WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.084
Volume 11, Issue 9, 1522-1530. Research Article ISSN 2277– 7105

EVALUATION OF THE ANALGESIC, AND ANTIPYRETIC ACTIVITY OF ETHANOLIC CUCUMIS OPERCULATUS LEAVES EXTRACT USING DIFFERENT MODELS IN RATS.

Mukund Kumar Yadav*[1], Dr. Rajeev Shukla[2] and Prashant Singh[3]

[1]M. Pharm (Pharmacology), SHEAT College of Pharmacy, [2]Director, SHEAT College of Pharmacy, [3]Assistant Professor, SHEAT College of Pharmacy, Department of Pharmacology, Sarswati Higher Education & Technical College of Pharmacy, Dr. A. P. J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh, India, 226031.

Article Received on
20 May 2022,

Revised on 09 June 2022,
Accepted on 30 June 2022

DOI: 10.20959/wjpr20229-24808

***Corresponding Author**
Mukund Kumar Yadav
M. Pharm (Pharmacology), SHEAT College of Pharmacy, Department of Pharmacology, Sarswati Higher Education & Technical College of Pharmacy, Dr. A. P. J. Abdul Kalam Technical University, Lucknow, Uttar Pradesh, India, 226031.

OBJECTIVE

To evaluate the analgesic, and antipyretic activity of ethanolic Cucumis operculatus leaves extract using different models in rats.

ABSTRACT

cucumis operculatus (common name: ridge guard,family-cucurbitaceae.it is a vegetable plant and most commonly used in kitchen.it is very popular in India and other Asian countries. it is very healthy food and contains several amounts of fibers, vitamins and minerals including vitamin b12, vitamin c, carotene, niacin, calcium, phosphorous, iron, and small amount of iodine and flurine.there are several cucumis species some of that are cucumis melo. luffa cylindrica. luffa acutangula. this present review is focused on the pharmacognostical characterstics like scientific classification, vernacular name, chemical constituents, nutritional value and plant potential in biological activity and in therapeutic index.

KEYWORD: cucumis operculatus, cucumis species, chemical constituents, growth and distribution, medicinal use, Pain, Inflammation, Fever, Analgesic, Antipyretic.

1. INTRODUCTION

Cucumis operculatus is economically established for its fresh natural goods as a vegetable. The regular cleaning wipes are the organic goods which are developed from the Cucumis operculatus and used. It is broadly spreaded from southeastern Asia to focal and eastern Asia. In areas, with lower temperature, environments, it is grow as a house plant.The normal English names of the Cucumis operculatus are, Chinese Okra, furrowed gourd, vegetables gourd, velvety gourd, luffa, dish material gourd, wipe gourd, sifter plant, silk gourd, sinkwa towel sponge, ribbed loofah.[1]

Plant Description

•Colour: light green with brownish yellow.

•Shape: somewhat twisted, wrinkled and angular, single layered epidermis, covered by thick cuticle; secondary cortex is wide in each ridge.

•Size: petiole 3-8 cm long.

Growth and Distribution

Cucumis operculatus may be a massive synoecious annual climber. it's autochthonal to western, central and southern regions of Asian nation, and considered wild form of cultivated species. it's smaller leaves, flower, fruits and seeds. an oversized climber with palmately 5-7 angulate or lobate leaves found wild in northwest Asian nation, bihar, bengal, geographic area and Assam, and conjointly in madras. seeds abundant compressed, 10-12 mm. Long, slightly furrowed on edges, black once rip. largely its culivated during a warm-season, cold – sensitive genus orginating in Asian nation. Propagation of Cucumis operculatus (L.) Roxb. by seeds. Cucumis operculatus will grow altogether style of soils and may be full-grown in season. Seeds will consequently be down either in February- marth (or) june- July. Luffa is full-grown largely as a novelty in Florida grdens. However, some are tried commertially for the sale of the sponges. Being cold sensitive, luffas ought to be full-grown throughout the nice and cozy season.

Chemical constituents

chemical examination of Cucumis operculatus showed the Presence carbohydrates, carotene, fat, protein, phytin, aminoacid, alanine, arginine, cystine, glutamicacid, glycine, hydroxyproline, leucine, serine, tryptophan,pipecolic acid. And conjointly presence of alkaloids, carotenoidsm and terpenoid, flavonoids, tannins, luffangulin, sapogenin, oleanolic acid, cucurbetacin B,E and anthraquinones. Leaves square measure a healthy food and

contains smart quantity of fiber,differents styles of vitamins like B-complex vitamin, Vitamin C, Calcium, phosphorus,iron and little quantities of iodine and atomic number 9. Seeds shows presence of saturated and unsaturated carboxylic acid palmatic, stearic, oleic, linoleic and traces of lignoceric acid. Plant shows presence of oleanane sort triterpene saponins- acutoside A, B, C, D, E, F, and G.

