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RESEARCH ARTICLE

# Exploring the pharmaco-clinical view on *Bhanga* (*Cannabis sativa* linn.): a classical unfamiliar portrayal

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## ABSTRACT

*Bhanga* (*Cannabis sativa* L.),Cannabinaceae family, an annual herbaceous plant, has been used since millennia as a source of medicine, industrial fibre, seed oil, food,recreation, religious and spiritual moods. This fast-growing plant has recently seen a resurgence of interest because of its wide applications. Ayurveda, the science of life, describing many of the formulation about the pharmaco-clinical application of *Bhanga* but many of these formulations are not in practice today. Indeed; it is a treasure trove of multi-variant *Guna* (qualities) and *Karma* (actions), making it a broad spectrum drug. In this review, the rich spectrum of cannabis is being discussed by putting a special emphasis on the formulations containing cannabis either as a major or a minor ingredient. Available 41 *Rasagrantha*s and 26 *Chikitsagrantha* and other Ayurvedic treatises were referred with respect to *Bhanga*'s *Adhikara* (main indication), *Kalpana* (dosage forms), *Anupana* (vehicle), *Aushadha Sevana Kala* (time and period of administration),*Pathya-Apathya*(do's and dont's),*Prayojyanaga* (parts used), *Karma* (action), specific uses and instructions of the formulations. It is observed that, there are 210 formulations which contain *Bhanga*, out of which 193 are recommended for internal administration and 17 for external applications. Among the formulations indicated for internal administration, 102 contain *Bhanga* as one of the major ingredient, whereas in 91 formulations, it's a minor ingredient. Nine formulations of external application are having *Bhanga* as major ingredient and 8 as minor ingredient.The review represents formulations being indicatedof 45 different*Roga- Adhikara*, 22 *Kalpana*,18 *Pathya- Apathya*, five different parts used, 49 *Karma* (action) and few benefits and instruction to be followed during administration of formulations containing *Bhanga.*

**Keywords:** Ayurveda, *Bhanga, Cannabis sativa, Kalpana, Anupana, Matra, Shodhana*

## INTRODUCTION

Cannabis (*Bhanga*) based medications have been a topic of intense study since the endogenous cannabinoid system was discovered two decades ago, thus improvement has been seen in wide therapeutic application of cannabis through large number of clinical trials.[1]The benefit of treatment with cannabinoids for a number of medical indications has been shown in controlled trials in which predominantly standardized and/or synthetic cannabinoid preparations were used. The use of such preparations may therefore be reasonable for patients in whom conventional treatment does not achieve adequate relief of symptoms. Ayurveda classics have also advocated number of disease conditions in which *Bhanga* is either used as a single drug or as an ingredient of a formulation. The current multisystem diseased affected population era caused the systemic use of number of molecules thus creating drug- drug interactions, adverse drug reaction and excess load of medicines over vital organs. In patients with multiple disease conditions, simply application of recommendations from multiple single disease clinical guidelines may result in complex multiple drug regimens (polypharmacy) with the potential for implicitly harmful combinations of drugs.[2] Polypharmacy has been linked to greater drug-related problems compared to single drug use and is associated with poorer mental health, including psychological distress, anxiety, depression; risk-taking behaviours and suicidal attempts.[3,4] *Bhanga* in this regards, is a drugs combating multiple clinical conditions, thus, formulations containing *Bhanga* can be used preferably to decrease the load of polypharmacy and its further ill consequences. However, concern over the danger of abuse led to the banning of the

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medicinal use of marijuana in most countries in the 1930s.Controlled Substances Act (1970) enlisted Marijuana under Schedule 1 drug with no medicinal value and a high potential for abuse. Administration of marijuana causes some psychological effects. [5]Many drugs used today can cause addiction and are misused and abused. Nevertheless they are still an important part of our pharmacopoeia, *Bhanga* being one of them. The first cannabis-based medication was approved for use in Germany in 2011.[6]An review has been attempted previously shows limelight on synonyms, classification, pharmacological properties, purification methods and indication of formulations [7] whereas review on pharmacotherapeutic application of *Bhanga* is lacking. Review on classical formulations having *Bhanga*as a levigating media has also been reported.[8]The proportionate of *Bhanga*, in formulations having *Bhanga* as an ingradient,either as a major or minor ingradient with respect to other ingradient of a particular formulation has not been reported yet. Initially, the safety of the formulations, containing minor proportion *Bhanga,* can be assessed through preclinical and clinical studies. Considering wide range of therapeutic applications, it is now high time to bring back these compounds formulations to clinical practice within the schedule rules and regulations.

## MATERIALS AND METHODS

In the present review information of herbo-mineral formulations where *Bhanga* is used as an ingredient are extracted from available 41 *Rasagrantha*s (compendia related to Rasashastra) and 26 *Chikitsagrantha*(compendia of Ayurveda) other Ayurvedic treatises.In 26 *Rasagranthas* and 9 *Chikitsagranthas Bhanga* has been included either as a single drug or in a formulations. The following texts were referred for the present review namely,*Vaidyachintamani*[9], *Rasakamadhenu Purvardha*[10], *Rasendra sarasamgraha* [11] *Siddhabhaishajaya-manimala* [12], *Bhavaprakasha Chikitsa* [13],*Yogaratnakar a*[14], *Rasarajmahodadhi*[15],*Rasayogasagara* – II[16] , *Vaidyaka Rasayana*[17], *Bharata Bhaishajya Ratnakara*I[18], *Sahastrayoga*[19], *Yogachintamani* [20], *Bharata Bhaishajya Ratnakara*–II [21], *Bruhatnighanturatnakara*[22],*Bhaishajya Ratnavali* [23] , *Yogatarangini* [24], *Rasakamdhenu Uttarardha*[25],*Rasachintamani*[26], *Rasaratna-sammuchaya* [27], *Rasayogasagara–I* [28], *Bruhat-rasarajasundara* [29], *Bharata Bhaishajya Ratnakara-V* [30], *Bharata Bhaishajya RatnakaraIV*[31],*Rasayansara*[32],*Arkaprakasha*[33], *Rasatarangini*[34],*Vaidyachamatkarachintamani*[35] , *Rasendrasambhava*[36], *Rasendrachintamani*[37], *Bharata Bhaishajya Ratnakara-III*[38], *Harita* [39], *Vaidyaratnama*[40], *Rasajalanidhi*[41], *Abhinava Navajeevana*[42], *Rasamanjiri*[43], *Anandakanda*[44], and *Vasavarajiyama*[45].

The formulations containing *Bhanga* are presented in this review and rest formulations have been excluded. Formulations containing *Bhanga* as an ingredient have been devided in two categories viz. *Bhanga* is considered as a major ingredient i.e. 1:1, 1:2, 1:3, 1:4, 1:5 or 1:6" and as a minor one i.e. consisting more than 1:6 proportions of other total ingredients in the formulations. Different search engines like Google scholar, MEDSCAPE, BMC, Science Direct, MEDLINE(www.pubmed.com)/pubmed database, SCOPEMED, and other relevant databases were searched using keywords like 'Cannabis', 'Marijuana', 'Hemp', 'Tetrahydrocannabinol' (THC), 'Cannabinol' (CBN), 'Cannabidiol' (CBD), 'Dosage forms', 'Routes of administrations', Time of administration', 'Indication', 'Contraindication', 'Activities', 'Action', 'Ayurvedic pharmaceutics', '*Rasashastra'* and '*Bhaishajya-Kalpana'* with their corresponding mesh terms in combination like OR,OF, AND. Published articles relevant to topic were also screened. All the identified articles using the online search were screened by reading the title, abstract and relevant information. The articles and searched Ayurvedic information not satisfying the article criteria were excluded from the final analysis. The information selected for inclusion at this stage was further screened for suitability by thorough reading. In this review, attempt has been made to describe formulations with name and its pharmaco-therapeutic review in the following systematic manner i.e.*Kalpa* (Formulations), *Adhikara* (Indication), *Aushadha Kalpana* (Dosage forms), *Anupana* (Vehicle), *Matra* (Dose), *Aushadha Sevana Kala* (Time of drug administration), *Aushadha Sevana Avadhi* (Period of drug administration), *Pathya-Apathya* (Do's and Dont's),Specific uses, Instructions, *Bheshaja Prayoga Marga* (Routes of drug administration), *Karma* (Action), *Prayojyanga* (part used) and *Shodhana* (Purification/ Processing). The probable correlation of disease condition has been presented in table 4.

This search was undertaken during March 2016 to October 2017.

## OBSERVATIONS AND RESULTS

 

## *Kalpa* (Formulations):

This review reports, 210 *Bhanga* formulations out of which 193 are for internal administration and 17 for external.(Table1, 2, 3)

