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A CRITICAL REVIEW ON PHARMACODYNAMIC PROPERTIES OF *SAMA GULIYA* (PILL) IN VATIKA PRAKARANA FOR THE DIGESTIVE DISORDERS OF THE CHILDREN

Review article

K T C Dilrukshi [1] I A M Leena[2]

[1]Demonstrator -Faculty of Indigenous Medicine, University of Colombo, Rajagiriya, Sri Lanka. BAMS Hons (UoC)(SL), Pg.Dip. in HD (UoC)(SL)(Reading),Dip.in Ayurveda Beauty Culture and Panchakarma (OCATM)(SL), Dip.in Counselling Psychology (MHF) (SL), Higher Dip in Psychotherapy (MHF) (SL), Cer.in Korean Acupunture (OCATM)(SL)

[2]Senior Lecturer Grade I' Faculty of Indigenous Medicine, University of Colombo, Rajagiriya, Sri Lanka.

ABSTRACT: Ayurveda Pediatrician use *Sama Guliya (Pill)* in the management of digestive disorders. This exploratory study aims to justify the actions and usage of *Sama Guliya* by analyzing its collaborative action of each ingredient, Ayurveda pharmacodynamic properties, phytochemical content and bioactivities and to find out the possible other indications. Data were collected from authentic Ayurveda texts, electronic sources & analyzed into percentages according to their Ayurveda pharmacodynamic properties. Variations have been identified in terms of preparation method and the dosage of the drug. The ingredients of *sama Guliya* are *kelinda hal(Kutaja) Holarrhena antidysenterica ,Inguru(Shunti) Zingiber officinale, Atividayam(Ativisha) Aconitum heterophyllum* wall, *kaladuru (Mustaka) Cyperus rotundus, Aralu (Abhaya) Terminalia chebula, Vadakaha (Vacha) Acorus calamus, Karabuneti (Lavanga) Syzygium aromaticum, kaha(Haridra) Curcuma longa & vasavasi (Jathiphala) Myristica fragrans*. Upon analyzing *Sama Guliya* predominantly have Ayurveda pharmacodynamic properties such as *katu(Pungent), tikta rasa(bitter taste) ,laghu(Lightness quality)) snigda guna(unctuousness quality)), ushna virya(Hot in potency) & katu vipaka(pungent* post digestive effect*)* .Almost all the ingredients posses *kapha pitta shamaka(shamaka(*Alleviate *Kapha pitta*), *deepana (Stimulate digestion), pachana (*digest undigested products*), krimighna (*Killing worms*), shoolaprasamana (*cures pain*), vishahara (*detoxify*), rakta shodaka (*purify blood*), vataanulomana(*pacify vata*), grahi* (Absorbing excessive moisture) properties. The ingredients comprise various Phytochemical such as alkaloids, saponins, flavanoids, terpenoids, glycosides, steroids that perform anti-inflammatory, antifungal, antibacterial, antimicrobial, analgesic, antioxidant, antispasmodic, antidiarrheal, anthelmintic, antidysentric, antiemetic, blood purifier activity etc. It can be justified that due to its properties *Sama Guliya* can be effectively used to manage Digestive disorders like dysentery, diarrhea, worm infestation, nutritional disorders & emesis. Collected data revealed that *Sama Guliya* pacifies *tridosha*, improve gut function & digestive strength, relieve abdominal pain, promote appetite, and remove toxins in the body. A future study is planned to analyze the variations of the Phytochemical content according to the preparation method.

