Review Article

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PROBABLE MODE OF ACTION OF HINGVASTAKA CHURNA: A CRITICAL REVIEW

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ABSTRACT

Mode of action of a poly herbal Ayurvedic formulation is a critical and essential issue to be considered in assuring the therapeutic efficacy and safety. Churna (Powder) preparations are widely and largely prepared in pharmacy as well as used by practitioners of Ayurveda for different ailments. Hingwashtaka Churna is one of the commonly used preparation containing very safe and easily available herbo-mineral drugs. Although, Hingvastak Churna is not mentioned in major classics like Charak Samhita, Sushruta Samhita etc. but after 3rd century onwards, it is mentioned in various authentic texts like Astanga Hridaya Samhita, Vanga Sen Samhita, Sharangdhara Samhita and Yoga Ratnakar etc. under the treatment of Gulma roga, Ajeerna, Agnimandya etc. In clinical practice, it is a drug of choice for Digestive impairment. However, as per classical texts and Ayurvedic Formulary of India, it is indicated for Agnimandya (Digestive impairment), Shula (Colicky Pain), Gulma (Abdominal lump) and Vata roga (Disease due to Vata dosha). The present study is aimed to critically review the formulation ingredients and probable mode of action of Hingvastak Churna in different clinical conditions.

Key words: Hingvashtaka Churna, Yavani, Ajmoda, Hingu Agnimandya, Shula, Gulma, Vataroga

INTRODUCTION

The digestive procedure relies on upon legitimate transformation of the ingested food into definite items like glucose, fatty acids – bile complex or fatty acids and glycerine and amino acids. For this, right arrangements of nourishment, appropriate emission of the digestive juices and enzymes and in addition motility of the intestinal tract are essential. Any unsettling influence in the digestive capacity prompts stasis and inadequate assimilation, which may prompt putrefaction or fermentation by the activity of the intestinal organisms. The collection of gas in the intestinal tract to some degree is a physiological procedure. However when there is an aggravation or inadequacy in the nature of one or a gathering of compounds or When there is a feast excessively high in fat and/or sugar and/or protein and when there is unsettling influence or poor function of the liver, then there is an inclination to gas formation in the intestinal tract. Gaseous distension of the stomach area creates a sentiment

obscure uneasiness, flatulence, a sentiment of feeling fullness, acid reflux, sickness, eructation and indigestion. Ayurveda too advocates role of digestive enzymes in the genesis of almost all disorders. Low fire (Mandagni) is the root cause of all diseases. Hingwashtaka Churna has been propitiously reported to be subsidiary in expelling trapped wind, palliating flatulence and eructation's, checking abdominal distension and relinquishing gas in the epigastric region. Ayurvedic herbal dosage forms are formulated through the transference of active ingredients by different manufacturing processes¹. It is a herbomineral preparation containing Sunthi, Pippali, Marica, Ajmoda or Yavani, Svetajiraka, Krishna Jiraka, Suddha Hingu and Saindhava Lavana. It is indicated in Agnimandya (Digestive impairment), Shula (Colicky Pain), Gulma (Abdominal lump) and Vataroga (Disease due to Vata dosha)². In the present critical analysis an attempt has been made to correlate the probable mode of action of the formulation in the above mentioned clinical conditions.

Drug Review

Ingredient	Part used	Ayurvedic properties	Percentage
Shunthi ³ <i>Zingiber officinale</i> (Ginger)	Rhizome	Rasa - Katu Veerya- Ushna Vipaka- Katu Guna- Laghu, Ushna, Teekshna Karma- Deepana, Pachana, Anulomana, Amavataghna, Shoolahar, Amadoshahara Agnimandya-hara, Vibhandahar, Hridya. Dosha Karma- VataKaphahara	12.5