**Table 1: *Yoga* (Formulations) containing *Bhanga* as a major ingredient for internal application**

| S. N | *Yoga*(Formulation) | *Adhikara*(Indication) | *Matra*(Dose) | *Anupana*(Vehicle) | *Karma*(Action of drug / formulation) | Reference |
|---|---|---|---|---|---|---|
| 1. | *Agnikumara Rasa (24)* | *Grahani* | *1 Shana* | | *Deepana, Grahi* | 11, 18 |
| 2. | *Agnikumara Rasa III* | *Agnimandya* | *3 Masha* | *Madhu: Deepana, Shunthi+ Guda ½ Tola* | | 28 |
| 3. | *Anya Kalpa* | *Sangrahani* | *1 Gunja* | | | 9 |
| 4. | *Anyat Lai Churna I* | *Sangrahani* | *1-4 Masha* | *Kanji, Roganurupa* | | 10 |
| 5. | *Anyat Lai Churna II* | *Sangrahani* | *1.5Masha* | *Mastu* | | 10 |
| 6. | *Lai Churna 7(Bruhat)* | *Grahani* | *1 Masha* | | | 31 |
| 7. | *Bhanga Churna (ii)* | *Kushtha* | | | | 12 |
| 8. | *Bhanga Churna (Bharjita)* (iii) | *Jwara* | | *Guda* | | 12 |
| 9. | *Bhanga Churna* | *Jwara* | | *Madhu* | *Nidrajanana, Grahi* | 13 |
| 10. | *Bhanga Churna* | *Amatisara* | | *Dahi* | *Grahi* | 14 |
| 11. | *Bhanga Putapaka* | *Nasaroga* | | *Taila+ Saindhava* (rock salt) | | 13 |
| 12. | *Bruhat Lai Churna(i)* | *Sangrahani* | *1 Masha* | *Roganurupa* | | 10 |
| 13. | *Bruhat Lai Rasa (ii)* | *Atisara* | *1 Masha* | *Roganurupa* | | 10 |
| 14. | *Bruhat Kameshwara Modaka* | *Vajeekarana* | *6 Masha* | | | 31 |
| 15. | *Churna (i)* | *Putanaroga* | | | | 15 |
| 16. | *Churna (ii)* | *Vajeekarana* | | *Dugdha ,Sharkara* | | 12 |
| 17. | *Daradadi Vati* | *Vajeekarana* | *1Makushtha* | *Jala* | *Vrushya, Vajeekara* | 16 |
| 18. | *Dhananjaya* | *Agnimandya* | | | | 12 |
| 19. | *Dnyanodaya rasa* | *Jwara* | | | *Grahi* | 17,30 |
| 20. | *Dyanodaya Rasa* | *Rasayana* | *1-2 Masha* | *Roganurupa* | *Shukrala, Vrushya* | 16 |
| 21. | *Gangadhara Churna (Bruhat)* | *Grahani* | *1-3 g* | *Ajadugdha, Madhu, Sheeta jala* | *Grahi, Deepana* | 19,42 |
| 22. | *Gokshura Paka (ii)* | *Vajeekarana* | *3 Masha- 1 Tola* | | | 28 |
| 23. | *Gokshura Paka* | *Kshaya* | - | - | - | 20 |
| 24. | *Gokshuradi Paka* | *Prameha* | *1Aksha* | | *Balya, Vrushya, Vajeekara* | 17 |
| 25. | *Grahanigajakesari Rasa (1)* | *Sangrahani, Grahani* | *2 Ratti/ 1 Maricha* | *Takra* | | 21, 28 |
| 26. | *Grahanikapata Rasa (II)* | *Grahani, Kaphapitta Sangrahani* | *1 Masha* | *Madhu+ Maricha* | | 28 ,14, 22 |
| 27. | *Grahanikapata Rasa(16) (v)* | *Grahani* | *2 Masha* | *Madhu* | | 28 |
| 28. | *Grahanishardula Churna* | *Grahani* | *2 Masha* | *Tandulodaka* | | 28 |
| 29. | *Grahanyari Rasa (2)* | *Grahani* | *1Chanaka* | *Guda+ Madhu* | | 28 ,23 |
| 30. | *Jatiphaladi Churna* | *Sangrahani, Atisara, Grahani* | *1Karsha, 1 Tola* | *Takra, Sharkara* | *Grahi, Balya, Rasayana* | 21,24,17,14 ,22 |
| 31. | *Jaya patra Churna* | *Nasaroga* | | *Saindhava +Tilataila* | | 23, 21 |
| 32. | *Jayadi Vati* | *Shoola, Vandhyatwa* | *1Chanaka* | *Roganurupa* | - | 21 |
| 33. | *Jayakhanda Churna* | *Atisara* | | *Dadhi* | *Grahi* | 21 |
| 34. | *Jwalanala Rasa* | *Ajeerna* | *4 Masha* | *Guda+ Shunthi* | *Deepana, Pachana* | 22 |
| 35. | *Kamagnisandiapana Modaka* | *Rasayana Vajeekarana* | *1 Karsha* | *Dugdha 4 Masha/ Ghruta, Madhu, Karpura* | *Balya, Bruhana, Vajeekara, Parama Rasayana, Shukrakara, Ojakara, Buddhivardhana, Ayuvardhana, Rasayana, Uttama Vajeekarana* | 25, 23 |
| 36. | *Kamadeva Rasa (10)* | *Vajeekarana* | *2 Masha* | *Sharkara+ Tila+ Ghruta+ Dugdha* | - | 28 |
| 37. | *Kamadeva Vati* | *Vajeekarana* | *4 Tola* | | *Kshudhavruddhikara, Kantikara, Chintahara, Manvinodkara, Veeryakara* | 24 |
| 38. | *Kamadeva Vati* | *Rasayana, Vajeekarana* | *2 Tola* | *Dugdha* | *Madakari, Nidrajanana, Rasayana, Vajeekara, Shukrala* | 18 |
| 39. | *Kamadeva Modaka Rasayana* | *Vajeekarana* | | | *Balya, Shukrala, Bruhana* | 15 |
| 40. | *Kamadeva Modaka Rasayana II* | *Vajeekarana* | | | *Vajeekarana* | 15 |
| 41. | *Kameshwara Modaka* | *Vajeekarana* | *1Modaka* | *Dugdha* | *Balya, Bruhana* | 16 |
| 42. | *Kameshwara Modaka* | *Vajeekarana, Rasayana* | *½ Karsha , 1 Tola* | *Dugdha+ Sharkara ½ Shera* | *Veeryastambhana, Balya,Vashikarana, Bruhana, Vajeekara, Rasayana* | 27,18, ,26,23 |
| 43. | *Kameshwara Modaka (3)* | *Vajeekarana* | *½-1 Tola* | *Dugdha* | | 28 |
| 44. | *Kameshwara Modaka (4)* | *Vajeekarana* | *4 Masha* | *Dugdha* | | 28 |
| 45. | *Kameshwara Modaka (5)* | *Vajeekarana* | *1 Tola* | *Dugdha* | | 28 |



 

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| 46. | *Kameshwara Modaka* (8) | *Rasayana, Vajeekarana* | *6 Masha* | *Dugdha* | *Vrushya,Rasayana, Balya,Vajeekarana, Brumhana, Sthira, Stambhana* | 28 |
| 47. | *Kameshwara Modaka (9)* | *Vajeekarana* | *-* | *-* | *Kamavriddhi* | 20 |
| 48. | *Kameshwara Modaka (10)* | *Grahani* | *-* | *-* | *Balya* | 17 |
| 49. | *Kameshwara Modaka (2)* | *Vajeekarana* | *1-3 Masha* | *Dugdha* | *Vrushya, Vajeekarana* | 28,23 |
| 50. | *Kameshwara Modaka III* | *Rasayana* | *1 Karsha* | *Dugdha* | *Balya, Bruhana, Shukrastambhana* | 16 |
| 51. | *Kamasundara Modaka* | *Vajeekarana* | *1-4 Masha* | *Madhu, Dugdha* | *Vajeekarana, Shukrala* | 18,28 |
| 52. | *Karpuradya Rasa* | *Prameha* | *As per Agni* | *Dhattura Beeja Taila* | | 29,11, 28 |
| 53. | *Katukadi Kwatha* | *Jwara* | *-* | *-* | | 30 |
| 54. | *Kumaryasava III* | *Gulma* | *As per Agni* | *-* | *Deepana, Shoolaghna* | 18 |
| 55. | *Lai Churna (6)(Laghu)* | *Sangrahani, Atisara, Grahani* | *1 Tanka* | *Takra, Bilwa Kwatha/ Madhu* | *Grahi, Deepana* | 29,13 ,22 |
| 56. | *Lai Churna* | *Sangrahani* | | | *Grahi* | 32 |
| 57. | *Lai Churna (Madhyama ) (3)* | *Grahani* | *1 Masha* | | | 31 |
| 58. | *Lai Churna (1)* | *Grahani* | *1 Masha* | *Takra* | | 31 |
| 59. | *Lai Churna (2)/ Madhya Lai Churna* | *Sangrahani* | *4 Masha,2 Masha* | | *Grahi, Deepana, Pachana, Ruchya* | 31, 29 |
| 60. | *Lai Churna (4)(Laghu)/ Lai Rasa* | *Grahani, Atisara* | *1-4 Masha* | *Takra* | *Grahi* | 31 , 10, |
| 61. | *Laxmivilasa A valeha* | *Vajeekarana* | | | *Vrushya, Balya, Deepana* | 17 |
| 62. | *Lavika Churna I (Madhyama)* | *Grahani* | *1 Tola* | *Kanji, Aranala, Mastu, Jala* | *Buddhivardhana* | 31, 29 |
| 63. | *Lavika Churna II(Mahat)* | *Grahani* | | *Kanji: Vatakaphajaroga/ Tushodaka* | *Uttejaka, Balya, Ayuvardhana, Deepana, Grahi, Keshya, Rasayana* | 31, 29 |
| 64. | *Madaka dravya Arka* | *-* | *-* | *-* | *Madaka* | 33 |
| 65. | *Madana Kameshwari Leha* | *Vajeekarana* | *½ Tola* | *Dugdha, Shalmali Moola Kwatha* | *Vajeekarana, Shukrala, Rasayana, Balya* | |
| 66. | *Madana Modaka* | *Vajeekarana, Rasayana* | *2 Tola* | | *Vajeekarana, Rasayana* | 15 |
| 67. | *Madananda Modaka* | *Vajeekarana* | *2Masha-0.5 Tola* | *Rudraksha Beeja, Tila, Ghruta, Sharkara,Dugdha, Payasa* | *Balya, Bruhana, Rasayana, Vajeekarana* | 31 |
| 68. | *Madana Modaka* | *Grahani* | *-* | *Koshna Dugdha* | *Vajeekarana, Rasayana* | 27,31 |
| 69. | *Madanodaya Modaka* | *Rajayakshma, Sangrahani* | *3-6 Masha* | *Dugdha+ Shrakara+ Ela* | *Balya, Pourushakara, Kantida, Buddhikara* | 34 |
| 70. | *Mahakameshwara I* | *Vajeekarana* | | | | 31 |
| 71. | *Maha Kameshwara Modaka* | *Vajeekarana* | | | *Balya, Medhya, Kantida, Vajeekara, Rasayana, Shukrashodhana, Deepana, Uttejaka, Varnya* | 31 |
| 72. | *Majuma Usaba Magarabi* | *Sarvaroga* | | | *Deepana, Pachana, Raktajanana, Medohara* | 15 |
| 73. | *Mundyadi Gutika I* | *Sannipata Sangrahani* | *3 Nishka* | *Madhu* | *Grahi* | 22 ,31 |
| 74. | *Mrutsanjeevana Rasa(ii)* | *Sannipata Jwara* | *2-3 Ratti* | *Dugdha* | *Deepana, Raktavardhana* | 15 |
| 75. | *Pushti Dava* | *Vajeekarana* | *7 Masha* | *Dugdha* | *Balya* | 15 |
| 76. | *Rasayana yoga* | *Vajeekarana* | | | | 17 |
| 77. | *Rativallabha Modaka* | *Vajeekarana* | *1 Tola* | | *Medhya, Balya* | 31 |
| 78. | *Rativallabha Modaka* | *Vajeekarana* | *1 Tola* | *Dugdha* | *Ojavardhana, Balya, Deepana, Vrushya, Drushtivardhaka, Bruhana, Vishaghna* | 31, 16 ,23 |
| 79. | *Shweta Aparajita Nasya* | *Apasmara* | | | | 27 |
| 80. | *Sparshavataghna rasa* | *Sparshavata* | | *Guda* | | 27,18 |
| 81. | *Stambhana Avaleha* | *Vajeekarana* | | *Madhu* | *Veeryastambhana* | 30 |
| 82. | *Stambhana Vati (3)* | *Rasayana* | *1 Ratti* | | | 16 |
| 83. | *Takra* (prepared with *Bhanga*) | *Shotha* | *1Badarasthi* | *Takra* | | 23 |
| 84. | *Talakeshwara Rasa* | *Vatavyadhi* | *1-4 Ratti ,1 Gutika* | | *Uttejaka* | 25,23,29 |
| 85. | *Talisadi Churna* | *Grahani, Atisara* | *1.5 Masha* | *Sharkara* | *Balya, Varnya, Medhya, Kantida, Rasayana, Kanti, Buddhiprada, Ayu-Bala-Kanti-Medha-Pushtikara* | 21,14, , 24 |
| 86. | *Talavatika* | *Rasayana* | *3 Ratti* | *Tambula patra* | | 21 |
| 87. | *Trailokyavijaya Vati* | *Atisara* | *1 Ratti* | | *Shoolaghna, Grahi, Nidrajanana, Balya* | 34 |
| 88. | *Trivruttadi Modaka* | *Parinamashoola* | *4 Masha* | *Koshna Dugdha* | | 21 |
| 89. | *Udayaditya Rasa (4)* | *Sparshavata* | *8 Ratti* | | | 28 |
| 90. | *Vangeshwaradi Vati* | *Jwara* | *1 Tola* | *Sharkara+ Dugdha* | *Balya, Rasayana, Vajeekarana, Medhya* | 31 |
| 91. | *Vati (Bhanga)* | *Vajeekarana* | *4 Tola* | | *Balya, Mahapushtikara* | 12 |
| 92. | *Vati (Bhanga)* | *Vajeekarana* | | | | 12 |
| 93. | *Veeryastambhakari Vatika* | *Vajeekarana* | *1 Masha* | | *Shukrala, Stambhana* | 31,17 |



 