Key Words: *Sama Guliya*, Ayurveda, Pharmacodynamic properties, Phytochemical, bioactivities

INTRODUCTION

The *Sama Guliya* is one of the popular medicines among Ayurveda Pediatrician in Sri Lanka. *Sama Guliya* consists *kelinda hal(kutaja),Inguru(Shunti),Atividayam(Ati visha),kaladuru(Mustaka), Aralu(Abhaya), Vadakaha (Vacha), Karabuneti(Lavanga), kaha(Haridra), vasavasi(Jathiphala) &* breastmilk. There are ten ingredients in *Sama guliya* .The Medicinal formula was selected from *Vatikaprakarana (Beheth Guli kalka potha*) which is written by Illeperuma Arachchige don Sadiris da Alwis Illeperuma in 1879.[1] *Vatikaprakarana* is considered as the main authentic text book in Sri Lankan Traditional Medicine. *Sama Guliya* is widely used in the indigenous medical systems for the gastrointestinal, disorders Specially emesis, abdominal pain, worm infestation, nutritional deficiency, diarrhea of children This exploratory study aims to justify the actions and usage of *Sama Guliya* by analyzing its Ayurvedic pharmacodynamic properties, phytochemical content and bioactivities and to find out the possible other indications.

Functional gastrointestinal diseases (FGDs) are common in children and adolescents in developing countries mainly in Sri Lanka, and assessing their epidemiology is vital in terms of determining disease burden on the society, health-care expenditure and planning of future allocation of already stretched health resources. FGDs account for 2–4% of consultations in pediatric care practice [2]

In the Modern society there is an increasing demand for herbal drugs. Also, most of the children suffer from GI disorders. This is very effective drug using for *Vamana, udarabada(*abdominal disorders*), Krimi mandam, athisara* of children in Traditional Medicine. None of the researches has done on *Sama Guliya*.So this research done to fulfill following aims

AIMS & OBJECTIVES

- To justify the actions and usage of *Sama Guliya* by analyzing its collaborative action of each ingredients,
- To review Ayurveda pharmacodynamic properties, Phytochemical content and bioactivities and to find out the possible other indications

1.1 Preparation of *Sama Guliya*

The formula of *Sama Guliya* is given in the text *Vatika Prakarana (Beheth Guli Kalka Potha*) Number 04,page 06 [Table 01] [3]

Selected Materials washed, dried, cut into pieces, grinded, take powder of all the drugs and mixed the powder of equal quantity. Then mixed breastmilk small quantity (*miris ata pamanin*)for the powder and prepare *small guli*.

Table 01: Ingredients of *Sama Guliya* [4]

Sanskrit Name	Botanical name	family	Sinhaleese name	Part used	Propotion (Part)
01.Kutaja	*Holarrhena antidysenterica*	Apocyanaceae	*Kelinda*	seed	1
02.Shunti	*Zingiber officinale*	Zingiberacaea	*Inguru*	Rhizome	1

03 Ativisha	*Aconitum heterophyllum* wall	Ranunculaceae	*Atividayam*	Root	1
04 Mustaka	*Cyperus rotundus*	Cyperceae	*Kaladuru*	tuber	1
05.Abaya	*Terminalia chebula*	Combretaceae	*Aralu*	seed	1
06 Haridra	*Curcuma longa*	Zingiberaceae	*Kaha*	Rhizome	1
07.Lavanga	*Syzygium aromaticum*	Myrtaceae	*Karabuneti*	Flower bud	1
08.Vacha	*Acorus calamus*	Acoraceae	*vadakaha*	Rhizome	1
09.Vasawasi	*Myristica fragrans*	Myristicaceae	*Vasavasi*	Outer shell	1
10 Breastmilk					1

1.2 MATERIAL & METHODS

Material and Data Collection

The Formula was selected from *Vatika Prakarana Sama Guliya*

Data were collected from Ayurveda texts, electronic sources previous research articles Pubmed & google scholar

Combination of following key words used for the study *Sama Guliya*, Ayurveda, Pharmacodynamic properties, Phytochemical, bioactivities

Breastmilk used as an anupana.Breast milk is the perfect nutrition for infants, a result of millions of years of evolution. In addition to providing a source of nutrition, breast milk contains a diverse array of microbiota and myriad biologically active components that are thought to guide the infant's developing mucosal immune system [5]

Methods

Ingredients of *Sama Guliya* are selected washed,dried,cut into pieces,grinded,take powder of all the drugs and mixed the powder of equal quantity.Then mixed breastmilk small quantity (*miris ata pamanin*)for the powder and prepare *small guli*.Then dried them in wind and prescribed this *sama guliya* for baby with breastmilk.