Maricha ⁴ <i>Piper nigrum</i> (Black Pepper)	Fruit	Rasa- Katu, Tikta Veerya- Ushna Vipaka-Katu Guna-Laghu, Ruksha, Tikshna Karma-Deepanya, Ruchaya, Shoolahara, Amadosahara , Krimihara Dosha Karma- Kaphahara, Pittakara, Pittapramathi, Kaphavatajita	12.5
Pippali ⁵ <i>Piper longum</i> (Long Pepper)	Fruit	Rasa- Katu, Tikta, Madhura Veerya- Anushana Vipaka- Madhura Guna-Snighdha, Laghu, Karma-Deepana, Shoolaprashmana, Amadosahara Gulma, Udara roga, Krimihara Dosha Karma - Vatakapahara, Tridoshaghna	12.5
Ajamoda ⁶ <i>Apium leptophyllum</i> (Celery fruit) or Yavani ⁷ <i>(Tachyspermum ammi)</i>	Fruit	Rasa- Katu, Tikta Veerya-Ushna Vipaka-Katu Guna - Laghu, Ruksha Karma-Deepana, Krimighna, Shulaghna, Gulma nashak Dosha Karma - - Kaphavatahara Rasa-Katu ,Tikta Veerya-Ushna Vipaka-Katu Guna-Ruksha, Laghu, Tikshna Karma-Deepana, Pachana, Ruchya, Anulomana, Sulahara, Krimighna Dosha Karma - Kaphavatahara	12.5
Saindhav Lavana ⁸ (Rock Salt)	-	Rasa- Lavana Veerya - Sheeta Vipaka- Madhura Guna - Laghu, Sukshma, Snighdha Karma-Srtotogamitwa, Chedana, Bhedana Dosha Karma -Tridoshaghna	12.5
Shveta Jeeraka ⁹ <i>Cuminum cyminum</i> (Cumin Seed)	Fruit	Rasa-Madhura Veerya- Sheeta Vipaka-Madhura Guna- Guru , Snighdha Karma-Deepana, Ama nashana, Krimighna, Agnimandiyahara, Dosha Karma - Tridoshaghna	12.5
Krishna Jeeraka ¹⁰ <i>Carum carvi</i> (Caraway Seed)	Fruit	Rasa- Katu Veerya-Ushna Vipaka-Katu Guna-Laghu, Karma-Deepana, Pachana, Ruchya, Agnimandiyahara, Grahani, Shothahara Dosha Karma - Kaphavatahara	12.5
Shuddha Hingu ¹¹ <i>Ferula assafoetida</i> (Asafoetida)	Resin of stem	Rasa-Katu, Veerya-Ushna- Vipaka-Katu Guna-Teekshna Karma-Pachana, Deepana, Ruchya, Anulomana, Krimihara, Shula, Agnimandiyahara, Gulma Dosha Karma- Vatakapaprashmana	12.5

DISCUSSION

Quantity of Hingu on Hingvashtaka Churna

In Hingvashtaka churna, different opinion is seen regarding the quantity of Hingu. Authors and commentators of all classical texts like Gada nigraha¹², Bhavprakash¹³, Yoga ratnakar¹⁴, Bhaishajya Ratnavali¹⁵, Yoga Tarangini¹⁶, Brihat Yoga. Tarangini¹⁷ have taken equal quantity of Hingu i.e. 1 part. Similarly in AFI¹⁸, Rasa Tantra Saar evam Siddha Prayoga Samghraha¹⁹, Rasa Darpan²⁰, equal quantity of Hingu is prescribed. However, some Scholars of present generation,^{21, 22, 23} are of opinion to take 1/8th part of Hingu in place of 1 part. Also some scholars misinterpreted to take 1/8th part of Hingu by total weight of other seven Drugs., if First drug is taken 100 g, then hingu 87.5g. As if 1 part of Hingu is taken then it will cause Ugragandha to the Churna and its oral administration may cause Utkleda (Nausea) to the patient. But after frying [compound/ Bandhani Hinga which is in practice] Hingu does not produce any nauseating (Utkleda) sensation. That is why, in context of Churna Kalpana, Sharangdhar Samhita has clearly

mentioned to take fried (Bharjita) Hingu as it is non nauseating (noutkledkrit). So the exact quantity depends upon the type & purity. Its sharp, hot and unctuous property helps to clear high Vata in the digestive tract, treating bloating, flatulence, colic and undigested food in the stool; it moves Samana Vayu and draws Apana Vayu down.

