IJPSR (2012), Vol. 3, Issue 04 **(Research Article)**

INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES AND RESEARCH

Received on 12 December, 2011; received in revised form 10 February, 2012; accepted 27 March, 2012

ANTIMICROBIAL ACTIVITY OF WATER EXTRACTS OF TRIKATU CHURNA AND ITS INDIVIDUAL INGREDIENT

P.R. Malvankar* and M.M. Abhyankar

Department of Pharmacognosy, S.G.R.S. College of Pharmacy, Saswad, Pune- 412301, Maharashtra, India

Keywords:
Trikatu churna,
Antimicrobial activity,
Agar well diffusion method,
Phytochemical study

Correspondence to Author:

Pooja R. Malvankar

Department of Pharmacognosy, S.G.R.S. College of Pharmacy, Saswad, Pune-412301, Maharashtra, India

ABSTRACT

Trikatu churna is one of the traditional poly herbal preparation, formed by mixing equal quantities of three important spicy materials such as *Piper longum L.* (Piperaceae), *Piper nigrum L.* (Piperaceae) and *Zingiber officinale Roscoe* (Zingiberaceae). Trikatu is also known as " Three Bitters". The trikatu preparation was reported to contain alkaloids, phenols, tannins, flavanoids, steroids, lignin & saponins. The objective of study is to evaluate the antimicrobial activity of trikatu churna & its individual ingredients with their preliminary phytochemical study. The aqueous extracts of trikatu churna & its each ingredient were tested for antimicrobial activity against certain bacterial strains of Escherichia coli, Staphylococcus aureus by in vitro agar well diffusion method and the results are recorded as the zone of inhibition. Trikatu churna was found to possess higher extent of phytoconstituents with promising antimicrobial activity.

INTRODUCTION: Trikatu means three herbs which are having Katu Rasa i.e. a pungent taste. It is the equiproportional mixture of *Pimpli (Piper longum* L.), Maricha i.e. black pepper (*Piper nigrum* L.) And Sunthi i.e. dried ginger (*Zingiber officinale* Roscoe). This combination streamlines the metabolism of the body, this is the reason it is indicated in a wide range of health problems like asthma, fever cold, cough etc. And also used as purgative, carminative, and inobesity, indigestion, high cholesterol, slow metabolism, hypothyroidism, congestion and edema**.**

In Ayurvedic tradition, Trikatu is known as Heating Formula. Its Thermogenic action promotes AGNI or digestive fire which burns the harmful toxins and revitalizing the metabolism. Trikatu enhances the bioavailability. Pimpli is well known for its immunomodulatory action and rejuvenating effect on digestive and respiratory system. Sunthi is one of the best herbs which rejuvenate the whole body, this is the reason it is also called as Vishvabhaishjya which means the medicine of the world. Maricha or black pepper is said to have Pramathi Guna i.e., it forcefully expels out the toxins from the body.

Trikatu shows some important benefits like, It promotes the healthy digestion, improves all gastric functions, It increases food absorption. It reduces congestion in digestive tract. It is recommended for poor digestion and poor appetite. It is recommended for improving lung functions. Also it helps in reducing excess weight, and increases vitality etc.

MATERIALS AND METHODS: Water extracts of Trikatu churna and its each ingredient like Zingiber officinale (ginger), piper nigrum (black pepper) and piper longum (pimpli) were tested for the antimicrobial activity on highly pathogenic bacteria like Escherichia coli, Staphylococcus aureus at various concentrations. The extracts were also subjected to preliminary phytochemical screening to find out the secondary metabolites present in the extracts.

1. **Preparation of Trikatu churna:** The Trikatu churna is fine powder of dried drugs. It is prepared by mixing equal quantities of piper longum, piper nigrum and Zingiber officinale and then sieved through muslin cloth. It is then stored in tightly closed container.

2. **Preparation of extracts:** Powdered Trikatu and its each ingredient were allowed to extract with distilled water by the process of maceration for seven days and the crude extracts were obtained, then dried and yield is measured. The dilution was made in concentration of 8mg/ml of distilled water.

3. **Microorganisms used:** The antimicrobial activity of Trikatu churna was performed against certain bacterial strains of Escherichia coli, Staphylococcus aureus, by the in vitro agar well diffusion method

4. **Culture media:** For the antimicrobial activity of trikatu churna and its each ingredient, nutrient agar is used, which is prepared by mixing beef extract, peptone, sodium chloride and agar in distilled water.

5. **Preliminary phytochemical screening:** The Trikatu churna and its each ingredient were tested for preliminary phytochemical screening by applying general chemical tests for alkaloids, tannins, steroids, terpenoids, phenols, flavonoids, saponins, etc.

6. **Antimicrobial activity:** The antimicrobial activity of trikatu churna and its each ingredient was carried out by using in vitro agar well diffusion method. Nutrient agar is sterilized by using autoclave, then it is poured hot in petri plates and allowed to get solidify. The wells of desired diameter (8 mm) were made with the help of borer. Bacterial suspension of each strain is applied and grown overnight. The ampicillin solution was taken as standard. Its concentration was taken as 8mg/ml.

Similarly water extracts of trikatu churna and its individual ingredients were also prepared in concentrations as given above.

These extracts along with standard solution were poured in each particular labeled well with the help of sterile micropipettes by maintaining the aseptic environment. These petri plates were then kept for incubation at 37°C for 24hrs. After the completion of incubation period, the zones of inhibition were measured and recorded. The activity was cross checked by repeating the experiment thrice.

