



## EVALUATION OF PANCHABHAUTIKA CONFIGURATION OF OFLOXACIN, CEFPODOXIME, CEFIXIME AND METRONIDAZOLE AS ANTIDIARRHEAL DRUGS A PRELIMINARY STUDY IN CHILDREN

Surya Prakash<sup>1</sup>, Srivastava Niraj<sup>2</sup>, Mishra O. P.<sup>3</sup>, Singh B. M<sup>4</sup>

<sup>1</sup>Assistant Professor, Government Ayurvedic college & Hospital, Atarra, Banda (U.P.), India

<sup>2</sup>Reader, Government Ayurvedic College, Varanasi (U.P.), India

<sup>3</sup>Professor, Dept. of Paediatrics, I.M.S, B.H.U., Varanasi (U.P.), India

<sup>4</sup>Professor, Dept. of Kaumarbhrtya/Bal Roga, I.M.S, B.H.U., Varanasi (U.P.), India

Email: [kbsuryabhu@gmail.com](mailto:kbsuryabhu@gmail.com)

<https://doi.org/10.46607/iamj08062020>

(Published online: June 2020)

### Open Access

© International Ayurvedic Medical Journal, India 2020

Article Received: 08/05/2020 - Peer Reviewed: 14/06/2020 - Accepted for Publication: 29/06/2020



## ABSTRACT

Diarrhea accounts for 13% of all death in Indian children younger than 5 years. For the control of diarrhea many herbal and modern medicines are available in market. Purpose of this study is to assess the *Rasa, Guna, Virya, Vipaka* and *Prabhava* in the allopathic drugs, the physical properties, therapeutic and non-therapeutic action of ofloxacin, cefpodoxime, cefixime, and metronidazole as mentioned in textbooks of pharmacology. These allopathic drugs are given in form of syrup along with the tablet form were tested for their *Rasa* as perceived by randomized 10 *Ayurvedic* physicians as volunteers. Study of antidiarrheal allopathic drugs suggests that use of antibiotics may be done better and more efficiently in accordance to the *Prakriti* of children and by considering the *Panchabhautika* and *Doshika* configuration and effect respectively. Ofloxacin, cefpodoxime, cefixime and metronidazole has *Rasa Kashaya – Pradhana, Tikta –Pradhana, Tikta – Kashaya* and *Tikta – Pradhana Kashaya* respectively.

**Keywords:** *Panchabhautika, Doshika, Allopathic drugs.*

## INTRODUCTION

Acute Diarrhea remains one of the most important health issues worldwide, with high morbidity and mortality rates, accounting for more than two million deaths annually<sup>1,2</sup>. It is the commonest infectious disease in developing countries, mostly affecting children's younger than five years old.

Supportive rehydration therapy along with adequate nutritional support is the cornerstone of therapy, regardless of etiology and the severity of the process. Its prompt and early adoption is associated with a favorable outcome. Antimicrobial treatment tends to quicken the clinical resolution of diarrhea, prevent the progress of disease and reduce the severity of associated symptoms such as fever, abdominal pain and vomiting.

In the study we assessed *Panchabhautika* configuration of four antidiarrheal medicines which have definite role in acute diarrhea in childhood period.

1. Cefixime – (third generation cephalosporins)
2. Cefpodoxime – (third generation cephalosporins)
3. Ofloxacin– (fluoroquinolones)
4. Metronidazole.

**Third generation cephalosporin's:** Cefixime and cefpodoxime is a third-generation cephalosporin that is administered orally; therefore, it may be an adequate drug for the treatment of outpatients. It is typically administered once or twice daily.

**Fluoroquinolones:** The fluoroquinolones have become the drugs of choice for the empirical treatment of acute diarrhea in the children, because they are active against most of the common treatable enteropathogens and are suitable for oral administration. In acute diarrhea they have been shown to decrease the duration of diarrhea, fecal shedding of pathogens, and of other symptoms as well as total duration of illness. Regimens of fluoroquinolone have been suggested to be effective for the treatment of shigellosis in adults and children<sup>3,4</sup>.

**Metronidazole:** Oral metronidazole is the first choice for the treatment of clostridium difficile colitis, which is responsible for over 80 % of antibiotics – associated cases of diarrhea, specially the most severe<sup>5</sup>.

**Pippali:** Pippali has Rasa Katu, Guna-Laghu, Snigha, Tikshna, Virya- Anushnashita, Vipaka-Madhura, and Prabhava- Vata Kapha Shamaka<sup>6</sup>.