Critical analysis on ingredients of Hingvashtaka Churna

Regarding ingredients, almost all authors have taken same ingredients and the controversy is only seen in taking either Ajomda or Yavani i.e. Ajowan in Hingvashtaka churna. On surveying the literature, it is found that Hingvashtaka churna is been prescribed in Ajeerna roga adhikara (Vangsen Samhita, Bhavprakash, Yogaratnakar, Yogatarangini, Brihat Yogatarangini), Agnimandya roga adhikara (Chakradatta, Bhaishjya Ratnavali.), Shula roga adhikara (Gada nigraha), Gulma roga adhikara (Astanga Hridaya), Grahani roga (Vangsen Samhita). (Vangasena had given two formulation of Hingvashtaka churna in Ajeerna & Grahani roga Chikistha.). Commentators of those texts where it is described in Ajeerna

Roga Adhikara mentioned to take Yavani as an ingredient. While Commentators of texts where it is described in Agnimandya prakaran are of opinion to take Ajamoda rather than Yavani. In Astanga Hridaya, for Hingwadi churna indicated for Gulma roga²⁴, the commentator has taken Ajowain for Dipyaka. Similarly in Charak samhita for Chitrakadi gutika (Grahani dosa chikitsa) commentator has replaced Ajowain for ajamoda²⁵. If we consider the therapeutic potential of these two herbs, author of Arka prakash mentioned Yavani ark as Pachana, Deepana, and Rochana while Ajamoda ark is used for Vatakapahjanya roga. As per Ayurveda sara samgraha Yavani ark is for Mandagni, Shula, Ajeerna, Gulma, Amadosha, Aruchi & Vatakapah dosha nashna²⁶. According to Ratnaprabha commentary of Chakradatta²⁷ & Vaidkiya Paribhasa Pradeep²⁸,

Yavani should be used for internal administration while Ajamoda is used for external application. Standards for Yavani as per FSSAI are, moisture not more than 11 % by weight, extraneous matter not more than 2 % by weight, damaged /insect damaged not more than 2 %, Volatile oil on dry basis not less than 1.5 % v/w. Ajamoda as per FSSAI conform the following standards; extraneous matter not more than 2 %), moisture not more than 10 %. As per Ayurvedic Pharmacopeia of India Yavani conforms the following standards extraneous matter Not more than 5 % by weight, Moisture not more than 9 %, Volatile oil not less than 2.5 %) whereas Ajamoda confirms the following standards extraneous matter not more than 5 %, Moisture not more than 14 %, Volatile oil not less than 2 % v/w) as shown in Table 2.

Table 2

	Moisture content (in %)	Volatile oil (in %)	Extraneous matter (in %)	Damaged /insect damaged matter (in %)
Yavani (API)	NMT 9	NLT 2.5	NMT -	NMT 5
Yavani (FSSAI) ²⁹	NMT 11	NLT 1.5	NMT 2	NMT 2
Ajamoda (API)	NMT 14	NLT 2	NMT 5	-
Ajamoda ³⁰ (FSSAI)	NMT 10	-	NMT 2	-