Medicinal uses

Cucumis operculatus.is the supply of the many therapeutically vital chemical constituents. Studies releaved its use in polygenic disorder, immunomodulation, neoplasm suppresion, Parkinsonism, antimocrobial, ulceration and hepatoprotection. And used as inhibitor, antipyretic, antiproliferative, anticataleptic, antimicrobial, analgesic and anti-inflammatory agents

ANALGESICS

A drug that by selection relives pain by acting within the system or on peripheral pain mechanisms, while not considerably fixing consciousness. a large vary of medicine area unit accustomed management pain. they vary from gentle over-the-counter (OTC) medicine, like acetylsalicylic acid and anodyne, to strong general anaesthetics. medicine that relieve pain usually scale back fever and inflammation that area unit accustomed treat conditions like

-Mild to moderate pain caused by injury or surgery

-Fever, headaches, and painful menstruation

-Rheumatoid arthritis (a chronic inflammatory disease of the peripheral joints)

-Osteoarthritis (a chronic disease that involves wear and deterioration of joints in the body, causing inflammation)

-Chronic pain associated with cancer, AIDS, multiple sclerosis, or sickle cell disease.

Analgesics are divided into two groups.

Opioids /Narcotics/Morphine like analgesics.

Nonopioid/Non-narcotic/Aspirin like/antipyretic/anti- inflammatory analgesics.

FEVER

Fever conjointly referred to as febrility is outlined as a temperature over thirty eight.3ºC(100.9ºF) that lasts for over 3 weeks with no obvious supply despite applicable investigation. it's a pathologic elevation of the conventional body temperature; it's a full of life method and resists changes by the external enviornment. Fever isn't a illness, however

just a proof of the many completely different illness. temperature is also raised while not pathological causes, as in excecise or in hyoerthermia ensuing from excessive exposure to heat. Fever is sometimes a proof of infection within the body. Infections suchnasncolds and contagious disease ar quite common, particularly in educational institution kids.[14]

Fever is most frequently caused by virus and typically by bacterium. microorganism infections ar common and don't want antibiotics as they are doing not cure viruses. microorganism infections ar typically treated with antibiotics. it's the body's natural response to assist fight infection. fever itself isn't harmful, therefore it's typically not necessary to treat fever.

TYPES OF FEVER

There are in the main four styles of fever supported the fluctuation of temperature

Intermittent : The body temperature alternates between fever and normal at regular intervels

Remittent : The body temperature always above normal but fluctuates in wide ranges

Relapsing : The fluctuations occurs between days. le : Week of fever followed by week of normal.[15]

Constant : Minimal fluctuation. Always above normal

2. Methods

2.1. Plant Material and Preparation of the Extracts

The leaves were collected from RGSC, BHU Barkachha, Mirzapur, Uttar Pradesh, India.

Procedure

The whole plant components were dried in shade and pulverised to urge a rough powder. concerning 800gm of dry coarse powder was extracted with fermentation alcohol (40-600C) by continuous hot percolation victimisation Soxhlet equipment. The extraction was continuing for 72hours. The wood spirit extract was filtered and targeted to a dry mass by victimisation vacuum distillation. A brownness waxy residue obtained. By taking this wood spirit extract the crude oil ether extract were obtained by means that of fractionation. additional the solvents were gaseous to waterlessness so the residue of various extract obtained gaseous to dried mass so the residue of various extract obtained were taken for the experiment.

2.2 Phytochemical analysis

The ethanolic extract of Cucumis operculatus. were subjected to qualitative phytochemical tests for various constituents like alkaloids, carbohydrates, glycosides, flavonoids, synthetic resin compounds, proteins, and free aminoacids and triterpenoids.

Animals

Albino rats of either sex (150-200 g) were used for the experimental study. The animals were maintained under standard husbandry conditions in polypropylene cages and provided with food and water ad libitum. The animals were kept on fasting overnight prior to the experimentation and all the procedures used in these studies were approved by the Institutional Animal Ethics Committee.

2.3. Acute toxicity studies

The acute toxicity was performed according to OECD guidelines.[7] The selected female albino rats were used for toxicity studies. The animals were divided into four groups of three in each. The animals were fasted overnight prior to the acute experimental procedure. Extract was given orally to rats at the graded doses like 100, 300, 1 000 and 2 000 mg/kg body weight. Immediately, after dosing, the animals were observed continuously for first four hours for behavioral changes and for mortality at the end of 24 h, and daily for 14 days for any behavioral change or mortality.