**Yastimadhu:** Yastimadhu has Rasa-Madhura, Guna-Guru Snighdha, Virya-Shita, Vipaka-Madhura and Prabhava- Vata Kapha Shamaka<sup>7</sup>.

**Kutaja:** Kutaja has Rasa- Tiktakashaya, Guna-Laghu, Ruksha, Virya-Shita, Vipaka-Katu and Prabhava-Kapha Pittahara<sup>8</sup>.

**Patha:** Patha has Rasa- KatuTikta- Guna-Guru, Ushna, Tikshna, Virya-Ushna, Vipaka- Katu and Prabhava-Tridosha shamaka<sup>9</sup>.

The Pippali, Madhuyashthi, Kutaja and Patha drugs are used to treat the diarrhea in day to day practice. Ingredients of Pippali, Madhuyashthi, Kutaja and Patha drugs have been mentioned as *Atisaranashaka* in different text book<sup>10,11</sup>.

The present study was planned to evaluate the anti-diarrheal drugs properties in relation to *Panchabhautika* and *Doshika* composition when used in children of various *Prakriti*. This study is based mainly on subjective and objective assessment of *Rasa, Virya, Guna, Vipaka,* and *Prabhava* properties of drugs (substance) as found in minor experimental findings and statement of the volunteers as well as the textual, journal and information collected from the websites.

### Material and Methods:

The study was planned as follows -

- a) **Assessment of Properties of the drugs** –To assess the *Rasa, Guna, Virya* and *Prabhava* in allopathic drugs, the physical properties, therapeutic and non - therapeutic action of ofloxacin, cefpodoxime, cefixime and metronidazole as mentioned in textbooks of pharmacology<sup>12</sup> were assessed on the principles of *Ayurveda* as per the guidelines mentioned in classics.
- b) **Experiment to assess the Rasa of Drugs:** These allopathic drugs are given in form of syrup along with the tablet form were tested for their *Rasa* as perceived by the 10 *Ayurvedic* physicians as volunteers. To assess the *Panchabhautika* properties of ofloxacin, cefpodoxime, cefixime and metroni-

dazole, the *Rasa* of these drugs were assessed as per the following method-

1. The drug solution prepared in 500 ml, 400ml, 300ml, 200ml, 100ml, 50ml, 25ml of water by mixing 100mg of each drug, separately. Thereafter, ten volunteers were asked to put the 5ml of prepared solution in mouth.
2. The perception of test, as perceived by the volunteers, of same prepared solution was noted on papers immediately, after 15 second, 60 second, and 300 second.
3. The final conclusion regarding the *Rasa* of above said drugs was based on, at least, seven similar observations of the volunteers.
4. Separate volunteers were taken for the *Rasa* of each drug dispensing form – tablet/syrup at different time.

5. The drugs in the syrup form were taken in the sugar based.

#### Study design:

- The randomized simple sampling method was adopted in this study.
- The study had a due clearance from the Institutional ethics committee.

#### Observation and Results:

The physical properties including *Rasa, Guna, Virya, Vipaka, Prabhava* and their *Panchabhautika* configuration and *Doshika Karma* of selected antidiarrheal drugs were observed very keenly by getting the finding of *Rasa* – experimentally and the information which were available in various textbooks.

**Table 1:** Showing pharmacological action, physical properties of selected allopathic drugs with their inference in form of various properties as mentioned in the *Ayurveda*-