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|---|---|---|---|---|---|---|
| 94. | *Vijaya Avaleha* | *Atisara* | *2 Masha* | *Madhu* | | 31,13 |
| 95. | *Vijaya Ghruta* | *Vajeekarana* | | | *Vrushya, Shukrala, Stambhaka, Vajeekara* | 31 |
| 96. | *Vijaya Gutika* | *Sangrahani* | *2 Tola* | *Madhu+ Ghruta* | | 10 |
| 97. | *Vijaya Yoga (i)* | *Vataja Jwara* | | *Madhu* | | 31,22 |
| 98. | *Vijaya Yoga(ii)* | *Rasayana* | | *Dugdha* | *Rasayana, Vajeekara* | 31 |
| 99. | *Vijaya Yoga(iii)* | *Nasaroga* | *1 Masha* | | | 31 |
| 100. | *Vijayadi Gutika* | *Kasa, Shwasa* | | | | 35,35 |
| 101. | *Vijayeshwara Rasa* | *Twakavikara* | *4 Masha* | *Daruharidra, Khadira, Neema* | | 22 |
| 102. | *Vyoshadi Churna* | *Sangrahani* | *3 Masha* | *Ghruta+ Madhu* | *Deepana, Balya* | 22 |

**Note:** Probable correlation of disease condition has been kept in table 4.

P.U. = Part used, L=Leaf, S=Seed, G=Ganja, Mo=Morning, Ev=Evening, Ni=Night, AN=Afternoon, Mt=Month

Dosage forms: *Rasa*- metalic or herbomineral prepearions, *Vati, Gutika*-Tablets, *Shaka*-Vegetables, *Leha*-Semi-solid jaggary based medicine for licking, *Parpati*-Crust medicine form, *Swarasa*-Expressed juice, *Kwatha*-Decoction, *Anupana*-Vehicle, *Siddha Jala*-medicated water, *Putapaka- ,Churna*- Powder , *Avaleha*-Confectionaries Medicated semisolid preparation , *Mandura vataka*- Preparation of ferric oxide clax ,*Usaba- ,Modaka*- Sweet based food or medicine in granules form , *Arka*- Liquid medicine preparation of volatile content ,*Paka*- Semisolid sugar, honey or jaggary based preparation

Dose:1 *Shana*=, 1 *Masha*= 1 g, 1 *Gunja*, *Ratti*= 125 mg , 1 *Makushtha*=size of a mat bean ,1 *Tola*/ *Karsha*= 12g, 1 *Aksha =12g* , 1 *Maricha*=size of a black peper *Chanaka*= size of a chickpea ,1 *Modaka*= ,1 *Tanka*= ,1 *Nishka*= 4 *g*, 1 *Badarasthi*- 1 *Kolasthi*= size of a ziziphus seed, 1 *Jatiphala*=size of a nutmeg, 1 *Kalaya* = size of a green pea

**Table 2: *Yoga* (Formulations) containing *Bhanga* as a as a minor ingredient**

| S. N | *Yoga*(Formulation) | *Adhikara*(Indication) | *Matra* (Dose) | *Anupana*(Vehicle) | *Karma*(Action of drug / formulation) | Refer-ence |
|---|---|---|---|---|---|---|
| 1. | *Afimpaka* | | 4 *Masha* | | *Balakara* | 20 |
| 2. | *Agastya Rasayana* | *Sangrahani* | | | | 28,24 |
| 3. | *Ahiphena Paka(i)* | *Vajeekarana* | | | *Veeryastambhana* | 18 |
| 4. | *Ahiphena Paka(ii)* | *Vajeekarana* | 1 *Tola* | *Mahisha*(buffalo) *Dugdha* | *Ayuvardhana, Rasayana, Vajeekarana* | 28 |
| 5. | *Amruta Vatika* | *Rasayana* | 0.9-1*Tola* | | | 23 |
| 6. | *Anya Churna* | *Sangrahani* | 4.5*Karsha* | | *162* | 9 |
| 7. | *Arkadi Kwatha* | *Dhanurvata* | | | | 35 |
| 8. | *Atisar vidaranama Rasa* | *Atisara* | 1 *Ratti* | | | 28 |
| 9. | *Bhanga Sharabata* | *Kshaya* | - | *Jala* | *Pushti, Balya* | 15 |
| 10. | *Bruhat Chandramruta Rasa* | *Kshaya, Kasa* | 4 *Ratti* | *Madhu* | | 36 |
| 11. | *Bruhatpaniya Gutika* | *Amlapitta* | 1 *Masha* | | | 37 |
| 12. | *Bruhat purna chandra Rasa* | *Rasayana, Vajeekarana* | | | | 29 |
| 13. | *Bruhatchandramruta Rasa (i)* | *Rajayakshma* | 4 *Ratti* | *Pippali+ Madhu* | | 31 |
| 14. | *Bruhatpaka* | *Sarvaroga* | | *Ghee, Dugdha* | *Balya, Veeryvardhaka, Vajeekara* | 15 |
| 15. | *Chandramruta Rasa (Bruhat)* | *Rajayakshma* | 4 *Ratti* | *Pippali 2 Ratti+Madhu ½ Tola* | | 23 |
| 16. | *Chyavanprasha Avaleha* | *Kshaya* | As per *Bala* | | *Rasayana, Deepana* | 39 |
| 17. | *Dadimavaleha* | *Atisara, Sarvatisara* | 1 *Pala* | | | 9, 38, 14 |
| 18. | *Drashtaphala paniya Vatika* | *Kaphaja Jwara* | | | | 29 |
| 19. | *Duralabha Arishta* | *Arishta* | | | *Deepana, Jwaraghna* | 17 |
| 20. | *Gangadhara Churna* | *Grahani* | 1.5 *Masha* | *Madhu, Manda, Ajadugdha* | | 21 |
| 21. | *Gandharyadi Nasya* | *Shiroroga* | | | | 28 |
| 22. | *Garbhavinodi Rasa* | *Sutikaroga* | *1Badarasthi* | *Gandhaprasarani rasa* | *Grahi, Shoolaghana* | 29 |
| 23. | *Gokshurapaka (i)* | *Vajeekarana, Prameha,* | | | | 15 |
| 24. | *Gokshura Paka* | *Vajeekarana* | | | *Rasayana, Vajeekarana, Balya, Tushtijanana* | 39 |
| 25. | *Grahanikapata Rasa(9)(i)* | *Grahani* | 1 *Ratti*, 3 *Ratti*, 3 *Masha* | *Ghruta* 1*Tola* + *Madhu* 1/2 *Tola/ After: Madhu, Before: Kshirini Jala +Saindhava + Maricha* | | 27, 41 , 28 |
| 26. | *Grahanikapata Rasa II* | *Atisara* | 3 *Ratti*+3 *Ratti* | *Shankha Bhasma* | | 24 |
| 27. | *Gunjagarbha Rasa (1)* | *Rasayana, Hrudroga* | 3 *Ratti* | *Ghruta* | | 28 , ,37 |
| 28. | *Gunjagarbha Rasa(3)* | *Vajeekarana* | 2 *Ratti* | *Dugdha* | *Deepana, Rukshana* | 28 |
| 29. | *Haridradi Modaka* | - | | | *Balya, Grahi* | 15 |
| 30. | *Jatyadi Vati* | *Bahumutra* | 1 *Chanaka* | | | 19 |
| 31. | *Kalagnirudro Rasa* | *Kaphaja Jwara* | 2 *Ratti* | | | 29 |
| 32. | *Kameshwara Modaka (2)* | *Vajeekarana* | 1 *Tola* | *Tila churna* | *Vajeekara, Shukrala, Rasayana, Grahani, Deepana, Bhutaghna* | 18,23 |
| 33. | *Kamehswara Modaka (1)* | *Vajeekarana* | 1-2 *Modaka* | | *Nitya Anandkara, Mrutuhara* | 28, 37 |
| 34. | *Kameshwara Rasa* | *Vajeekarana* | *½ Tola* | *Ghruta + Madhu* | *Rasayana* | 43 |
| 35. | *Kamsandipana Modaka* | *Vajeekarana* | | | *Balya, Bruhana, Ruchya, Deepana* | 15 |
| 36. | *Kaphachintamani Rasa* | *Kapha Roga* | 1*Chanaka*, 1 *Mana* | *Roganurupa* | | 11,29, 36,18,28 |
| 37. | *Karpursundara Vati* | *Vataja Grahani* | 1 *Kolasthi* | | | 28 |
| 38. | *Kasturibhushana rasa* | *Jwara* | 1-2 *Ratti* | *Adraka Swarasa* | *Veeryavardhana, Balya,* | 36, |



 