Figure 1 *kelinda kaladuru*

Figure 2 *Inguru*

Figure 3 *Atividayam*

Figure 4

Figure 4 *Aralu vadakaha*

Figure 5 *kaha*

Figure 6 *Karabuneti*

Figure 7

Figure 8 *Vasawasi*

1.3 *Anupana*

In Ayurveda medicine, *Guli* are usually administered with *Anupana*. As mentioned in *Vatika Prakarana, Sama Guliya* should be given with breast milk .however; its amount is not given.

1.4 Indications

According to the text, *Vatika Prakarana, Sama Guliya* can be prescribed in the diseases such as *Vamana,badaruja, panudosha, maandam, athisaara*

2.0 Properties of *Sama guliya*

Ayurveda Pharmacodynamic Properties of the Ingredients

Ingredients of *Sama guliya* have various properties, which are capable of mitigating vitiated *Dosha. Rasa, Guna, Virya, Vipaka* and *Dosha Karma* of these ingredients are given in table 2.

Table 2 Ayurveda Pharmacodynamic Properties of ingredients

Ingredient	Rasa	*Guna*	*Virya*	*Vipaka*	*Prabhava*	*Doshakarma*
01.Kutaja	*Madhura, Kashaya*	*Laghu,Snigdha*	*Sheeta*	*Katu*	*Antidysenteric*	*Vata Kaphahara,[6]*
02.Shunti	*Katu*	*Guru,Ruksha,Theekshna*	*Ushna*	*Madhura*	-	*Kaphahara[7]*
03 Ativisha	*Tikta,katu*	*Laghu,Ruksha*	*Ushna*	*Katu*	*Vishahara*	*Pacify kaphadosha[8]*
04 Mustaka	*Tikta,katu ,kashaya*	*Laghu,Ruksha*	*Sheeta*	*Katu*	-	*Kapha pitta dosha shamaka[9]*
05.Abaya	*Tikta,Kashya*	*Ruksha*	*Shee*	*Katu*	-	*Tridosha*

			ta			shamaka[10]
06 Haridra	Tikta,Katu	Ruksha,Laghu	Ush na	Katu	-	Vatapitta kapha shamaka[11]
07.Lavan ga	Tikta,Katu	Laghu,Snigdha	Shee ta	Katu	-	Kapha pitta hara[12]
08.Vacha	Tikta,Katu	Laghu.Theekshna	Ush na	Katu	-	Vata pitta hara[13]
09. Vasawasi	Tikta,kashaya	Theeshna,Laghu	Ush na	Katu	-	Kapha vata shamaka[14]
10.Breast milk	Madhura,Kas haya anurasa	Laghu	shee ta	Madh ura		Jeevana,Vrun hana Vatapitta shaman[15]

Table3 Other Actions of the ingredients

Ingredient	Other Actions
01.Kutaja	Balya (tonic),Mutrajanana(increase urine),drik hitha(good foe\r eyes),pittajanana(increasePitta), Vedanasthapana(reduce pain)[6]
02.Shunti	Vedana Sthapana(reduce pain), Shothahara(reduce swelling), Nadi Balakaraka(strengthen the nervous system), Medhya(brain tonic), Rasayana(rejuvenation), , Sheeta Prashamana(reduce cold sensation), Nadi Uttejaka(stimulate nerves), Deepana(incease digestion), Pachana(digest ama), Rochana(, Vatanulomana, Shula Prashamana(reduce pain), Jvaraghna(relieve pyrexia), Rakta Shodhana(purify vitiated rakta), Vrushya, Balya(tonic),Truptighna(destroy thirst),trishna nigrahana(reduce thirst)[7]
03 Ativisha	Rakta Shodhana, Rakta Shamaka(alleviate rakta dosha), Shothahara(reduce selling), Vedana Sthapana, Deepana, Pachana, Vajikarana, Jvaraghna, Medaghna[8]
04 Mustaka	Vedana Sthapana, Shothahara, Nadi Balakaraka, Medhya, Rasayana,pachana[9]
05.Abaya	Sveda Janaka(increase sweating), Jvaraghna, Deepana, Pachana, Nadi Balakaraka, Medhya, Balya, Rakta Prasadana, Mutrala, Vishaghna[10]
06 Haridra	Vishagna,Krimighna,Mehaghna(alleviate Meha),lekaniya,kushtaghna9cure skin diseases),Vamanopaga(vomiting),Shirovirechana[22]
07.Lavang	Kasahara,Deepana,pachana,Ruchya,Trushna,Netrahitam,Pittasranashana,Vakt ra kleda Daurganda Nashana,chedana,Shula