Apart from the quantity of Hingu as described earlier, variety of Hing to be taken for preparing Hingvastak churna is also very confusing. For Hing or Hingu, *Ferula foetida* regel and *Ferula narthex* boiss are recommended but to curtail the cost, it is generally substituted and adulterated with Kikar or Babul Gond, Hashab (Gum Accaia or Acacia senegal), and Shittim Gond (Acacia seyal)³¹. Even sometimes sodium silicate was used as a substitute for Hingu. All the above substitutes are not recommended by API. As per API Hingu consists of oleo-gum-resin obtained from rhizomes and roots of *Ferula foetida* Regel, *Ferula narthex* Bioss, and other species of *Ferula* (Fam. Umbelliferae). In food safety standards authority of India (FSSAI) three types of Hing has been described as Hing, Hingra and Bandhani Hing. Hing shall conform the following standards; Total ash not exceed 15 percent, acid insoluble ash shall not

exceed 2.5 %, Alcoholic extract shall not be less than 12%, Starch shall not exceed 1 % by weight), Hingra shall conform to the following standards; Total ash Not exceed 20 %, acid insoluble ash not exceed 8 % by weight, alcoholic extract not less than 50 %, starch not exceed 1 % by weight, Bandhani Hing, total ash more than 10 %, acid insoluble ash not more than 1.5 %, Alcoholic extract less than 5 % as shown in table no 3. Most of the pharmaceutical companies are using compound Hing or Bandhani Hing. As per API, Hing shall conform to the following standards (Foreign matter not more than 2 %, Total ash not more than 15%, acid insoluble ash not more than 3%, alcohol soluble extractive not less than 50 %, water soluble extractive not less than 50 %. Standards described in API & FSSAI differ.

Table 3

	Total ash (in %)	Acid insoluble ash (in %)	Alcoholic extract (in %)	Starch (in %)	Water soluble extractive (in%)
Hing ³² (FSSAI)	NMT 15	NMT 25	NLT 12	NMT 1	-
Hingra ³² (FSSAI)	NMT 20	NMT 08	NLT 50	NMT 1	-
Bandhani Hing ³² (FSSAI)	NMT 10	NMT 1.5	NLT 50	NMT 1	-
Hing (API)	NMT 15	NMT 3	NLT 50	-	NLT 50

In case of Krishna jeeraka also some controversy is seen. The latin name mentioned in API for Krishna jeeraka is *Carum carvi*. But Fruits of *Carum bulbocastanum* Koch, known as Kala zeera or Shimai shiragam is commonly used as substitute but API does not recommended it. The fruits of *Carum bulbocastanum* Koch are larger in size (upto 7 mm long and 2mm. wide) darker in colour seminterete in shape. Coloured fruits of *Cuminum cyminum* are sometimes found as adulterant in commercial samples of Krishna jeeraka. P.V.Sharmaji considered *Carum Carvi* as Karavi and *Carum bulbocastanum* as Krishna jeeraka. Bapalalji also accepted *Carum carvi* as Karagi? (Krishna jeeraka). Dr.Nishlteshwar. K. mentioned *Carum carvi* as Krishna jeeraka in his text. Thakur Balwant Singh quoted *Cuminum cyminum* and *Carum carvi* as Shweta and Krishna variety of Jeeraka, Prithvika as *Carum bulbocastanum*.

Regarding Sveta jeeraka and Krishna jeeraka it is always indicated that it should be slightly roasted until the spice releases an aroma and turns a shade or two darker. As per unani pharmacopeia of India for the purification of Siyah jeera it

should be Dip in sirka (the level of sirka should be 2 inch above the level of Zeera Siyah) for three days. After three days it should be taken out and dried properly prior to its internal use. So proper validated scientific studies are needed for the selection of either Yavani or Ajamoda, particular variety of Hing and Krishna jeeraka for getting desired results.

Probable Mode of Action in Agnimandya (Digestive impairment)

It is a traditional Indian blend of Trikatu (Shunthi, Pippali, and Maricha), Ajmoda /Yavani, Saindhav Lavana, Jeeraka, Krishna Jeeraka and Hingu. Sunthi due to its Katu Rasa and Ushna Veerya property increases the Agni (Digestive fire) thereby relieves Mandagni (Low fire). Sunthi is known to stimulate digestion beneficially.³³ Sunthi is described as Ruchyam that means which brings taste to the mouth. Due to strong Katu property ginger purifies the Tongue and throat thus, relieves Arochaka (anorexia). It helps in alleviating Vata kapha and Pitta.