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|---|---|---|---|---|---|---|
| | | | | | *Shukrala, Ojovardhana* | 23,28 |
| 39. | *Kasturyadi Stambhana Vati* | *Vajeekarana* | 3 *Ratti* | | *Vajeekara, Vrushya* | 28, 17 |
| 40. | *Kesara Paka (2)* | *Rasayana, Vajeekarana* | 1 *Jatiphala* | *Dugdha* | *Vrushya, Vajeekara,, Balya, Rasayana* | 28 |
| 41. | *Khajuramruta Kalpa* | *Vajeekarana, Prameha* | 1 *Tola* | | - | 15 |
| 42. | *Kuchila Paka* | | | | | 15 |
| 43. | *Kushmanda Paka (Bruhat)* | *Vajeekarana* | ½-1 *Tola* | *Dugdha* | *Deepana, Dhatuvardhana* | 28 |
| 44. | *Madhya Lai Churna* | *Sangrahani* | | *Roganurupa* | | 31, 10 |
| 45. | *Lakshmivilasa Rasa* | *Vatavyadhi, Rasayana , Vajeekarana, Vishamajwara* | 1 *Chanaka*, 3*Ratti* | *Tambul patra/ Takra, Seedhu, Sura/ Mamsarasa, Dugdha, Dadhi, Jala, Seedhu* | *Grahi, Rasayana, Vajeekarana, Shukrala, Keshya, Rasayana, Netrya, Balya* | 11,23,29 ,31,318, 29,39 |
| 46. | *Lavangasava* | *Prameha, Dhatukshaya* | - | | | 31 |
| 47. | *Lavangadi Gutika* | *Agnimandya* | | *Chukra* | *Deepana, Ayuvardhana* | 17 |
| 48. | *Madanmanjiri Gutika* | *Vajeekarana* | | | | 17 |
| 49. | *Madankama Rasa* | *Upadansha* | 1 *Masha* | *Sharkara* | *Balya, Veerya vardhana* | 11 |
| 50. | *Madanpraksha Churna* | *Vajeekarana,Prameha* | 2.5 *Tola* | *Dugdha* | *Rasayana, Vajeekara, Vrushya, Balya* | 31 |
| 51. | *Mahabilvadya Leha* | *Pitta roga* | 3*Nishka* | | | 19 |
| 52. | *Mahabhutwara Ghruta* | *Balaroga* | | | | 23 |
| 53. | *Mahakameshwara Kalpa* | *Rasayana Kalpa* | ½ *Karsha* | *Dugdha, Shalmali-moola churna- Shukrala* | *Rasayana, Deepana, Grahi, Vajeekara, Shukrala* | 44 |
| 54. | *Mahalakshmivilasa* | *Shiroroga* | 2 *Ratti* | | | 36,23,11 ,36,23 |
| 55. | *Mahalavangadi Churna* | *Jwara* | | | | 45 |
| 56. | *Mahapushti Dava* | *Vajeekarana* | 1 *Tola* | *Dugdha+ Ghruta* | *Balya* | 15 |
| 57. | *Maharaja Vati* | *Vishamajwara* | 4 *Gunja* | *Madhu-Vishamajwara* | *Jwaraghna, Balya, Deepana, Jwaraghna, Shoolaghna, Grahi* | 11,23 |
| 58. | *Majum Usaba* | *Upadansha* | | | *Deepana, Balya, Pachana* | 15 |
| 59. | *Mansoullasaka Churna* | *Vajeekarana* | | | *Vrushya* | 17 |
| 60. | *Modakadi Churna* | *Atisara* | | *Madhu* | *Grahi* | 31 |
| 61. | *Nagasundara Rasa* | *Atisara* | 1 *Ratti* | *Madhu* | | 27,38 |
| 62. | *Namardihara Paka II* | *Vajeekarana* | 1 *Tola* | *Dugdha* | | 15 |
| 63. | *Naradiya Lakshmivilasa Rasa* | *Rasayana, Vajeekarana* | 3 *Gunja* | *Dugdha, Dadhi, Sura, Seedhu* | *Rasayana, Vajeekarana* | 11 |
| 64. | *Narayana Churna* | *Sangrahani* | | *Madhu* | | 38 ,22 |
| 65. | *Narayanjwarankusha Rasa* | *Taunajwara* | | | *Swedajanana, Jwaraghna* | 38,14 |
| 66. | *Paniya Vatika* | *Jwara* | 1 *Tila* | *Sheeta Jala* | | 38 |
| 67. | *Pippalyadi Churna* | *Sangrahani* | | | | 38 |
| 68. | *Praneshwara Rasa (3)* | *Sarvaraoga* | 1 *Masha* | *Koshna Jala* | | 38 |
| 69. | *Pushtikara Churna* | *Vajeekarana* | 1 *Tola* | *Dugdha* | *Deepana, Balya* | 15 |
| 70. | *Rajayoga* | *Vajeekarana* | 1 *Puga* | | | 31 |
| 71. | *Rasachandrika Vati* | *Shiroroga* | 1 *Kalaya* /2 *Ratti* | *Sheeta Jala* | | 11,23 ,31 |
| 72. | *Rasadi Gutika* | *Vatavyadhi* | | | | 29 |
| 73. | *Rudra Tailam I* | *Shiroroga* | As required | | | 31 |
| 74. | *Saouvarchaladi Churna* | *Grahani* | 6 *Masha* | *Madhu+ Sharkara* | | 27 |
| 75. | *Shakravhadi Kwatha* | *Sheeta Jwara* | | | | 35 |
| 76. | *Sharbata* | *Prasuti roga* | 1 *Tola* | | | 15 |
| 77. | *Sharbata II* | *Prasuti roga* | 1 *Tola* | | | 15 |
| 78. | *Shigru Pushpa Rasayana* | *Prameha* | | | *Stambhaka* | |
| 79. | *Shushkamuladya Taila* | *Shotha* | As required | | | 23,30 |
| 80. | *Stambhana Vatika(1)* | *Vajeekarana* | 1 *Chanaka* | *Madhu, Sita+ Ghruta+ Dugdha* | *Veeryastambhana* | 30 |
| 81. | *Swarjiksharadi Yoga* | *Grahani* | 1 *Masha* | *Madhu, Ghruta, Sharkara* | | 16 |
| 82. | *Trushanadi Loha* | *Sthoulya* | | *Madhu+ Ghruta* | *Balya, Varnya, Rasayana, Deepana* | 11,36,29 |
| 83. | *Udaradi Loha* | *Udara* | | | | 30 |
| 84. | *Unmattadya Arka* | *Vajeekarana* | | | | 17 |
| 85. | *Unmatbhairava Rasa(2)* | *Rasayana, Sannipata* | 2 *Ratti* | *Madhu* | | 28 |
| 86. | *Upadanshghna Modaka* | *Upadansha* | 2 *Tola* | | *Balya, Ojavardhana* | 28 |
| 87. | *Vajeekarana Yoga* | *Vajeekara* | 3 *Ratti* | *Ghruta+ Madhu* | | 46. |
| 88. | *Varisagaro Rasa* | *Kaphaja Jwara* | 4 *Masha* | | | 29 |
| 89. | *Vasadi Kwatha* | *Netraroga* | | | | 17 |
| 90. | *Vatalakshmi Vilasa* | *Vatavyadhi* | 1*Chanaka* | | | 36 |
| 91. | *Vijayadi Vrushya Yoga/ Rasayanabhra Yograja* | *Vajeekarana* | | | *Madakaraka* | 24 |

1 *Tila*- size of 1 seasam, 1 *Jatiphala* =size of 1 nutmeg, 1 *Puga*- size of 1 betel nut

**Table 3: *Bhanga* containing formulations external applications**

| S.N. | ***Yoga*(Formulation)** | ***Adhikara*(Indication)** | **M/m** | ***Matra* (Dose)** | ***Karma*(Action)** | **Reference** |
|---|---|---|---|---|---|---|
| 1. | *Amryasthi yoga* | *Palitya* | m | | *Ranjana* | 30 |
| 2. | *Bhanga (i)* | *Kshudra roga* | M | | | 12 |
| 3. | *Dhoopa* | *Arsha* | M | | | 17 |
| 4. | *Kanaka Taila* | *Shiroroga* | m | As required | | 23,18 |
| 5. | *Lepa* | *Jwara* | M | | *Nidrajanana* | 17 |
| 6. | *Mahalakshminarayana Taila* | *Vatavyadhi* | m | As required | | 22 |
| 7. | *Mahanarayana Taila* | *Vatavyadhi* | m | 2 *Tola* | | 25 |

 

| | | | | | | |
|---|---|---|---|---|---|---|
| 8. | *Mahapinda Taila* | *Vatarakta* | m | As required | | 23,31 |
| 9. | *Malla Taila* | *Vatavyadhi* | m | | | 12 |
| 10. | *Nirgundyadi Dhoopa* | *Dhooma* | m | | | 38 |
| 11. | *Pottali* | *Vajeekarana* | M | | | 24 |
| 12. | *Rudra Taila* | *Shiroroga* | m | As required | | 23 |
| 13. | *Saraswata Churna* | *Churna* | M | | | 19 |
| 14. | *Taila* | *Vajeekarana* | M | | *Uttejaka* | 12 |
| 15. | *Vijaya Bandha* | *Aagantuja Jwara* | M | | *Jwaraghna* | 22 |
| 16. | *Vijayadi Lepa* | *Kshudraroga* | M | 1 *Nishka* | | 22,26 ,25 |
| 17. | *Yoni-Sankochkara Gutika* | *Vajeekarana* | M | | | 24 |

P= *Panchanga*, m= minor ingredient, M= Major ingredient
Pottali mentioned for *Vajeekarana* is to be kept at site for 1 *Prahara* (3 hours)



Out of 193 formulations recommended for internal administration, 102 formulations have *Bhanga* as a major constituent, whereas, in 100 formulations it is a minor. (Table 1, 2). In nine external applications, *Bhanga* is in major proportion while in 8, it is in minor. (Table 3)
*Jatiphaladi Churna* for *Sangrahani, Atisara* and *Grahani, Kaphachintamani Rasa* for *Kapha Roga, Lakshmivilasa Rasa* for *Vatavyadhi, Rasayana, Vajeekarana* and *Vishamajwara, Mahalakshmivilasa* for *Shiroroga, Kameshwara Modaka* for *Vajeekarana Rasayana* and *Trushanadi Loha* for *Sthoulya* etc. are frequently repeated by classics.(Table 1,2,4)

**Table 4: *Adhikara* (Disease condition) wise categorization of formulations containing *Bhanga* and its probable modern co-relation**

| SN | *Adhikara*(Disease condition) | Probable modern disease co-relation as per API | No. of formulations where *Bhanga* is used as major ingredient | No. of formulations where *Bhanga* is used as minor ingredient | Total formulation |
|---|---|---|---|---|---|
| 1. | *Agnimandya* | Digestive impairment | 11 | 1 | 12 |
| 2. | *Ajeerna* | Indigestion | 1 | 0 | 1 |
| 3. | *Amlapitta* | Hyperacidity | 0 | 1 | 1 |
| 4. | *Apasmara* | Epilepsy | 1 | 0 | 1 |
| 5. | *Atisara/Sarvatisara/ Amatisara* | Diarrhoea | 9 | 5 | 14 |
| 6. | *Bahumutrata* | Excessive urination | 0 | 1 | 1 |
| 7. | *Balaroga* | Diseases of children | 0 | 1 | 1 |
| 8. | *Dhanurvata* | Tetanus | 0 | 1 | 1 |
| 9. | *Grahani* | Malabsorption syndrome | 18 | 7 | 25 |
| 10. | *Hrudroga* | Heart diseases | 0 | 1 | 1 |
| 11. | *Jwara* | Fever | 5 | 2 | 7 |
| 12. | *Kaphaja Roga* | Diseases of *Kapha Dosha* | 0 | 1 | 1 |
| 13. | *Kaphaja Jwara* | Fever due to *Kapha Dosha* | 0 | 3 | 3 |
| 14. | *Kasa* | Cough | 1 | 0 | 1 |
| 15. | *Kshaya* | Emaciation | 2 | 2 | 4 |
| 16. | *Kushtha* | Diseases of skin | 1 | 0 | 1 |
| 17. | *Nasaroga* | Diseases of nose | 3 | 0 | 3 |
| 18. | *Netraroga* | Diseases of eye | 0 | 1 | 1 |
| 19. | *Palitya* | Greying of hair | 0 | 1 | 1 |
| 20. | *Parinamshoola* | Peptic ulcer | 1 | 0 | 1 |
| 21. | *Pittaja Roga* | Diseases due to vitiation of *Pitta Dosha* | 0 | 1 | 1 |
| 22. | *Prameha* | Urinary disorders | 3 | 4 | 7 |
| 23. | *Putanaroga* | Napkin rash | 1 | 0 | 1 |
| 24. | *Rajayakshma* | Tuberculosis | 0 | 2 | 2 |
| 25. | *Rasayana* | Adapto-immuno-neuroendocrino-modulator | 5 | 4 | 9 |
| 26. | *Rasayana+ Vajeekarana* | Adapto-immuno-neuro-endocrino -modulator+ Aphrodisiac | 5 | 4 | 9 |
| 27. | *Sangrahani* | Malabsorption syndrome | 13 | 4 | 17 |
| 28. | *Sannipata* | Disease due to vitiation of all *Doshas* | 1 | 1 | 2 |
| 29. | *Sarvaroga* | All disease | 1 | 2 | 3 |
| 30. | *Sheetajwara* | Fever due to cold | 0 | 1 | 1 |
| 31. | *Shiroroga* | Diseases of head | 0 | 4 | 4 |
| 32. | *Shoola* | Pain | 1 | 0 | 1 |
| 33. | *Shotha* | Edema | 1 | 1 | 2 |
| 34. | *Shwasa* | Dyspnoea/ asthma | 1 | 0 | 1 |
| 35. | *Shwetakushtha* | Vitiligo | 1 | 0 | 1 |
| 36. | *Sparshavata* | Loss of sensation due to vitiated *VataDosha* | 2 | 0 | 2 |
| 37. | *Sthoulya* | Obesity | 0 | 1 | 1 |
| 38. | *Sutikaroga* | Postpartum diseases | 0 | 3 | 3 |
| 39. | *Tarunajwara* | Acute fever | 0 | 1 | 1 |
| 40. | *Udara* | Diseases of abdomen/ enlargement of abdomen | 0 | 1 | 1 |
| 41. | *Upadansha* | Syphilis | 0 | 3 | 3 |
| 42. | *Vajeekarana* | Aphrodisiac | 29 | 19 | 48 |