S. No.	Name of the drug	Physical Properties	As per Modern Medicine	Physical Properties as Ayurvedic literature
1.	Ofloxacin	Color	Off white to yellow crystals	
		Solubility	Sparingly to slightly soluble in water at pH 7	<i>Vileya</i> - Solubility depend upon the <i>Vishada, Sara, Drava, Sukshma</i> properties
		Stability	Stable under ordinary condition	<i>Sthira</i> - It depend upon the <i>Shita</i> properties
2.	Cefpodoxime	Colour	White to yellow crystalline powder	<i>Shweta - Peeta</i>
		Stability	Stable under the ordinary condition	<i>Sthira</i> -It depend upon the <i>Shita</i> properties
		PH	6 – 8	<i>Kshariya</i> – not defined but usually <i>Katu, Tikta</i> have high pH
		Odour	Odourless	<i>Gandhaheena</i>
3.	Cefixime	Colour	White to yellow crystalline powder	<i>Shweta - Peeta</i>
		PH	2.6 to 4.1	<i>Amla</i> – not defined in <i>ayurveda</i> but usually has low pH. But on taste drug has not shown <i>Amla Rasa</i>
		Stability	Stable under the ordinary condition	<i>Sthira</i> -It depend upon the <i>Shita</i> properties
4.	Metronidazole	Solubility	Soluble in water	<i>Vileya</i> - Solubility depend upon the <i>Vishada, Sara, Drava, Sukshma</i> properties
		Colour	White or pale-yellow crystalline powder	<i>Shweta - Peeta</i>
		Odour	Odourless	<i>Gandhaheena</i>
		Stability	Stable in air but darkens on exposure to light	<i>Sthira</i> -It depends upon the <i>Shita</i> properties
		Solubility	Sparingly soluble in water, alcohol & chloroform and slightly in ether	<i>Vishad Vileya</i> in <i>Jala</i> due to <i>Picchila &amp; kathina</i> dominant properties
		Taste	Bitter	<i>Tikta</i> – <i>Laghu, Ruksha, Sheeta</i>

\* *Physical properties may varies depending upon the Desha, Kala, Agni etc.*

**Table 2:** Table showing *Rasa* (taste) of the modern drugs as perceived by the 10 *Ayurvedic* physicians as volunteers:

Drugs	<i>Rasa</i> (Taste) of syrup	<i>Rasa</i> (Taste) of Tablets
1. Ofloxacin	<i>Madhura, Kashaya, Tikta</i>	<i>Kashaya, Tikta, Amla, Madhura Anurasa</i>
2. Cefpodoxime	<i>Madhura, Kashaya, Tikta</i>	<i>Kashaya, Tikta</i>
3. Cefixime	<i>Madhura, Kashaya, Tikta</i>	<i>Tikta, Kashaya Anurasa</i>
4. Metronidazole	<i>Madhura, Kashaya, Tikta</i>	<i>Tikta Pradhana, Kashaya</i>

As the four drugs like ofloxacin, Cefixime, Cefpodoxime, & Metronidazole were given in syrup form to the patient. Therefore, these drugs in form of syrup along with the tablet form were tested for their *Rasa* as (table no.2).

The *Panchabhautika* configuration of perceived *Rasa* of each drug has been made in accordance to description mentioned in *Ayurvedic* classics<sup>13,14</sup>.

**Table 3:** Showing Therapeutic, non-therapeutic and pharmacodynamics /Pharmacokinetic properties of selected allopathic drugs with their inference in form of various properties as mentioned in the *Ayurveda*

S. No.	Name of the drug	Pharmacological Properties					
		Therapeutic		Non-Therapeutic		Pharmacodynamics/ Pharmacokinetic	
		As mentioned in Modern Medicine	Similar <i>Ayurvedic Properties</i>	As mentioned in Modern Medicine	Similar <i>Ayurvedic Properties</i>	As mentioned in Modern Medicine	Similar <i>Ayurvedic Properties</i>
1.	Ofloxacin	Gastroenteritis & Abdominal Infections	<i>Amashaya Shotha Atisara</i>	Nausea, Vomiting & Abdominal discomfort	<i>Hrillas, Chhardi, Udarapida</i>	Well absorbed after oral administration	<i>Sara</i>
		Antiparasitic & Antimicrobial Effects	<i>Jeevanm Nashanam &amp; Jantughna</i>	Headache Anxiety insomnia	<i>Shiroruja Chinta Nidranash</i>	High tissue penetration	<i>Pramathi</i>
		UTI	<i>Vasti Shotha</i>	Dizziness	<i>Bhram</i>	-	-
		RTI	<i>Kasa-Shwasa</i>	Skin rashes	<i>Udarda</i>	-	-
2.	Cefpodoxime	Antimicrobial & Antiparasitic Effects	<i>Jeevanm Nashanam &amp; Jantughna</i>	Hypersensitivity	-	Good penetration into the CSF	<i>Pramathi</i>
		-	-	Nephrotoxicity	<i>Vasti Roga</i>	-	-
		Soft tissues infection	<i>Shotha</i>	Bronchospasm	<i>Shwasa-kashta</i>	-	-
		-	-	Urticaria	<i>Udard</i>	-	-
3.	Cefixime	Antimicrobial	<i>Jeevanm Nashanam</i>	Hypersensitivity	-	Oral absorption-60 %	<i>Sara</i>
		Antiparasitic	<i>Jantughna</i>	Anaphylaxis	<i>Murchha</i>	Cross placenta	<i>Pramathi</i>
		UTI	<i>Vasti Shotha</i>	Bronchospasm	<i>Shwasa-Kashta</i>	High con.in Bile & urine	-
		RTI	<i>Kasa-shwasa</i>	Urticaria	<i>Udard</i>	-	-
4.	Metronidazole	Antiparasitic	<i>Jeevanm Nashanam</i>	Headache, Dry mouth	<i>Shiroruja Dry mouth</i>	Absorbed completely and promptly after oral intake.	<i>Sara</i>