RESULTS AND DISCUSSION: Trikatu churna and its individual ingredients were subjected to antimicrobial activity, which was done by using in vitro agar well diffusion method. The results were obtained as zones of inhibition and they showed that trikatu churna and its each component possess potent antimicrobial activity. The activity shown by aqueous extract is of considerable importance. The extract of trikatu churna shows highest activity which is almost equal to the effects shown by standard ampicillin solution. The clear circular zones of inhibition were formed around the wells containing plant extracts. The data given in table shows that, the trikatu churna is very effective against E. coli and S. aureus. But all the individual ingredients of trikatu churna possess moderate antimicrobial activity.

The results are elaborated in **table 1** given here under-

TABLE 1: ANTIMICROBIAL ACTIVITY OF TRIKATU CHURNA AND ITS INDIVIDUAL INGREDIENT

Treatment	Concentration mg/50ml	Zone of inhibition (mm)	
		E. coli	*S. aureus*
Ampicillin	500	20	18
Trikatu churna	500	18	17
Piper longum	500	15	14
Piper nigrum	500	11	12
Zingiber officinale	500	13	13

Aqueous extracts of Trikatu churna and its ingredients were also subjected to preliminary phytochemical screening to determine the presence of secondary metabolites. Results of this study clearly indicate the presence of alkaloids, tannins, phenols, flavonoids, steroids, lignin and saponins in trikatu churna. But steroids are absent in Maricha, lignin is absent in ginger while saponins and tannins are absent in pimpli. As trikatu churna extract shows all tests positive, it indicates that, it is a mixture of all these phytoconstituents.

Herbal formulations generally do not cause any unwanted effects, because such formulations are safe, natural and have little or no side effects. Also raw materials required for the formulation are easily available with low cost. Thus if we formulate antibacterial drug from trikatu churna, then it will be beneficial to human beings.

CONCLUSION: The aqueous extract of trikatu churna was found to be very effective against different bacterial strains than its individual component. Actually, these plant materials contain a wide variety of biologically active moieties. Thus, they exert a potent activity when blended and used together as far as antimicrobial activity is concerned.

Also it was found that, this spicy preparation fights against harmful and highly pathogenic microorganisms and enhances natural immune system in human beings.

REFERENCES:

1. Jerald E.E., Jerald S.E., *Colour Atlas Of Medicinal Plants (Common Names & Classification)*, CBS publishers & distributors, 210, 212,262.
2. Duke J., Bogenschutz M., Godwin J., *Handbook of medicinal herbs,* 2nd edition, CRC press, 98, 327.
3. Mecanna D.J., Jones K., Hughes K., and Humphrey S., *Botanical Medicines: The desk reference for major herbal supplements*, 2nd edition, IBLCL Viva books 411-439.
4. Khandelwal K.R., *Practical Pharmacognosy: Techniques and Experiments*, 6th edition (2006), Nirali Prakashan, 149.
5. Kokare C. R., *Pharmaceutical Microbiology: Experiments and Techniques*, 2nd edition, Career Publication, 63, 66, 139.
6. Prof. Vaidya. Gogte V.M., *Dravyagunavidnyan*, Vaidyamitra Prakashan, 272, 505, 562.
7. Reddy B. U., Seetharam Y. N., (2009), *Anthelmintic Activity Of Trikatu Churna And Its Ingredients, Ethnobotanical Leaflets*, Volume- 13, 532- 539.
8. *Indian Herbal Pharmacopoeia*, Revised new edition 2002, Published by- IDMA, 479, 306, 317.
9. Kokate C. K., Purohit A.P., Gokhale S.B., *Pharmacognosy*, 27th edition, 106, 395, 351,
10. Arya Vaidya Sala, *Indian Medicinal Plants: A compendium Of 500 Species*, Volume- 4, Orient Longman Publication, 290, 297.
11. Arya Vaidya Sala, *Indian Medicinal Plants: A compendium Of 500 Species*, Volume- 5, Orient Longman Publication, 431.
12. Reddy B. U., Seetharam Y. N., (2009), *Antimicrobial And Analgesic Activities Of Trikatu Churna And Its Ingredients, pharmacologyonline*, Volume- 3, 489- 495
13. *The Ayurvedic Pharmacopoeia of India,* Part- 1 Volume- 1, 1st edition, Ministry of Health and Family Welfare, Government of India, New Delhi 1989, 103.
14. *The Ayurvedic Pharmacopoeia of India*, Part- 1 Volume-4, 1st edition, Ministry of Health and Family Welfare, Government of India, New Delhi1989, 91, 92.
15. *The Ayurvedic Pharmacopoeia of India,* Part- 1 Volume- 3, 1st edition, Ministry of Health and Family Welfare, Government of India, New Delhi1989, 115.
16. Sharma R. K., Shrivastava K., Daniel V., (May-Aug 2010), *Synthesis And Antihelmentic Activity Of Some Azole Derivative Of Hippuric Acid, Int. J. Ph. Sci.*, Volume- 2, 502- 507.
17. Balasubramanian B., Rajamanickam. P., (May-Aug 2010), *Phytochemical Analysis & Antibacterial Activity Of solanum trilobatum L. against HIV Associated Bacterial Pathogens. Int. J. Ph. Sci., Volume- 2*, 598- 605
18. Janakiraman K., Manavalan R., (Jan 2009), Studies on effect of co- administration of Trikatu and its components on oral bioavailability of Ampicillin and Norfloxacin, in rabbits, J. Ph. Research, Volume- 2, Issue 1, 27- 30
19. WEB: www.google.com

****