 

| | | | | | |
|---|---|---|---|---|---|
| 43. | *Vandhyatwa* | Impotency | 1 | 0 | 1 |
| 44. | *Vatavyadhi* | Diseases due to *Vata Dosha* | 1 | 2 | 3 |
| 45. | *Vishamajwara* | Intermittent fever | 0 | 1 | 1 |
| | **Total** | | 119 | 85 | 206 |

(**Note**: For four formulations Adhikara has not been mentioned by classic)

In due course of time, *Bhanga* has been excluded as an ingredient in some formulations like *Kanaksundara Rasa* and *Madanakamadeva Rasa*,probably to avoid its adverse effects [26].To avoid the adverse reactions classics recommends *Shodhana* of *Bhanga* before using it for oral administration. In *Madanmodaka, Mundyadi Gutika I, Madanaprakasha Churna* and *Ghritabharjita Bhanga* i.e. cannabis fried with *cowghee* is recommended for use in the formulations. Frying with *cowghee* is one type of *Shodhana* (purification/processing) method described for *Bhanga.* [ 46, 47, 48]

### *Adhikara* (Indication):

Formulations segregated according to their *Adhikara* (Indication) are described in table 4.Formulations containing *Bhanga* have been indicated in various 45 disease conditions. Use of *Bhanga*, as a levigating media, in the treatment of 40 disease conditions has been reported.[49] It is found that; maximum formulations i.e. 36 are described in *Vajeekarana* (Aphrodisiac) *Adhikara* followed by *Grahani* and *Sangrahani* (Malabsorption syndrome) i.e.24 and 16 formulations respectively. As per *Doshika* predominance; specifically one formulation each has been explained for *Kaphapittaja Sangrahani, Sannipatika Sangrahani* and *Amatisara* (Amoebic dysentery).Formulations of *Bhanga* are broad spectrum covering diseases of both *Amashaya* (stomach) and *Pakwashaya* (intestine) region where *Agnimandya* (hypofunctioning of *Agni*) is the root cause. *Bhanga* being a *Deepana, Pachana* drug works at the root level of disease and also has the *Vyadhi-pratyanikatwa* (Disease combating capacity) for the respective disease conditions as mentioned above. (Table 4)

*Bhanga* possess *Tikta Rasa, Ushna Veerya, Laghu Teekshna Guna, Kaphahara* and *Pittakara Doshaghnata, Grahi, Pachana Karma.* [50]*Bhanga,* being *Vyavayi*[51] in action, brings fast acting nature to formulation. This is due to its *Tikta Rasa* which has *Aakasha Vayu Mahabhuta* (element) composition, *Ushna Veerya*, *Laghu* and *Teekshna Guna*.[52]

Cannabis has been widely used for *Shukrala, Vajeekarana* purpose since ages. Recent in-vivo and in-vitro studies have concluded that cannabis may actually have peripheral antagonizing effects on erectile function by stimulating specific receptors in the cavernous tissue. Also, it seems that there are inherent differences between primate and non-primate species concerning cannabis effects on erectile functions.[53]Clinical studies showing correlation of cannabis use in male sexual function are conflicting and contradictory and limited in both quality and quantity. Few studies outlined the beneficial effects of cannabis in enhancing erectile function while others contradict the result. [54]

Crohn's disease and ulcerative colitis are two major chronic disorders of gastrointestinal tract forms of inflammatory bowel diseases (IBD). Anandamide and 2-arachidonoylglycerol are endogenous bioactive lipids that bind to and activate the cannabinoid receptors, and together with the enzymes responsible for their biosynthesis and degradation [fatty acid amide hydrolase (FAAH) and monoacylglycerol lipase (MAGL)] constitute the endocannabinoid system (ECS). The ECS is implicated in gut homeostasis, modulating gastrointestinal motility, visceral sensation and inflammation as well as being recently implicated in IBD pathogenesis.Therapeutic potential for the ECS have been identified through numerous subsequent studies investigating the effects of cannabinoid agonists and endocannabinoid degradation inhibitors in rodent models of IBD.[55]

### *Aushadha Kalpana* (Dosage forms):

About 22 different dosage forms of *Bhanga* have been reported in the classical texts of Ayurveda.(Table 5)

**Table 5: *Kalpana* (Dosage forms)of *Bhanga* (*Cannabis sativa* L.) for various internal or external formulations**

| S. N | *Kalpana* (Dosage form) | M | m | M | m | T | S.N. | *Kalpana* (Dosage form) | M | m | M | m | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Internal | | External | | | | | Internal | | External | | |
| 1 | *Churna* | 29 | 13 | 2 | 0 | **44** | 12 | *Putapaka* | 3 | 0 | 0 | 0 | **3** |
| 2 | *Rasa* | 20 | 23 | 0 | 0 | **43** | 13 | *Lepa* | 0 | 0 | 2 | 1 | **3** |
| 3 | *Modaka* | 10 | 29 | 0 | 0 | **39** | 14 | *Aasava* | 1 | 1 | 0 | 0 | **2** |
| 4 | *Vati* | 9 | 12 | 1 | 0 | **22** | 15 | *Arishta* | 1 | 1 | 0 | 0 | **2** |
| 5 | *Avaleha* | 8 | 5 | 0 | 0 | **13** | 16 | *Usaba* | 1 | 1 | 0 | 0 | **2** |
| 6 | *Taila* | 2 | 2 | 1 | 6 | **11** | 17 | *Dhoopa* | 0 | 0 | 1 | 1 | **2** |



 

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7 | *Paka* | 4 | 2 | 0 | 0 | **6** | 18 | *Arka* | 1 | 1 | 0 | 0 | **2** |
| 8 | *Sharabata* | 3 | 3 | 0 | 0 | **6** | 19 | *Loha* | 0 | 1 | 0 | 0 | **1** |
| 9 | *Gutika* | 5 | 1 | 0 | 0 | **6** | 20 | *Mandura Vataka* | 0 | 1 | 0 | 0 | **1** |
| 10 | *Ghruta* | 2 | 3 | 0 | 0 | **5** | 21 | *Pottali* | 0 | 0 | 1 | 0 | **1** |
| 11 | *Kwatha* | 3 | 1 | 0 | 0 | **4** | 22 | *Bandhana* | 0 | 0 | 1 | 0 | **1** |

M-*Bhanga* as a major ingredient, m=*Bhanga* as a minor ingredient T: Total, *Churna*=powder, *Rasa*=Purified metalic or herbomineral prepearions,*Modaka*= Bolus/Sweet based food or medicine in granules form, Vati/ *Gutika* = Tablets, *Avaleha*=Confectionaries, *Taila*=Oil, *Paka*= Semisolid sugar, honey or jaggary based preparation, *Sharabata*=Medicated juicy preparation, *Kwatha*= Decoction, *Putapaka: Swarasa* extracted by heating drug material closed container-, *Lepa*=soft mixtures for application or cream, *Aasava, Arishta* =Self generated alcoholic preparations , *Usaba*=Unani preparation , *Dhoopa*= Fumes , *Arka*- Liquid medicine preparation of volatile content, *Loha*=Iron based medicinal preparation, *Mandura Vataka*- Preparation of ferric oxide clax, *Pottali*= a mercurial preparation , *Bandhana*=Bandag

Among them, *Churna*(powder) is maximum[44] followed by *Rasa* (Purified metalic or herbomineral prepearions)[43]and *Modaka* (Bolus/Sweet based food or medicine in granules form).[39]Out of 22 dosage forms, eight are solid dosage forms i.e. *Rasa, Vati* (Tablets), *Churna, Loha* (Iron based medicinal preparation), *Modaka*, *Gutika*(Tablets), *Mandura-Vataka* (Preparation of ferric oxide clax), *Dhoopa* (Fumes); five are semi-soild dosage forms i.e. *Avaleha*(Confectionaries), *Paka(*Semisolid sugar, honey or jaggary), *Lepa* (soft mixtures for application or cream), *Pottali* (here it is a mercurial preparation) and *Bandhana* (Bandage)filled with *Kalka-Dravya*(semisolid preparation of herbal powders)*;* and eight are liquid dosage forms i.e. *Arka* (Liquid medicine preparation of volatile content), *Kwatha* (Decoction), *Aasava* (Self generated alcoholic preparations), *Taila* (oil), *Ghruta*(Ghee), *Sharabata* (Medicated juicy preparation), *Arishta(*Self generated alcoholic preparations) , *Usaba* (A type of unani preparation). (Table 5) As *Bhanga* is used in varied dosage forms, it suggests its solubility both in water, milk, and alcohol as well as lipid media.

For *Vajeekarana* purpose *Modaka Kalpana* is commonly advised. It is generally prepared by using sugar, jaggery, *ghee* etc. edibles. It is reported that, eating of cannabis preparations does not produce effects for 30 minutes to 2 hours, and the perceived high is relatively prolonged, lasting 5 to 8 hours or even longer. The slow action of orally ingested cannabis is due to $\Delta^9$-THC being absorbed by the intestine and transported to the liver where it is converted into 11-OH-THC, an equipotent and longer-lasting metabolite .[56]

In recent pharmaceutical development cannabis is being used in various dosage forms. In recent market, cannabis is available in extracts, herbal cannabis, tinctures, resins, edibles, lozenges, lollipops, nabiximols and prescribed cannabinoids nabilone, dronabinol etc.Tincture is prepared by soaking the dried flowers of the female hemp plant (marijuana) in ethanol as tetrahydrocannabinol (THC) and other cannabinoids dissolve into the alcohol.[57] This tincture can be used orally or as an external application for skin. An example for such type of pharmaceutical preparation is nabiximols with trade name "Sativex" used as an oral spray.In *cannabis oil* ground cannabis plant material may be "activated" by the decarboxylation of (−)– Trans-Δ9-tetrahydrocannabinol acid to (−)-Trans-Δ9-tetra-hydrocannabinol (THC) in order to become a psychoactive compound. On heating the highest yield of psychoactive THC is achieved at 110 °C after 110 minutes due to decarboxylation. [58] Nowadays,cannabis cooking oils are available to medical cannabis patients in a variety of organic blends for various cooking applications. [59]Cannabis edibles or cannabis infused food are available in market which contains cannabinoids, significant amount of THC which can induce a wide variety of feelings, including relaxation, euphoria and panic. Cannabis edibles are consumed for spiritual, medical, and recreational purposes. The effects of THC depend on the amount of THC consumed and on the presence of other psychoactive substances in the food. A minority of edibles contains trace amounts of THC and instead contains significant amounts of other cannabinoids, most commonly CBD. Cannabis-infused butter or canna-butteris prepared by heating the raw cannabis in melted butter allows the cannabinoids to be extracted by the fat. A cannabis-infused drink, sometimes called a liquid edible or drinkable, is a drink that has been infused with cannabinoids. Traditional cannabis-infused drinks include the Indian drinks *Lassi* and *Thandai* when prepared with *Bhanga*.Cannabis tea is an herbal tea that is psychoactively weak due to the lack of fat and alcohol in the drink. In U.S. states that have legalized cannabis for recreational use, drinks are an increasingly popular means of consuming cannabinoids.[60] Mirth provisions is one of the largest companies in the emerging cannabis-infused beverage market, known for its line of drinks called Legal[61].The *Modaka, Paka,*



 

*Sharabata, Usaba, Ghruta* etc. falls under the category of cannabis edibles.