	Antimicrobial	Jantughna	Nausea,	Hrillasa	-	-
	-	-	Abdominal dis-tress	Udarapida	Metronidazole penetrates well into body tissues and fluids	Pramathi
	-	-	Glossitis	Jihva Shoth	-	-
	-	-	Metallic teste	Vairasya	-	-
	-	-	Dizziness, Vertigo	Bhrama	-	-

## DISCUSSION

It has been clearly mentioned in *Charaka Samhita* that all the substances in world have *Panchabhautika* configuration and has been classified into *Parthiva*, *Jantava* and *Vanaspatika*. Ingredients of *Pippali*, *Madhuyashthi*, *Kutaja* and *Patha* drugs have been mentioned as *Atisaranashaka* in different textbook. Some of these drugs have *Samgrahi*, *Deepaniya*, *Pachaniya*, *Vataanuloman*, *Vranaropana*, *Vedanasthapana*, *Shothahara*, *Jantughan* and *Vata*, *Pitta*, *Kapha* and *Tridosahar*<sup>15,16</sup>. They have been reported to exert astringent, analgesic, anti-inflammatory, antimicrobi-

al, antiprotozoal and antifungal properties is also responsible for having Antidiarrheal effect<sup>17</sup>.

In light of this principle, four allopathic drugs like Ofloxacin, Cefixime, Cefpodoxime, & Metronidazole were selected for the study to know the *Panchabhautika* configuration of the drugs in syrup and tablet form as these drugs are given in such dispensing form. These drugs were examined for their *Rasa*, *Guna*, *Virya*, *Vipaka*, *Prabhava* and *Karma* properties. The *Panchabhautika* configuration should be inferred in accordance to the perceived *Rasa*.

**Table 4:** Showing Drug's *Panchabhautika* Configuration as per their *Rasa*:

S. No.	Pre-Selected Drugs	Rasa	Panchabhautika Composition	Guna	Virya	Vipaka	Prabhav
1.	<i>Pippali</i>	<i>Katu</i>	<i>Vayu2, Agni</i>	Described in above			
2.	<i>Maduyashthi</i>	<i>Madhura</i>	<i>Jala, Prithvi</i>				
3.	<i>Kutaja</i>	<i>Tikta, Kashaya</i>	<i>Vayu2, Aakash, Prithvi</i>				
4.	<i>Patha</i>	<i>Tikta</i>	<i>Vayu, Aakash</i>				
5.	Ofloxacin	<i>Kashaya-Pradhan, Amla, Tikta with Madhur Anurasa</i>	<i>Vayu2, Aakash, Prithvi, Agni &amp; Jala</i>	<i>Vishada, Sara, Drava and Sukshma</i>	<i>Sheeta</i>	<i>Madhur</i>	See table having therapeutic and non-therapeutic properties.
6.	Cefpodoxime	<i>Tikta-pradhana, Kashaya</i>	<i>Vayu2, Aakash, Prithvi</i>	-	<i>Sheeta</i>	<i>Katu</i>	
7.	Cefixime	<i>Tikta-Kashaya</i>	<i>Vayu &amp; Aakash + Prithvi</i>	<i>Vishada, Sara, Drava and Sukshma</i>	<i>Sheeta</i>	<i>Katu</i>	
8.	Metronidazole	<i>Tikta-pradhana, Kashaya</i>	<i>Vayu2, Aakash, Prithvi</i>	<i>Picchila, Kathina, Laghu and Ruksha dominant</i>	<i>Sheeta</i>	<i>Katu</i>	

## CONCLUSION

The study of antidiarrheal allopathic drugs suggests that use of antibiotics may be done better and more efficiently in accordance to the *Prakriti* of children and by considering the *Panchabhautika* and *Doshika* configuration and effect respectively. Ofloxacin, cefpodoxime, cefixime and metronidazole has *Rasa Kashaya – Pradhana, Tikta – Pradhana, Tikta – Kashaya* and *Tikta – Pradhana Kashaya* respectively. However, the study regarding the *Panchabhautika* configuration and *Doshika Karma* is preliminary but it needs all the useful *parthivadi* allopathic medicine should be assessed more scientifically as per the principle of *Ayurveda* for the better and more rational individualized use in accordance to the *Prakriti* of children.