2.4. Analgesic Activity of Ethanol Extracts in Rat

2.4.1. Tail-immersion test

The tail withdrawal response was determined by immersing the lower 3.5 cm of the animals tail into a cup freshly filled with water from a large bath at a constant-temperature of 50 °Cuntil the typical response was observed. A 25 s cutoff was imposed to avoid tail damage by heat. A control group received vehicle while the aspirin 100 mg/kg p.o. administered to group II and Cucumis operculatus leaves extract (100, 200 and 500 mg/kg p.o.) was given to III, IV and V groups. Analgesic activity was measured at 0, 30, 60, 90, 120 and 180 min after administration of Cucumis operculatus leaves extract, aspirin and distilled water.[8],[9]

Table 1: Analgesic effect of ethanolic on tail immersion method in rats.

GROUP	Mean latency to tail immersion in seconds				
	0 min	30min	60min	90min	120min
Group-I Control	1.5±0.04	1.4±0.02	1.6±0.01	1.6±0.03	1.7±0.04

Group II Pentazocine(3mg/kg)	1.8±0.06	2.6±0.04**	4.2±0.02**	5.8±0.06**	5.4±0.02**
Group III (200mg/kg)	1.2±0.02	1.9±0.01*	2.1±0.04*	2.4±0.02	2.8±0.04*
Group IV (400mg/kg)	1.4±0.01	2.0±0.04*	2.6±0.01**	3.5±0.04**	3.2±0.01**

Values were mean ± SEM,(n=6), *P<0.05 **P<0.01 Vs control. Data were analyzed by using One-way ANOVA followed by Dennett's test.

2.4.2. Hot plate Method in Rat

The analgesic activity of ethanolic leaves extract of dicot genus operculatus. was assessed victimisation hot plate technique in Swiss unusual person rat. The ethanolic leaves extract of dicot genus operculatus. Showed important analgesic activity at two hundred and four hundred mg/kg. Analgesic activity was comparable customary drug painkiller. Among the 2 doses, four hundred mg/kg showed most analgesic activity at interval a hundred and twenty min (7.2±0.44) is slightly not up to the quality drug painkiller (9.9±0.34) during this analgesic testing model, painkiller considerably prolonged the interval of animals with comparatively extended period of stimulation, confirming centrally active medication. within the gift study, all extracts showed important ($p<0.05$ and $p< 0.01$) analgesic activity however among the 2 doses, four hundred mg/kg showed highest analgesic activity at reaction time120 min.

Table 2: Analgesic effect of ethanolic on hot plate test in Swiss albino rat.

GROUP	Paw licking or jumping in seconds			
	30min	60min	90min	120min
Group-I Control	2.3±0.23	2.7±0.13	3.0±0.22	2.9±0.11
Group-II Pentazocine (3mg/kg)	2.7±0.17	6.8±0.61**	9.7±0.63**	9.8±0.33**
Group-III (200mg/kg)	2.6±0.19	3.6±0.14*	4.5±0.20**	4.0±0.40**
Group-IV (400mg/kg)	2.9±0.15	5.9±0.38**	7.5±0.39**	7.1±0.43**

Values were mean ± SEM, (n=6), *P<0.05 **P<0.01 Vs control. Data were analyzed by using One-way ANOVA followed by Dennett's test.

2.4.3. Brewer's yeast induced hyperpyrexia

Subcutaneous injection of yeast suspension markedly elevated the rectal temperature after 24 h of administration. Treatment with the Cucumis operculatus leaves extract at the doses of 100, 200 and 500 mg/kg significantly decreased the rectal temperature of the rats in a dose-

dependent manner. The antipyretic effect started as from the first hour and the effect was maintained for 4 h, after administration of the extract. The result obtained from both the standard (paracetamol) and Cucumis operculatus leaves extract treated rats were compared with that of control and a significant reduction in the yeast induced elevated rectal temperature was observed (Table 4).

Table 3: Analgesic effect of ethanolic on Brewer's Yeast Induced Pyrexia In Rats.

Treatment	Rectal temperature (°C)				
	18 h after yeast administration	Temperature after treatment			
		1 h	2 h	3 h	4 h
Group-I Control	38.1±0.1	38.4±0.2	38.0±0.1	38.3±0.2	38.2±0.1
Group-II Negative control	40.2±0.1	40.4±0.3**	40.1±0.2	39.8±0.1	39.1±0.3
Group-III paracetamol	39.8±0.2	37.9±0.2	38.2±0.2	38.0±0.1	38.4±0.2
Group-IV (200mg/kg)	40.2±0.1	39.4±0.3	39.1±0.1	39.0±0.2	38.9±0.3
Group-V (400mg/kg)	40.1±0.1	38.8±0.1	38.5±0.2	38.4±0.1	38.5±0.2

Values were mean ± SEM,(n=6), *P<0.05 **P<0.01 Vs control. Data were analyzed by using One-way ANOVA followed by Dennett's test.

3. DISCUSSION

It is well known that pharmaceutical companies around the world are interested in developing safer and more effective drugs to treat pain, inflammation and fever. The present study evaluated the analgesic, and antipyretic effect of Cucumis operculatus leaves extract in several animal models.