### *Anupana* (Vehicle):

Classics texts have advocated 49 *Anupana* for administration of *Bhanga* in various disease conditions. (Table 6)

**Table 6: Various *Anupana* (Vehicle) of formulations containing *Bhanga* (*Cannabis Sativa* L.)**

| SN | *Anupana* (Vehicle) | SN | *Anupana* | SN | *Anupana* | SN | *Anupana* |
|---|---|---|---|---|---|---|---|
| *1* | *Dugdha* | *14* | *Guda* | *27* | *Manda* | *40* | *Tambula* (*Piper betel* Linn.) *patra* |
| *2* | *Koshna Dugdha* | *15* | *Guda +Shunthi* | *28* | *Payasa* | *41* | *Daruharidra* (*Berberis aristata* DC.) |
| *3* | *Dugdha+ Sharkara* | *16* | *Takra* | *29* | *Tila* (*Sesamum indicum Linn.*) *Churna* | *42* | *Khadira* (*Acacia catechu Linn.*) |
| *4* | *Dugdha+ Sharkara+ Ela* | *17* | *Dadhi*(Curd) | *30* | *Tilataila* | *43* | *Neema* (*Azadirachta indica* A. Juss.) |
| *5* | *Dugdha+ Ghruta* | *18* | *Mastu* | *31* | *Taila/Tilataila + Saindhava* | *44* | *Gandhaprasarani rasa* |
| *6* | *Madhu* (Honey) | *19* | *Kanji* | *32* | *Dhattura* (*Datura metel Linn.*) *Beejataila* | *45* | *Shankha Bhasma* |
| *7* | *Madhu+ Maricha* | *20* | *Aranala* | *33* | *Jala* | *46* | *Kshirini*{*Manilkara hexandra* (Roxb.)Dubard} *Jala + Saindhava + Maricha* (*Piper nigrum* Linn.) |
| *8* | *Madhu+ Pippali* | *21* | *Seedhu* | *34* | *Sheeta Jala* | *47* | *Adraka Swarasa* |
| *9* | *Madhu+ Sharkara* | *22* | *Sura* | *35* | *Koshna Jala* | *48* | *Tushodaka* |
| *10* | *Ghruta* | *23* | *Mamsa-rasa* | *36* | *Karpura* (*Cinnamomum camphora* Nees & Eberm) | *49* | *Tandulodaka* |
| *11* | *Ghruta+ Madhu* | *24* | *Chukra* | *37* | *Rudraksha* (*Elaeocarpus ganitrus Roxb.*) *Beeja* | *50* | *Roganurupa* |
| *12* | *Ghruta + Saindhava* | *25* | *Sharkara* | *38* | *Bilwa* (*Aegle marmelos* Corr.) *Kwatha* | | |
| *13* | *Ghruta +Sita* | *26* | *Aja-dugdha* | *39* | *Shalmali Moola Kwatha* | | |

Formulations showing multi-disease action can be administered with the *Roganurupa Anupana* (Vehicle as per the vitiated *Dosha* or disease condition).The same principle is applicable where *Anupana* are not mentioned. Amongst all, most commonly used *Anupana* are *Dugdha* (Milk), *Madhu* (Honey), *Takra* (Buttermilk), *Ghruta* etc.Some *Anupana* are specified indication-wise e.g. *Madhu* for *Deepana* (Appetizer) and *Vishamajwara* (Intermittent fever)and *Kanji* (fermented preparation)for *Vatakaphajaroga/ Tushodaka*(Feremented preparation of cereals with husk), *Dugdha+ Shrakara* (Sugar)+ *Ela* (*Eletteria cardamomum* Maton.) and *Shalmali* (*Salamalia malabarica* Schott & Endl) *Moola* (Root*) Churna* (Powder)for *Shukrala* (Spermatopoietic)activity.(Table 1,2)Perez-Reyes et al., reported that effect of THC dissolved in five different vehicles and delivered each in gelatin capsules. The vehicle that produced the highest plasma cannabinoid concentration was reported in sodium glycocholate followed by sesame oil. Authors concluded that the speed and degree of absorption were greatly influenced by the vehicle, thus validating the concept of *Anupana*.[62]

### *Matra* (Dose):

The *Rasa* formulations containing *Bhanga* in major proportion can be administered minimum from 1 *Chanaka* upto 1 *Ratti*(125 mg)but when it is in minor proportion it can be prescribed upto 1 *Masha* (4 g). *Bhanga* formulations in C*hurna* form can be given upto 1 *Tola* (12g).(Table 7) *Paka* containing *Bhanga* can be given maximum upto 1 *Tola*(12g).It is found that for *Vati Kalpana* there wide dose range i.e. 1 *Tila*, 1 *Makushtha*, 1 *Ratti*, 1 to 4 *Masha* and maximum upto 4 *Tola*. *Modaka* preparation can be given upto 2 *Tola* (24g). *Kwatha* dose has not been given, it should be considered as standard dose given by Ayurveda pharmaceutics i.e. *Asava* must be given as per *Agni* i.e. digestion power of an individual. The maximum dose suggested for *Avaleha* is 1 Pala (48 g).*Sharabata* can be given upto 1 Tola(12 ml).The dose for formulations like *Arka, Usaba, Ghruta, Arishta* and *Loha* etc has not been mentioned, it should be consider according to classical recommendation.(Table 1,2,7)

### *Aushadha Sevana Kala* (Time of administration):

Mostly formulations indicated for *Rasayana* purpose are advised to be administered in morning time i.e. *Rasayanakala*. Formulations for the *Vajeekarana, Shukrala* purpose are advised to be administered in night time i.e. *Nishikala* (Table 7).



 

**Table 7: Maximum and minimum *Matra* (Dose) of *Bhanga* (*Cannabis sativa* Linn.) formulation according to *Kalpana* (dosage forms)**

| S. N. | *Kalpana* (Dosage form) | M/ m | *Yoga* (Formulation) | Minimum dose | Reference | Formulation | Maximum dose | Reference |
|---|---|---|---|---|---|---|---|---|
| 1. | ***Rasa*** | **M** | *Anya Kalpa, Talakeshwara Rasa* | 1 *Ratti* | 9,25,23, 29 | *Grahanyari Rasa (2)* | 1 *Chanaka* | 28 , 23 |
| | | **m** | *Atisara Vidaranama Rasa* | 1 *Ratti* | *28* | *Varisagaro Rasa* | 4 *Masha* | |
| 2. | ***Churna*** | **M** | *Bruhat Lai Churna(i), Gangadhara Churna (Bruhat), Lai Churna (Madhyama ) (3), Lai Churna (1), Lai Churna (4)(Laghu)/ Lai Rasa* | 1 *Masha* | 15 , 19, 42,31, 31, 31 , 10 | *Jatiphaladi Churna, Lavika Churna I (Madhyama)* | 1 *Tola* | 21,24, 17,14, 22,31, 29 |
| | | **m** | *Gangadhara Churna* | 1.5 *Masha* | 31 | *Madanapraksha Churna* | 2.5 *Tola* | 31 |
| 3. | ***Paka*** | **M** | *Gokshura Paka (ii)* | 3 *Masha* | 28 | *Gokshura Paka (ii), Gokshuradi Paka* | 1 *Aksha* | 28, 17 |
| | | **m** | *Kesara Paka (2)* | 1 *Jatiphala* | 28 | *Ahiphena Paka(ii)* | 1 *Tola* | 28 |
| 4. | ***Vati*** | **M** | *Daradadi Vati* | 1*Makushtha* | 16 | *Kamadeva Vati* | 4 *Tola* | 24 |
| | | **m** | *Paniya Vatika* | 1 *Tila* | 38 | *Bruhatapaniya Gutika* | 1 *Masha* | 37 |
| 5. | ***Modaka*** | **M** | *Kameshwara Modaka* (2),*Kamasundara Modaka* | 1 *Masha* | 28,23,18 | *Madana Modaka* | 2 *Tola* | 15 |
| | | **m** | *Kameshwara Modaka (2)* | 1 *Tola* | 18,23 | | | |
| 6. | ***Kwatha*** | **M** | *Katukadi Kwatha* | | 30 | | | |
| | | **m** | *Arkadi Kwatha* | | 31 | | | |
| 7. | ***Asava*** | **M** | *Kumaryasava III* | As per *Agni* | 18 | | | |
| | | **m** | *Lavangasava* | | 31 | | | |
| 8. | ***Avaleha*** | **M** | *Vijaya Avaleha* | 2 *Masha* | 31,13 | *Madana Kameshwari Leha* | ½ *Tola* | |
| | | **m** | *Chyavanprasha Avaleha* | As per *Bala* | 39 | *Dadimavaleha* | 1 *Pala* | 9, 38, 14 |
| 9. | ***Arka*** | **M** | *Madaka Dravya Arka* | | 33 | | | |
| 10. | ***Usaba*** | **M** | *Majuma Usaba Magarabi* | | 15 | | | |
| | | **m** | *Majum Usaba* | | 15 | | | |
| 11. | ***Ghruta*** | **M** | *Vijaya Ghruta* | | 31 | | | |
| 12. | ***Taila*** | **m** | *Shushkamuladya Taila, Rudra Tailam* | As required | 23,30,31 | | | |
| 13. | ***Sharabata*** | **m** | *Bhanga Sharabata* | | 15 | *Sharbata II* | 1 *Tola* | 15 |
| 14. | ***Arishta*** | **m** | *Duralabha Arishta* | | 17 | | | |
| 15. | ***Ghruta*** | **m** | *Mahabhutwara Ghruta* | | 23 | | | |
| 16. | ***Loha*** | **m** | *Trushanadi Loha, Udaradi Loha* | | 11,36,29 ,30 | | | |

**Table 7: *Aushadha Sevana Kala* (Time of administration) of formulations containing *Bhanga* (*Cannabis sativa* L.)**

| S N | Time of administration of formulation | Frequency of administration of formulation | Formulations |
|---|---|---|---|
| 1 | Morning | OD | *Gokshuradi Paka, Lavika Churna I(Madhyama), Madana Modaka, Kushmanda Paka (Bruhat), Praneshwara Rasa (3), Rasachandrika Vati, Shigrupushpa Rasayana, Vasadi Kwatha* |
| 2 | Night | | *Kamadeva Vati, Kamadeva Vati, Madana Kameshwari Leha, Afimpaka, Ahiphena Paka(i), Madanapraksha Churna, Mahakameshwara Kalpa,, Stambhana Vatika(1)* |
| 3 | Evening | | *Madananda Modaka* |
| 4 | Morning ,night | BID | *Lai Churna (2)/ Madhya Lai Churna, Madana Modaka, Kesara Paka (2)* |
| 5 | Morning, evening | | *Grahanigajakesari Rasa (1), Rasadi Gutika, Sharabata II* |
| 6 | For two hours after diet | | *Rajayoga* |
| 7 | Morning, evening , night | TID | *Vangeshwaradi Vati* |

## *Aushadha Sevana Avadhi (*Period of administration):

Formulations containing cannabis as an ingredient, in specific dosage form, are safe to administer from two months maximum upto the period of one year. [27,38](Table 8) Chronic effects of cannabis use include mood disorders, exacerbation of psychotic disorders in vulnerable people, cannabis use disorders, withdrawal syndrome, neurocognitive impairments, cardiovascular and respiratory and other diseases. [63]

**Table 8: *Aushadha Sevana Avadhi* (Period of administration) for the formulation containing *Bhanga* (*Cannabis sativa* L.)**

| Sr No | No. of days to be administered | Formulation |
|---|---|---|
| 1. | 7 days (Minimum) | *Vasadi Kwatha* |
| 2. | 15 days | *Kumaryasava* |
| 3. | 40 days | *Talavatika, Talakeshwara Rasa,Bruhatpaka* |
| 4. | 42 days *(1 Mandala)* | *Jatyadi Vati* |
| 5. | 60 days | *Udayaditya Rasa (4), Sparshavataghna Rasa* |
| 6. | 90 days | *Madanodaya Modaka* |
| 7. | 120 days | *Vijaya Yoga(ii), Bruhatapaka* |
| 8. | 180 days | *Kamadeva Modaka Rasayana I* |
| 9. | 365 days (Maximum) | *Kameshwara Modaka (1)* |

## *Pathya-Apathya* (Do's and dont's):

The do's and don'ts of a patient during administration of formulations containing *Bhanga*

*IJPBA, Nov-Dec, 2017, Vol. 8, Issue 6*

has been well reported.(Table 9) It is always advisable to follow the *Pathya-Apathya* for desired therapeutic effects.