Sunthi Churna due to its Katu Rasa and Agnidiptikara Karma does the Agnidipana and due to Katu Rasa and Tikshna Guna does the Pachana of Amadosha. Due to Katu Rasa and Laghu, Tikshna Guna it causes Srotoshodhana. This renders the indigested and Pakva-Apakva food into the assimilable form and due to Katu Rasa and Ushna Virya, the Agni become normal leading to the Vyadhi Shamana i.e. subsidence of disease.

Due to these properties it is helpful in anorexia, indigestion nausea, flatulence, pain in abdomen.³⁴ Pharmacologically Ginger is useful as a carminative and stimulant. Powdered ginger is even more effective antiemetic than dimenhydrinate (Dramamine), it may ameliorate the effect of motion sickness in the gastrointestinal tract itself, in contrast to antihistamines which act centrally. In a randomized double blind standard ginger root powder extract was compared with dimenhydrinate as anti nauseant and anti emetic. The response of ginger extract was found to be better than standard drug.³⁵ Both the fresh and dried rhizomes of Ginger suppress gastric secretion and reduce vomiting. That means it is effective in clinical condition known as Vidagdha jeerna in Ayurveda. Gingerols along with shogaol present in ginger produces enhancement of gastrointestinal activity with effects on bile secretion. Gingerol present in ginger has cholesterol – biosynthesis inhibitory activity in animal preparations and is assumed to be a HMG-CoA reductase inhibitor. Shogaol & gingerols inhibit the emetic action induced by the oral administration of copper sulphate pentahydrate to leopard & ranid frog. Galactone and diterpenoids isolated from ginger also showed anti 5HT effect. Acts as digestive aids; possesses anti-ulcer, cholagogic (Increases the biliary secretions) and anti-emetic properties.³⁶ Gingerol and shogaol, active components of Ginger, suppress gastric contractions but increases gastro intestinal motility and spontaneous peristalsis activity in experimental animals.^{37,38}

Maricha by its Ushna and Katu Vipaka increases Agni; by Tikshna Ushna Guna expels the vitiated Doshas which are in sanchaya avastha (accumulated stage). Pramathi Guna of Maricha helps in Srotoshodhana³⁹ It is useful for Agnimandya, Ajeerna, Shula and Adhyamana.

Pippali increases Agni by its Deepana action. It acts on the biliary system by secreting digestive enzymes, thus helps in digestive process. It normalizes the Vishmagni (improper digestion) which in turn increases Dhatu Bala (immune system). It also acts as a good Srotoshodhaka. According to Sushruta, one year old Pippali should be used for achieving its Srotoshodhaka action⁴⁰. By its Srotoshodhaka & Rasayana property nourishment of Rasadi Dhatu takes place. This is the reason for consideration of Pippali as best remedy for Pleeha Roga.⁴¹ Piperine present in Pippali shows hepatoprotective activity against tert-butyl hydro peroxide and carbon tetrachloride induced hepatotoxicity. Pippali showed significant anti-ulcer activity. It caused a significant increase in mucin secretion and mucosal glycoprotein and significant reduction in cell shedding, indicating anti-ulcer effect.⁴² It acts as a catalyst; enhance the action of other herbs. in particular functions as bioavailability enhancer by improving gastro intestinal absorption and inducing thermogenesis. Thermogenesis is the heat energy associated with the digestion of the food involving autonomous nervous system that controls the digestive and absorptive process of gastro intestinal tract. Pippali also shows anti-giardial and immune stimulatory effects on giardiasis. Both alcoholic extract and piplartine extracted from the stems showed significant inhibition of ciliary movements of oesophagus of frog, which prevent heartburn and the nausea in hyperacidity. The hepatoprotective effect has been shown in carbon

tetrachloride –induced liver damage in rats. Due to this action of this herb keeps hepato-biliary system in healthy way.