Cucumis operculatus leaves extract prolonged the tail-immersion latency, indicating an increase in the nociceptive threshold. The tail-immersion response is believed to be a spinally mediated reflex.[14] Moreover, Grumbach et al has shown that the effectiveness of analgesic agents in the tail flick pain model is highly correlated with human pain relief.[15]

The action of analgesic drugs differs in the two phases of the formalin test. Opiates, which act centrally for the most part, inhibit both phases similarly. However, nonopiate analgesics, including dipyrone, with both central and peripheral site of actions, produce an analgesic effect in both phases of the formalin test, especially in the second phase, in which pain is inhibited at lower doses than those necessary to be inhibited in the first phase. In the present

investigation, the activity of Cucumis operculatus leaves extract was observed in the first phase of the formalin test, a phase in which, as demonstrated by morphine, the action occurs at the level of the central nervous system.[16] Additionally, Cucumis operculatus leaves extract produced a significant effect on the second phase.

Cucumis operculatus leaves extract significantly reduced the pyrexia induced by yeast in rats. The reference drug aspirin also suppressed the yeast-induced fever in rats by inhibiting the synthesis of prostaglandin E2.[19],[20]-[26] These results support the use of as an antipyretic for the treatment of fever.

The results of this study exhibited that Cucumis operculatus leaves extract possesses analgesic, and antipyretic activities which may be mediated by the central and peripheral mechanisms. An activity-guided fractionation of this extract is presently being carried out. The isolation of new and effective analgesic, and antipyretic compounds is important for both drug development and establishment of the ethno medicinal use of this plant.

4. RESULTS

Results demonstrated that the no mortality was reported even after 14 days. This indicated that the methanol extract was safe up to a single dose of 2 000 mg/kg body weight. Cucumis operculatus leaves extract (100, 200 and 500 mg/kg p.o.) significantly increased the latency period in the tail immersion test, reduced the licking time in both the neurogenic and inflammatory phases in the formalin test. Cucumis operculatus leaves extract (100, 200 and 500 mg/kg p.o.) significantly prevented increase in volume of paw edema. Cucumis operculatus leaves extract at the doses of (100, 200 and 500 mg/kg p.o.) significantly decreased the rectal temperature of the rats.

5. CONCLUSIONS

This study exhibites that Cucumis operculatus leaves extract possesses analgesic, and antipyretic activity which may be mediated by the central and peripheral mechanisms.

6. REFERENCE

1. Khandelwal KR. Practical pharmacognosy. Pune, India: Nirali prakashan, 2007. [Google Scholar]
2. Kokate CK, Purohit AP, Gokhale SB. Pharmacognosy. Pune, India: Nirali prakashan; 2008. [Google Scholar]

3. Trease GE, Evans WC. Textbook of pharmacognosy. London, United Kingdom: Balliese Tindall and Company Publisher; 1989. [Google Scholar]
4. 423, OECD/OCDE Acute oral toxicity-Acute toxic class method. Guideline for the testing of chemicals, guidance document on acute toxic class method, 2001.
5. Chapman CR, Casey KI, Dubner R, Foley KM, Gracely RH, Reading AE. Pain measurement: an overview. Pain, 1985; 22: 1–31. [PubMed] [Google Scholar]
6. Soo-Hyun P, Yun-Beom S, Soon-Sung L, Jin-Kyu K, Jin-Koo L, Hong-Won S. Antinociception effect and mechanisms of Campanula Punctata extract in the mouse. Korean J Physiol Pharmacol, 2010; 14(5): 285–289. [PMC free article] [PubMed] [Google Scholar]
7. Dascombe MJ. The pharmacology of fever. Prog Neurobiol, 1985; 25: 327–373. [PubMed] [Google Scholar]
8. Gupta J, Kumar D, Gupta A. Evaluation of gastric anti–ulcer activity of ethanolic extract of Cayratia trifolia in experimental animals. Asian Pac J Trop Dis, 2012; 2(2): 99–102. [Google Scholar]
9. Karki S, Kumar K. Study on the possible use of Vi polysaccharide typhoid fever vaccine to control endemic typhoid fever in Nepal. Asian Pac J Trop Dis, 2011; 1(1): 76–79. [Google Scholar]
10. Vane JR. The evolution of non-steroidal drugs and their mechanisms of action. Drugs, 1987; 33: 18–27. [PubMed] [Google Scholar]
11. Yadav MO and Parle MI. an easy laboratory model for causing and activity pain in tiny experimental animals. International Journal of Pharmacy and Pharmaceutical Sciences, 8(7): 156-162.
12. author AR and Basello weight unit. Approach to the adult patient with fever of unknown origin. yankee family MD, 2003; 68(11): 2223-2228.