## REFERENCES

1. Kosek M., Bern C., Guerrent R.L. The global burden of diarrhoea disease, as estimated from studies published between 1992 and 2000. Bull World health organ 2003; 81: 197- 204.
2. Bern., Martines J., de Zoysa I., Glass R.I. The magnitude of the global problem of diarrhea disease: A ten-year update. Bull World health organ 1992; 70:705-14.
3. Bennish M.L., Salam M.A., Kahn W.A., et al. Treatment of shigellosis: III. Composition of one and two dose ciprofloxacin with standard 5-day treatment. Ann Inters Med 1992; 117:727-34.
4. Gendrel D., Moreno J. L., Nduwimana M., et al. One – dose treatment with pefloxacin for infection with multidrugresistant shigella dysenteriae type I in Burundi. Clin Infect Dis 1997; 24:83.
5. Vasa C.V., Glatt A.E. Effectiveness and appropriateness of empiric metronidazole for Clostridium difficile – associated diarrhea. Am J Gastroenterol 2003; 98:354-8.
6. Sharma P C, Yelne MB, Dennis T J. Database on Medicinal Plants used in Ayurveda, 1<sup>st</sup>ed. New Delhi.CCRS;2001Vol.-3.
7. Sharma P. V, Dravya Guna Vigyan, Vol.2<sup>nd</sup>Varanasi: Chaukhambha Bharati Academy; 2005 P. 253.
8. Sharma P C, Yelne MB, Dennis T.J. Database on Medicinal Plants used in Ayurveda, 1<sup>st</sup>ed .New Delhi.CCRS;2001Vol.-1

9. Sharma P C, Yelne MB, Dennis T J. Database on Medicinal Plants used in Ayurveda, 1<sup>st</sup>ed. New Delhi.CCRS;2001Vol.-1
10. Shastri Satyanarayan, Charak, Charak Samhita, Varanasi; Chaukhambha Bharati academy; 2003. Ch. Su.27/297, Ch. Su.40 and Ch.Su.27/88.
11. Mishra Bhava: Bhava Prakas, Bhramshakeer Mishra, 1<sup>st</sup> ed, Varanasi, Chaukhambha Sanskrit series, Bha.P. Chi.2.
12. Tripathi K.D, Essential medical pharmacology, 5<sup>th</sup>ed, New Delhi, Jaypee Brothers Medical Publishers(P) Ltd; 2004 P. 265, 750.
13. Shastri Satyanarayan, Charak, Charak Samhita, Varanasi; Chaukhambha bharati academy; 2003.Ch.Su.26/40.
14. Shastri Ambika D. Sushruta, Sushruta Samhita, Varanasi: Chaukhambha bharati academy; 2005. S.Su 42/4.
15. Shastri Satyanarayan, Charak, Charak Samhita, Varanasi; Chaukhambha bharati academy; 2003. Ch.Chi, 19/20.
16. Mishra Bhava: Bhava Prakas Nighantu with commentary by Dr. K.C. Chunekar, edited by G.S. Ponday, ed. Reprint, Varanasi; Chaukhambha bharati academy; 2006, Guduchyadi varg153, Haritkayadi varg102-103.
17. Sharma PC, Yelne MB, Dennis T J. Database on Medicinal Plants used in Ayurveda, 1<sup>st</sup>ed. New Delhi.CCRS;2001Vol.-1, Vol.-3

**Source of Support: Nil**

**Conflict of Interest: None Declared**

How to cite this URL: Surya Prakash et al: Evaluation Of Panchabhautika Configuration Of Ofloxacin, Cefpodoxime, Cefixime And Metronidazole As Antidiarrheal Drugs A Preliminary Study In Children. International Ayurvedic Medical Journal {online} 2020 {cited June, 2020} Available from:

[http://www.iamj.in/posts/images/upload/3634\\_3639.pdf](http://www.iamj.in/posts/images/upload/3634_3639.pdf)