If Ajmoda, is added in Hingvasthak churna then acts as a Vatanulomana,^{43 44} helps in relieving the excessive gases generated during the digestion process. So it also helps in the fullness of stomach. It induces hyperactivity of the central nervous system in mice. It also exhibits activity against Entamoeba histolytica. Pharmacological studies of the oil shows its parasympathomimetic effect. It produces contraction of the isolated ileum, tracheal chain and bronchial musculature in guinea pigs.⁴⁵ Regarding Ajamoda caution should be observed in kidney inflammation as the volatile oils may cause irritation⁴⁶

Yavani, on the other hand due to its Katu Rasa and Ushna Veerya increases the Agni. By this it helps in increasing the appetite. In Agnimandya due to the effect of Tikshna Ushna Guna liquefaction of Kapha takes place. It forces the Samana vayu in downward movement. People with zinc deficiency will generally suffer from digestive disturbances, especially difficulty digesting protein. As zinc is high in Yavani (84.95 µg/g) it produces strong enough stomach acids⁴⁷ Ajowain has Ameliorative effect which leads to an increase in hepatic lipid peroxidation⁴⁸.

Saindhav Lavana is rock salt, which acts as a catalyst during the digestive process. As it is a hygroscopic in nature it creates the lubrication, which actually helps for digestion. Salts are known as Lavana in Sanskrit. In general all the salts have property to provide taste to the medicine and the food. They acts as a catalyst, enhance the action of other herbs in the formula by helping them in deep penetration in the body after administration of drug. Lavana helps soften food and make it easily digestible, aids secretion of saliva and gastric juices. It also softens the mucus membrane. It acts as carminative, digestive and stomachic properties.

Shuddha Hingu is one of the well-known herb for the digestion and relieves the gases produced during the digestive process. Hingu by its Katu Rasa and Katu Vipaka; Tikshna Guna, Ushna Veerya increases Pitta dosha. Increased Pitta dosha favours Anulomana of Vata dosha. Due to its Ushna Guna it subsides pain. This is the reason, why Hingu is preferred, when Anaha and Shula are the chief complaints. Hingu significantly reduces the gastric volume, total acidity, free acidity, and increase the pH of gastric juice.⁴⁹

Trikatu in total is known to influence the bioavailability of drug. Piperine, in particular functions as bioavailability enhancer by improving gastro intestinal absorption and inducing thermogenesis. Thermogenesis is the heat energy associated with the digestion of the food involving autonomous nervous system that controls the digestive and absorptive process of gastro intestinal tract.⁵⁰ Like Trikatu, Zingiber⁵¹ *Cuminum cuminum*⁵² *Carum carvi*⁵³ also possess antioxidant properties.

Moreover, constituent ingredients of Hingvashtak Churna act as digestive stimulant by various enzymatic secretions. Oral administration of Piperine, Cumin, Asafoetida, Ajamoda, as a single dose significantly stimulates the liver to produce and secrete bile rich in bile acids, which play a very important role in fat digestion and absorption. Proteins, starch and triglycerides, the major macromolecules in food are hydrolyzed by the major pancreatic enzymes - proteases (trypsin and chymotrypsin), amylase and lipase respectively. The dietary intake of spice principles Piperine, Ginger, Asafoetida, and Ajowan significantly increase lipase activity. Pancreatic amylase

activity is elevated by dietary ginger and piperine. Dietary Asafoetida, and Cumin also significantly enhanced the activity of pancreatic amylase.⁵⁴

Probable Mode of Action in Shula (Colicky Pain)

