of GJ on single dose and repeated treatment.

Table 1: Value Of Licking Paw In Vehicle Control Group And GJ Treated Group (Single Dose&Repeated).

Parameters	On set of licking paw (sec.)
Control (n=6)	14.35 ± 1.51 seconds*
(GJ 4ml/rat), single dose (n=6)	10.00 ± 2.19 seconds**
(GJ 4ml/rat), repeated (n=6)	14.66 ± 1.34 seconds***

Graphical representation of Table-1

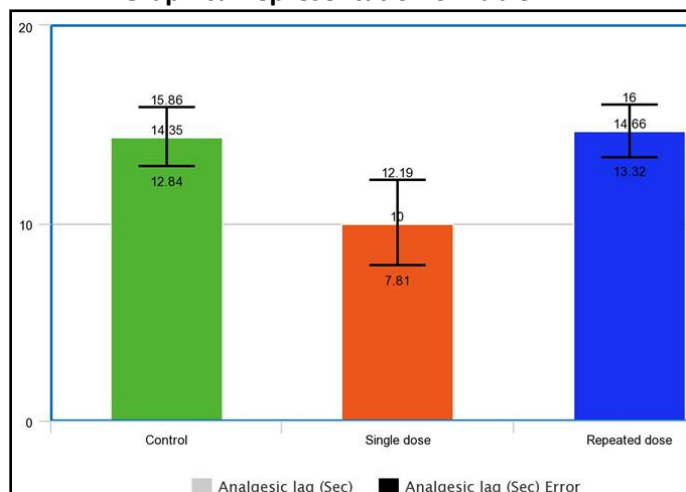


Table 2: Statistical Analysis (Using Unpaired T-Test With 95% Confidence Interval, Two Tailed P-Value And Sed = Standard Error Of Difference; By Online Graphpad)

Comparison	Indices
Control (n=6) versus single dose (n=6)	P <0.8810; CI -1.5771 to 10.2771 ; SED 2.66
Control (n=6) versus repeated dose (n=6)	P <0.1330; CI -4.8082 to 4.1882 ; SED 2.02
single dose (n=6) versus repeated dose (n=6)	P <0.0996; CI -10.3806 to 1.0606 ; SED 2.57

Discussion: Observations in the experimental animals in the present study, with single dose as well as repeated administration of GJ, do not statistically show any consistent analgesic effect on "hot plate" test. The reason of no significant results can be small sample

size or site specific analgesic action of GJ – as shown by benefits in muscle pain (Wilson, 2015; Terry, 2011; Black, 2010)⁹⁻¹¹, dysmenorrhea (Rahmana, 2012)¹² or rheumatoid arthritis (Al-Nahain, 2014)¹³.

Observations on single dose and repeated administration of GJ administered in the present study were in the crude form. Possibility remains that active ingredient separated in acetone extract may be present in a very small quantity in crude form of the GJ used in the present study which may not be enough to exhibit analgesic effects in the present study. Even if we presume enough quantity of anti-arthritis and anti-inflammatory property present in crude form, anti-arthritis and anti-inflammatory effect might have not manifested in the present study because of possibility of presence of other unknown confounders.

Conclusion: Ginger administered itself did not show analgesic effect on hot plate model.

References:

1. FarshidRayati "Anti-inflammatory and analgesic effect of Ginger powder in dental pain model" Clinical Trials.gov, Qazvin university of Medical Sciences, Iran, 4th September, 2011
2. Pereira, M. M., R. Haniadka, P. P. Chacko, P. L. Palatty, and M. S. Baliga. "Zingiber officinale Roscoe (ginger) as an adjuvant in cancer treatment: a review." *Journal of BU ON.: official journal of the Balkan Union of Oncology* 16, no. 3 (2010): 414-424.
3. Banerjee, S., H. I. Mullick, J. Banerjee, and A. Ghosh. "Zingiber officinale: 'a natural gold'." *Int J Pharmaceutical Bio-Sci* 2 (2011): 283-94.
4. Germplasm Resources Information Network, United States Department of Agriculture, Agricultural Research Service, Beltsville Area, @ <<http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?42254>> last update 10.09.2015
5. Akram, M., M. Ibrahim Shah, Khan Usmanghan, E. Mohiuddin, Abdul Sami, M. Asif, SM Ali Shah, Khalil Ahmed, and Ghazala Shaheen. "Zingiber officinale roscoe (A medicinal plant)." *Pakistan Journal of Nutrition* 10, no. 4 (2011): 399-400.
6. Otunola, Gloria A., Oyelola B. Oloyede, Adenike T. Oladiji, and Anthony J. Afolayan. "Comparative analysis of the chemical composition of three spices—Allium sativum L. Zingiber officinale Rosc. and Capsicum frutescens L. commonly consumed

- in Nigeria." *African Journal of Biotechnology* 9, no. 41 (2010): 6927-6931.
7. vanBreemen, Richard B., Yi Tao, and Wenkui Li. "Cyclooxygenase-2 inhibitors in ginger (*Zingiber officinale*)." *Fitoterapia* 82, no. 1 (2011): 38-43.
 8. Umeh, S. O., B. N. Emelugo, E. E. Bassey, S. C. Nwobi, and J. N. Achufusi. "Investigation of the anti-microbial and analgesic activities of crude ethanolic extract of ginger (*Zingiber officinale*) rhizome." *International Journal of Agriculture and Biosciences* 2, no. 3 (2013): 132-135.
 9. Wilson, Patrick B., and One Memorial Stadium. "Ginger (*Zingiber officinale*) as an analgesic and ergogenic aid in sport: a systemic review." *Journal of strength and conditioning research/National Strength & Conditioning Association* (2015).
 10. Terry, Rohini, Paul Posadzki, Leala K. Watson, and Edzard Ernst. "The use of ginger (*Zingiber officinale*) for the treatment of pain: a systematic review of clinical trials." *Pain Medicine* 12, no. 12 (2011): 1808-1818.
 11. Black, Christopher D., Matthew P. Herring, David J. Hurley, and Patrick J. O'Connor. "Ginger (*Zingiber officinale*) reduces muscle pain caused by eccentric exercise." *The Journal of Pain* 11, no. 9 (2010): 894-903.
 12. Rahnema, Parvin, Ali Montazeri, Hassan F. Huseini, Saeed Kianbakht, and Mohsen Naseri. "Effect of *Zingiber officinale* R. rhizomes (ginger) on pain relief in primary dysmenorrhea: a placebo randomized trial." *BMC complementary and alternative medicine* 12, no. 1 (2012): 92.
 13. Al-Nahain, Abdullah, Rownak Jahan, and Mohammed Rahmatullah. "Zingiber officinale: A potential plant against rheumatoid arthritis." *Arthritis* 2014 (2014).

Conflict of interest: None

Funding: None

Cite this Article as: Prasad S, Pathak R, Desai A, Vajpeyee S, Bhavsar V. The Analgesic Effects Of Ginger-Juice (<i>Zingiber Officinale Roscoe</i>) . <i>Natl J Integr Res Med</i> 2015; 6(6): 47-50
--