**Table 9: *Pathya-Apathya* (Do's And Dont's) for formulations containing *Bhanga* (*Cannabis sativa* L.)**

| N | Formulation | Do's | Ref |
|---|---|---|---|
| 1. | *Anyata Lai Churna I* | To be taken with food | 10 |
| 2. | *Lai Churna (6)(Laghu)* | During administration of formulation there is no diet restrictions even curd, fish are indicated. | 29,13,22 |
| 3. | *Mahakameshwara Kalpa* | Milk in diet | 44 |
| 4. | *Mrutsanjeevana Rasa(ii)* | Diet should be followed strictly. | 15 |
| 5. | *Pushti Dava* | Diet should be followed strictly. | 15 |
| 6. | *Udayaditya Rasa (4)* | Rice, Ghee | 28 |
| 7. | *Grahanikapata Rasa (9) (i)* | Can be administered with *Dugdhika (Euphorbia hirta* Linn.*) Churna, Jeeraka* (Cuminum cyminum *Linn.*), *Saindhava, Maricha* (*Piper nigrum* Linn.) with curd to be administered | 27, 41 , 28 |
| 8. | *Kesara Paka (2)* | Avoid food at night | 28 |
| 9. | *Narayanjwarankusha Rasa* | It causes sweating thus cover the body .*Pathya* (Dietary) food and Curd cold water can't be given afterward | 38,14 |
| 10. | *Paniya Vatika* | After administration keep body covered with warm cloth. | 38 |
| 11. | *Praneshwara Rasa (3)* | Can be taken with cold water | 38 |
| 12. | *Rajayoga* | Keep *Javitri* (*Myrstica fragrance* Houtt.) in mouth during administration period. | 31 |
| 13. | *Saouvarchaladi Churna* | If felt tastelessness take with cow buttermilk | 27 |
| 14. | *Udayaditya Rasa(4)* | Night awakening not restricted. | |
| 15. | *Upadanshghna Modaka* | *Dugdha* (milk), *Mamsarasa* (meat juice). | 28 |
| 16. | *Vajeekarana Yoga* | *Payasa* (An Indian recipe) of cowmilk+ wheat+ Honey+ ghee for 21days and avoid intercourse during this *Payasa* administration | 45 |
| 17. | *Varisagaro Rasa* | Curd of buffalo to be taken. | 28 |
| 18. | *Vasadi Kwatha* | It should be taken next morning, prepared 1 day before | 28 |
| 19. | *Lepa* | *Lepa* on plantar sole of legs | 17 |
| | | **Dont's** | |
| 20. | *Bruhatpaka* | Don't indulge in sexual activities till administration i.e. 40 days | 17 |
| 21. | *Praneshwara Rasa (3)* | Vegetables, pulses, *Diwaswapa*, oil massage, sex are contraindicated | 38 |
| 22. | *Rajayoga* | Salt, sour curd are contraindicated | 31 |
| 23. | *Kamadeva Modaka Rasayana* | Sex is contraindicated | 15 |
| 24. | *Lai Churna (2)/ Madhya Lai Churna* | *Takra* is contraindicated | 31, 29 |
| 25. | *Takra* (prepared with *Bhanga*) | Salt to be avoid during administration. | 23 |
| 26. | *Udayaditya Rasa (4)* | Night awakening to be avoid. | 28 |

## Specific uses:

Formulations on which specific emphasis is given for its activity or administration are described in table 10.*Bhanga* containing formulations can be given in pediatric cases e.g. *Talisadi Churna.* There is no classical evidence that, the formulations containing *Bhanga* either as an ingredient or as a levigating media can be given in pregnancy.[64]However, Animal studies reports that cannabis exposure during pregnancy may alter the normal processes and trajectories of brain development.[65]Long-term effects of marijuana consumption on prenatal exposure to humans is yet to be explored.

**Table 10: Specific uses of formulations containing *Bhanga* (*Cannabis sativa* L.)**

| SN | Formulation | Specific uses | Ref |
|---|---|---|---|
| 1. | *Lai Churna 7(Bruhat)* | Wood can be digested {i.e. it's an *Uttama Pachana (*powerful digestive) churna} | 31 |
| 2. | *Dnyanodaya rasa* | Administration causes quick sexual arousal | 17, 30 |
| 3. | *Kamagnisan diapana Modaka* | It is *Sukrakara* i.e. increases high sexual potency | 25,23 |
| 4. | *Kameshwara Modaka* | Useful for all men | 16,27,8, 26,23 |
| 5. | *Kameshwara Modaka (5)* | Person can indulge in high sexual activities after administration of the drug. | 28 |
| 6. | *Kameshwara Modaka (8)* | 1 Tab causes 4 hours of *Veeryastambhana* i.e. semen fall is avoided. As per classics, it's a clinically tested formulation. After administration for some period the strength becomes stable and then persists as it is. | 28 |
| 7. | *Maha Kameshwara Modaka* | Person can digest double quantity of diet. | 31 |
| 8. | *Talisadi Churna* | Useful of child | 21,14,24 |
| 9. | *Lakshmi-vilasa Rasa* | People can endulge in high sexual activities after administration. It is said that Lord Krishna has consumed this drug so was able to have multiple thousands of relations. | 11,23,29 ,31,37,2 9,39 |
| 10. | *Madanpraksha Churna* | Useful for adults | 31 |
| 11. | *Mahabhutwara Ghruta* | Can be used in *Nasya, Abhyanga* or *Dhoopana* form. | 23 |
| 12. | *Trushanadi Loha* | No diet and lifestyle restriction | 11,36,29 |
| 13. | *Udaradi Loha* | *Satmya* (Assimilated due to consumption) food | 30 |
| 14. | *Unmattadya Arka* | Men can do intercourse for long time | 17 |
| 15. | *Karpursundara Vati* | Useful for deaddiction of *Ahiphena* with chronic addictors | 28 |

## Instructions during the administration of *Bhanga* containing formulations:

Formulations like *Kamadeva Vati*, *Madana Modaka* and *Madananda Modaka* are specially designed for those involving in multi-partner sexual activities. Such preparations possess high sexual potency thus, strictly prohibited for the common person. In formulations like *Madana Modaka*, *Mundyadi Gutika* it is advised to use *Ghrutabharjita* (fried with cow's ghee) or *Mrudubharjita* (shallow fried) *Bhanga*. During administration of *Talakeshwara Rasa* indicated for *Vatavyadhi* it is instructed to live in cowdung



 

coated home or in cow's shade probably to avoid its heat effect as the formulation is prepared by using cannabis seeds which has high volatile content[66], *Bhanga* being a *Pittala* in action.[67] (Table 11)

**Table 11: Instruction while administration of formulations containing *Bhanga (Cannabis sativa* L.)**

| SN | Formulation | Instruction | Reference |
|---|---|---|---|
| 1. | *Kamdeva Vati* | Tablet prepared for kings not to be administered by common man. | 18 |
| 2. | *Madana kameshwari leha* | Keep *Avaleha* in between *Champak (Michelia champaca* L), *Ketaki* (*Pandnus odorifer* Forssk. Kuntze) , *Jati* (*Jasminum grandiflorumLinn.*) *Pushpa* | |
| 3. | *Madana Modaka* | It is said that Lord *Vasudeva* has administered it thus can have relations with 16108 females indicating its high *Shukrala* and *Vajeekara* potency. | 15 |
| 4. | *Madananda Modaka* | Administration of 108 *Modaka* gives *Amruta* (nectar) like properties. It is said to be Best medicine for all disease. | 31 |
| 5. | *Madana Modaka* | *Ghrutbharjita Bhanga* to be used while preparing formulation. | 31 |
| 6. | *Mundyadi Gutika I* | *Mrudu Bharjita Bhanga* to be used while preparing formulation. | 22,31 |
| 7. | *Sparshavata ghna rasa* | It should be administered at sunrise | 27,30 |
| 8. | *Talakeshwar a Rasa* | Patient must live in cowdung coated home and in shade. | 25,23,29 |
| 9. | *Agastya Rasayana* | No diet and lifestyle restriction during administration also no restriction for indulging in sexual activities. | 28, 24 |
| 10. | *Ahiphena Paka* | Keep the drug in mouth during intercourse | 18 |
| 11. | *Kanaka Taila (E)* | Very potent formulation; even a drop can spoil *Durva* (*Cynodon dactylon* L.) grass.<br>Oil examination: If drop falls on *Durva* grass it should get dried. | 23, 18 |

## *Bheshaja Prayoga Marga* (Routes of drug administration):

The route of administration of cannabis can affect the onset, intensity, and duration of the psychotropic effects, the effects on organ systems, and the addictive potential and negative consequences associated with its use. [68] Various routes of administration such as oral, topical, inhalation etc. are presented in Table1, 2,3 and 5.

Nowadays, cannabis is used by inhalation both by smoking and vaporization, oral, oromucosal or sublingual, topical and rectal routes of administration. Smoking, a widely used route of cannabis administration, provides a rapid and efficient method of drug delivery from the lungs to the brain, contributing to its abuse potential. Intense pleasurable and strongly reinforcing effects may be produced due to almost immediate drug exposure to the central nervous system (CNS). Slightly lower peak THC concentrations are achieved after smoking as compared to intravenous administration. [69] Bioavailability following the smoking route was reported as 2−56%, due in part to intra- and inter-subject variability in smoking dynamics, which contributes to uncertainty in dose delivery.[70] Very few studies are available on the disposition of THC and its metabolites after oral administration of cannabis as compared to the smoked route. THC is readily absorbed due to its high octanol/water partition coefficient (P).[71] The advantages of cannabinoid smoking are offset by the harmful effects of cannabinoid smoke; hence smoking is generally not recommended for therapeutic applications.

Ayurveda classics advocate oral as a principal route of administration for many of cannabis formulations. Due to low bioavailability of oral THC formulations, alternative routes of drug administration, including oromucosal or sublingual dosing, vaporization of product and inhalation, and rectal administration, have been developed to improve the amount of delivered cannabinoids.*Sativex*® a standardize extract of cannabis contains equal proportions of THC and CBD is administered sublingually to avoid first-pass metabolism by the liver. *Sativex*® is approved in Canada for the treatment of neuropathic pain associated with multiple sclerosis. [72]

On oral and rectal administration it is found that, THC concentrations peaked within ranged between 2.1 to 16.9 ng/ml and 1.1−4.1 ng/ml respectively. The bioavailability of the rectal route was approximately twice that of the oral route due to higher absorption and lower first-pass metabolism. [73] However, the data is procured from pilot study on two patients and need to be explored in detail.Topical administration, another route of cannabinoid exposure to avoid first-pass metabolism and improves THC bioavailability.[74] Transdermal delivery of cannabinoids is hoped to reduce negative side effects seen with inhalation dosing. These properties could improve the utility of transdermal cannabinoid slow delivery of THC to the brain and hence drug-abuse potential of cannabinoid is expected to be low. However, extraction of cannabinoids for rapid delivery through Transdermal route has not been evaluated.Intravenous (i.v.)administration of cannabis showed symptoms like acute paranoi, panic, hypotension, withdrawal of consent due to dislike of THC effects like broad range of transient symptoms, behaviors, and cognitive deficits in healthy individuals that resembled endogenous psychoses. Hence, IV administration



 

is not a prescribed route for cannabis. Ayurveda has not advised i.v. administration.