Ginger (Sunthi) inhibits both acetylcholine-evoked and electrically-induced smooth muscle contractions. The spasmolytic property is attributed to the active chemical constituent in Ginger, gingerol, which also inhibits the biosynthesis of prostaglandins (lipid compounds that have a role in pain perception). Ginger is also an anti-inflammatory that helps in the management of pain and discomfort associated with inflammatory changes in the gastrointestinal tract. *Zingiber officinale* is proven to be efficacious in inhibiting the gastric and intestinal motility and withal has been found to inhibit the colonic motility in vitro.⁵⁵ *Zingiber officinale* is proven efficacious in inhibiting the intestinal, gastric, and colonic motility and the spasmolytic activity of *Zingiber officinale* might be attributed to gingerol that was found to inhibit PG biosynthesis and serotonergic activity.⁵⁶ *Zingiber officinale* has inhibitory effects on COX-1 and -2 enzymes^{33, 57} and the mechanism of action is hypothesized to be due to the attenuation of COX-1 and -2 (regulated by the eukaryotic transcription factor NF-kappaB) and thromboxane-synthase enzymatic activity.⁵⁸ Celery (Ajamoda) also has spasmolytic property, which is especially beneficial in relieving gastrointestinal tract spasms. Celery has potent COX-1 and -2 inhibitory anti-inflammatory activity⁵⁹ and has a potent anti-nociceptive and analgesic effect.⁶⁰ In traditional system of medicine, Shweta Jeeraka as well as Krishna Jeeraka seeds are prominently considered astringent and used in the treatment of mild digestive disorders, diarrhoea, dyspepsia, flatulence, morning sickness, colic, dyspeptic headache and bloating, and are said to promote the assimilation of other herbs and to improve liver function,⁶¹ and are said to promote the assimilation of other herbs and to improve liver function.⁶² Cumin also has carminative, stimulant, and analgesic effects. It exhibits neurotropic anti-spasmodic activity. *Carum carvi* seed extract is anti ulcerogenic⁶³ and Anti spasmodic⁶⁴ in experimental model. The antispasmodic effect of an alcoholic extract of caraway has shown inhibitory effects on smooth muscle contractions induced by the spasmogens, acetylcholine and histamine.⁶⁵ Extracts from caraway produced dose-dependent antiulcerogenic effect against indomethacin-induced gastric ulcers.⁶⁶ Anti ulcerogenic activity of *Cuminum cyminum* has also been reported.⁶⁷ Colloidal solution of asafoetida showed ulcer protecting effects against acute gastric ulceration induced by cold restraint stress, aspirin and pylorus ligation in rats.⁶⁸ *Piper longum*, *Zingiber officinalis* and *Ferula* species augment mucin secretion and decrease cell shedding in the stomach of rats.

Probable Mode of Action in Gulma (Abdominal lump)

As per Ayurveda, Gulma is abdominal lump caused due to aggravation & encapsulation of Vata Dosa (Kupita anila moodhatwat) which spreads widely like shrubs/lump (Gulmawat Vishalaatawaat). It is usually known as gaseous tumor of abdomen. When there is obstruction in the Rasavaha srotas, it results in Agnimandya, progressive to Gulma. Katu rasa and Ushna veerya of Shunthi removes Srota Bibandha⁶⁹. Sunthi purifies numerous canals in the body. Shunthi agitate the Ahara Rasa by which the concentric form of body tissues will be increased. Pippali due to its Katu Rasa and Ushna Veerya increases Agni by which Ama Pachana occurs. Due to the above factor Amaja Gulma subsides. In apara patanartha gulma Pippali detoxify the Garbha Kostha so Gulma subsides. Ajomoda /Ajowan is helpful in Anulomana of Vayu. Pippali increases

Agni and thereby reduces blockage in the microcirculatory channels. Hingu, Pippali, Sunthi and Yavani are prescribed Pathya dravya for Gulma Roga⁷⁰.