## *Karma* (Action):

*Bhanga* has been repeatedly quoted to be a *Balya* drug followed by *Rasayana, Vajeekara, Deepana, Vrushya, Shukrala, Brumhana, Pachana, Medhya* and, *Stambhana* etc. activities.(Table 12).

**Table 12: Various *Karma* (Action) of formulations containing *Bhanga (Cannabis sativa* L.*)***

| SN | *Karma* (action) | R | SN | *Karma* (action) | R | SN | *Karma* (action) | R | SN | *Karma* (action) | R | SN | *Karma* (action) | R |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **1** | *Balya* (tonic) | 43 | **11** | *Ayuvardhana /Ayukara* (Life enhancer) | 6 | **21** | *Ruchya* (Taste promoter) | 2 | **31** | *Kamavriddhikara* (Increases sexual potency) | 1 | **41** | *Vashikarana* (Hypnotism/Subjugation) | 1 |
| **2** | *Rasayana* | 28 | **12** | *Medhya* (Memory booster) | 5 | **22** | *Pachana* (Digestant) | 4 | **3** | *Buddhiprada* (Memory inducer) | 1 | **42** | *Mrutuhara* (Life saving) | 1 |
| **3** | *Vajeekara* | 28 | **13** | *Jwaraghna*(Antipyretic) | 5 | **23** | *Madakari* (intoxicant) | 2 | **33** | *Raktajanana* (Haemopoietic) | 1 | **43** | *Sthira* (Stable) | 1 |
| **4** | *Deepana* (Appetizer) | 25 | **14** | *Shoolaghna*(Analgesic) | 4 | **24** | *Manvinodkara* (Mood stabilizer) | 2 | **34** | *Raktavardhana* (Haematenic) | 1 | **44** | *Kshudhavruddhikara* (Hunger stimulator) | 1 |
| **5** | *Grahi* | 13 | **15** | *Nidrajanana* (Sedative) | 3 | **25** | *Buddhivardhaka* (Memory enhancer) | 3 | **35** | *Medohara* (Anti-lipidemic) | 1 | **45** | *Netrya* (Eye tonic) | 1 |
| **6** | *Vrushya (*Aphrodisiac) | 12 | **16** | *Uttejaka* (Stimulant) | 3 | **26** | *Veeryakara/ Veeryvardhaka/Pourushakara* | 3 | **36** | *Dhatuvardhana* (Tissue promoter) | 1 | **46** | *Nitya-Anandkara* | 1 |
| **7** | *Shukrala* (Spermatopoietic) | 11 | **17** | *Varnya* (Complexion promoter) | 3 | **27** | *Ojovardhana/ Ojakara* | 2 | **37** | *Swedajanana* (Sweat producer) | 1 | **47** | *Drushtivardhaka* (Vision promoter) | 1 |
| **8** | *Bruhana* (Bulk promoter) | 9 | **18** | *Pushtikara* (tonic) | 3 | **28** | *Sukhakara* (Spermatogenesis) | 1 | **38** | *Rukshana* (roughning) | 1 | **48** | *Vishaghna* (anti-poison) | 1 |
| **9** | *Kantida / Kantikara* (Complexion promoter) | 7 | **19** | *Keshya* (Hair tonic) | 2 | **29** | *Shukrastambhana* (Prevents spermatorrhoea) | 1 | **39** | *Chintahara* (Anti-anxiety) | 1 | **49** | *Parama* (Best)*Rasayana* | 1 |
| **10** | *Stambhana* (Withholds faces, urine) | 6 | **20** | *Ojavardhana* (*Oja* promoter) | 2 | **30** | *Shukrashodhana* (Semen depurant) | 1 | **40** | *Bhutaghna* (Antibacterial) | 1 | | | |

**R: repetition**

It is observed that these formulations have multi-varient actions. Thus, it can be used to combat multiple clinical conditions. It is evident from present review that *Bhanga* has active role in treating multisystem disorders of almost all *Strotasa* (systems) diseases (disorders) whether it is a *Pradhana Vyadhi* (Main disease), *Upadrava* (side effects), *Udarka* (after effects) etc.(Table 13).

**Table 13: *Strotasa* (system) wise, *Karma* (action) wise classification of *Bhanga (Cannabis sativa* L.*)* Formulations**

| SN | *Strotasa* (System) | *Vyadhi* (Disease) of respective *Strotasa* | *Karma* (action) of respective *Strotasa* |
|---|---|---|---|
| 1. | ***Rasavaha*** | *Jwara, Hrudroga, Shotha, Sutikaroga* | *Jwaraghna* |
| 2. | ***Raktavaha*** | *Kushtha, Shwetakushtha, Vyanga, Nyachha, Shiroroga, Sutikaroga* | *Jwaraghna, Varnya, Kantida, Raktajanana, Raktavardhana* |
| 3. | ***Mamsavaha*** | *Shiroroga, Shotha* | *Bruhana* |
| 4. | ***Medovaha*** | *Sthoulya, Prameha,* | *Rukshana, Medohara* |
| 5. | ***Asthivaha*** | *Vatavyadhi* | *Keshya* |
| 6. | ***Majjavaha*** | *Sparshavata, Dhanurvata* | *Buddhivardhana, Netrya, Drushtivardhaka, Buddhiprada, Uttejaka, Medhya* |
| 7. | ***Shukravaha*** | *Upadansha, Rajayakshma* | *Sukhakara, Vrushya,Shukrastambhana, Shukrashodhana, Shukrala,Vajeekara, Veeryvardhaka, Ojavardhana, Ojakara, Stambhana, Netrya, Pushti, Kamavriddhikara, Nitya-Anandkara, Uttejaka, Bruhana* |
| 8. | ***Annavaha*** | *Agnimandya, Ajeerna, Amlapitta, Atisara/ Sarvatisara / Amatisara, Grahani, Parinamshoola, Sangrahani* | *Deepana ,Pachana, Stambhana,Kshudhavruddhikara, Ruchya* |
| 9. | ***Pranavaha*** | *Kasa, Shwasa, Rajayakshma* | *Sthira, Vishaghna* |
| 10. | ***Manovaha*** | *Unmada, Apasmara* | *Chintahara, Manvinodkara, Madakari, Madakaraka, Vashikarana, Manvinodkara, Bhutaghna, Nidrajanana, Uttejaka* |
| 11. | ***Mutravaha*** | *Bahumutrata, Madhumeha* | *Uttejaka* |
| 12. | ***Sarva* (All) *Stotasa*** | *Rajayakshama* | *Dhatuvardhana, Balya, Ayuvardhana, Ayukara, Rasayana, Vishaghna,Bhutaghna, Swedajanana,* |



 

| | | | |
|---|---|---|---|
| | | | *Pushtikara, Shoolaghna* |

Huge therapeutic potential of CB1 receptor has been reported. The drug can be used for both local as well as internal administration. Topical CB1 agonists or agonists that do not penetrate the blood-brain barrier can be used. On peripheral targets, cannabinoids acting specifically on non-psychoactive CB2 receptors can be used. Apart from CB1/CB2 receptors additional, new cannabinoid also do not produce psycho activity. [75,76]

### *Prayojyanga* (Part used):

It is observed that leaves, seeds, inflorescence and whole plant of *Bhanga* are the parts used. Leaves and seeds being the most commonly used.(Table 14 )There are many formulations where the part used are not clearly noted. In such formulations parts can be decided by the assessment of use of formulation by *Yukti* (wisdom) or leaf can be used as per the recommendation of Ayurvedic pharmacopoeia of India. [77]

The flowering tops or "buds" of the female cannabis plant have the highest concentrations of THC, followed by the leaves in comparison with male species of cannabis. Much lower THC levels are found in the stalks and seeds of the cannabis plant.[78] In seed or seed oil Phytocannabinoids are very trace only kernel contains trace amount of THC and CBD. Outside surface of seedcoat has higher concentration of THC may be due to contamination with plant leaves or flowers. [79] Effect of *Sthana* (Habitat) and *Jati* (Species variation) on the properties of *Bhanga* has been reported.[80]Differences are observed phytochemically amongst the species of cannabis and as per habitat. It is reported that, isoenzymatic pattern of esterase and peroxidase is richer in hemp male plants in comparison with female plants. Specific activity of catalase is less in female plants while specific peroxidasic activity is greater in male plants. Female plants possess average level of soluble protein. The polyphenols, flavones and polyholozides values are significant differ with sex as well as parts in the same plant, polyphenol being absent in male plant. [81, 82]

**Table 14: Different *Prayojyanga* (parts used) of *Bhanga* in the various formulations**

| SN | *Prayojyanga* (Part used) | Name of the Formulations | References |
|---|---|---|---|
| 1 | ***Patra* (Leaves)** | *Gangadhara Churna (Bruhat), Madanakameshwari leha, Madana Modaka, Veeryastambhakai Vatika, Kameshwara Modaka (1), Kanaka Taila Saraswata Churna,Rudra Taila* | 19, 27,31, 31,17, 28,23,7, 37,19 |
| 2 | ***Beeja* (Seeds)** | *Karpuradya Rasa, Shweta Aparajita Nasya, Madananda Modaka, Talakeshwara Rasa, Chandramruta Rasa (Bruhat), Kaphachintamani Rasa, Kasturibhushana rasa, Lakshmivilasa Rasa, Mahalakshmivilasa Rasa, Rajayoga, Malla Taila* | 29,11,28,27 ,31,25,23,2 9,23,6,29,3 6,18,28,36, 23, 28, 11, 23,29,31,37 , 29, 39, 36,23,7, 36, 23,31 |
| 3 | **Leaves+ Seeds** | *Kamagnisandiapana Modaka, Kameshwara Modaka III, Rativallabha Modaka, Kameshwara Modaka (2)* | 25,23, 16, 31, 16 ,23, 11,23,23 |
| 4 | ***Pachanga* (All parts)** | *Vijaya Bandha* | 22 |

P.U. = Part used, L= Leaf, S=Seed, G=Ganja, Mo=Morning, Ev=Evening, Ni=Night, AN=Afternoon, Mt=Month

### Precautions:

Ayurveda have strongly advocated the use of *Bhanga* after its *shodhana (*processing / purification) in order to minimize its probable adverse effects i.e '*Madakari'* effect.[83] To manage the adverse effects, caused by intake of *Bhanga Dosha,* it is advised to administer cow *Dadhi* (curd) with *Shunthi* (*Zinziber officinalae* Roxb.) or *Nimbuka* (*Citrus limon*L.) juice.[36] Further, *Godugdha* (cowmilk) and *Shunthi* or crushed wet root of *Sandesada* (*Delonix elata* L.) with water can be used for neutralizing the adverse effects caused by *Bhanga* administration.[84]

### xiv) *Bhanga Shodhana* (Purification or processing):

*Bhanga* has been included under *Upavisha (semi-poisonous)* group of plants. To combat its possible adverse effects, before its clinical applications, differentclassical texts have advocated various methods of *Shodhana* of *Bhanga* by using media like water, cow's milk, cow's ghee etc.[85,86,87,29,36]and decoction of bark of *Acacia arabica* Linn. In formulations like *Mundyadi Gutika* I, *Madana Modaka, Madanapraksha Churna* use of *Ghrutabharjita Bhanga* has been advised.[22, 31,15, 31]

## CONCLUSION

*Bhanga* is a unique versatile plant having diversed pharmacological properties which can provide high therapeutic potential appear to go much beyond psychotic effects. It presents a colossal potential for enlarging the single drug effectiveness of Ayurveda treatment.

## FUTURE PERSPECTIVE

*Bhanga* should be used after *Shodhana* in the formulations to avoid adverse effects and thus narcotraffiking. Future studies in these regards are



 

an encouraging direction in the Ayurveda research.

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