Maricha by its Ushna and Katu Vipaka increases Agni; by Tikhna Ushna Guna expels the vitiated Doshas which are in sanchaya avastha (accumulated stage). Pramathi Guna of Maricha helps in srotoshodhana. It is useful for Agnimandya, Ajeerna, Shula and Adhaman.

According to Ayurveda, Gulma encompasses a clinical condition from simple abdominal distension to malignant growth and phytochemical present in constituent ingredient of Hingvashtaka churna like *Zingiber Officinale*, *P.longum*, *P.nigrum*, *Carum Carvi*, and *Cuminum cyminum*, *Asafoetida* are researched for their role in the treatment of tumor or cancerous condition. Ginger may act as an anti-cancer and anti-inflammatory agent by inactivating NFkB through the suppression of the pro-inflammatory TNF- α ⁷¹. Anti abdominal gaseous tumor mechanisms of action of *piper* compounds is by piplartine & piperene. Piplartine compound kills cancer cells by targeting the stress response to reactive oxygen species (ROS). Piplartine induces apoptosis selectively in cells that have a cancer genotype by targeting a non-oncogene co-dependency acquired through expression of the cancer genotype in response to transformation-induced oxidative stress.⁷² Piperine is a major component of black (*P. nigrum*) and long (*P. longum*) pepper. The content of piperine in black pepper varies between 5% and 9%. Piperine can inhibit human fibrosarcoma (HT-1080) cell expression of matrix metalloproteinase (MMP)-9, thereby interfering with tumor cell migration and invasion. Piperine-induced cytotoxicity against human rectal tumor (HRT)-18 cells may be mediated at least in part by ROS. The essential oil present in *Carum Carvi* is useful as a potential drug used as a cancer preventing agent. It is also known to boost the immune system and possesses antitumor⁷³ Asafoetida contain essential oil (10-17%) having antioxidant, cancer chemo preventive agent⁷⁴ *Cuminum cyminum* in colon cancer has also been researched.⁷⁵ However, no such researches are undergone to establish that Hingvashtak Churna may have any role in treatment of this deadly disorder even in palliative way.

Probable Mode of Action in Vataroga (Disease due to Vata Dosha)

As per Ayurvedic Formulary of India, Vata roga means, disease due to Vata dosha. Here vata dosa signifies Kostha gata or Amasaya gata vata. As per Chikistha tatwa pradeep Hingvastak churna is indicated in Amasaya gata vata. Aggravation of Vata located in Kostha (Abdominal & thoracic viscera) leads to Gulma, (tumor), Retention of urine and feces (constipation)⁷⁶. For Kosthagata Vata, Kshara, agnideepana, amlarasa sevana treatment has been indicated⁷⁷. The basic pathology in the Kosthagata Vata is the formation of Ama in the body due to Agnimandya⁷⁸, Balabhramsha is described as one of the clinical consequences of Ama. Bala is very well accepted as an immune component by Ayurvedic scholars. Pippali has Dipana, Pachana and Rasayana actions and is helpful in alleviating Ama from the body which is the basic pathological factor in Kosthagata vata.

CONCLUSION

The rising use of Herbal drug by human is forcing the driving force to evaluate the health claims of these agents and to develop standards of quality, purity, safety and efficacy of the drug⁷⁹. Indigestion is a commonly encountered syndrome in medical practice. Being a multifactorial syndrome complex, many complex mode of action have been studied. Gaseous

distension of the abdomen, a feeling of fullness will be relieved by the ingestion of Hingvastak Churna. This critical analysis was to evaluate the mode of action in mentioned clinical conditions for Hingvastak churna. This study observed the ingredients present in Hingvastak churna provides a significant symptomatic relief from Agnimandya (indigestion) Shula (abdominal pain), Gulma (abdominal bloating). Clinically, Hingvastak Churna is not a drug of choice, for Vata roga (Kostha gata vata/Amasaya gata vata), but as it helps in Vatanulomana, it may be effective medication as an adjuvant with some other potent medicament in the management of the disease.

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