a	*prasamana,vishagna,Mutrajanana,Amapachana,Jwarghna,Hridya,Krimihara,vedanasthapan,admanahara[12]*
08.Vacha	*Pachana,deepana,Medhya,vamani,Vahnikrit,Apasmarahara,Jantuhara,Vibandhara,jeewani,ahara,kantya,Rakshoghn,Vatajwarahara,vakprasada,swarprasa,unmadahara,shoolahara,adhmanahara,shakrut mutra visodani,kantya,anilahara,vatajawarahara[13]*
09. Vasawasi	*Deepana,Pachana,vibandahara,Vishahara,Medhya,Garbapatana,Trushnapaha, Vaktrakledahara,Mehaghna,Vataathisara,Vrushya,Rochana,Grahi,Vamihara,Kasahara,Swasahara,Hrdya,Varnakrit[14]*
10Breast milk	Jeevana,Vrunhana,[15]

3.0 Phytochemicals and Bioactivities of the Ingredients

Phytochemicals of the Ingredients

Phytochemicals are chemical compounds that occur naturally in plants, which possess different bioactivities. Several Phytochemicals have been isolated from each ingredients of *Sama Guliya*[Table 04]

Table 4: Isolated Phytochemicals of the Ingredients.

Ingredients	Pytochemicals
01.Kutaja	Conessine, holarrhenine, holarrhimine, kurchine, kurchicine, norconessine, hollarrhimine, holarrhine, conarrhimine, conamine, conessimine, isoconessimine, conessidine, conkurchine, holarrheninelettocine.antidysenterine, crystalline glucoalkaloid, kurchiline, kurchiphyllamine, kurchiphylline, holarrhesmine, kurchessine, holarrhedine, holarrhemine, holantosine-E, trimethyl conkurchine.[16]
02.Shunti	Zingerone, Shogaol, Camphene, Phellandrene, Zingiberene, Cineol, Borneol, Gingerol, Gingerin, Resins, Geraniol[17]
03 Ativisha	Alkaloids, Terpenoid-alkaloid complex, Lipids, Calcium oxalate[18]
04 Mustaka	essential oils, flavonoids, terpenoids, sesquiterpenes, sitosterol, cyperene, cyperol, nootkatone[19]
05.Abaya	Gallic acid, Tannic acid, Chebulinic acid, Myrobalanin[20]
06 Haridra	flavonoids, tannins, alkaloids, phenolic compound ,steroids,aminoacid,protein,sponin,Glycosides,Tanin,amino acid,Carbohydrates [21]
07.Lavanga	carbohydrates, lipids, alkaloids, flavonoids, tannins, sterols and triterpenes ,proteins, saponins, cardiac glycosides volatile oil,resin,ketones[22]
08.Vacha	alkaloid, saponin, flavonoid, terpenoid, glycosides, tannin, phenolic compounds, carbohydrate, amino acid, quinines and oxalate) of the twelve analyzed were present in stem bark, ten phytochemicals (alkaloid, saponin, flavonoid, terpenoid, glycosides, phenolic compounds, carbohydrate, amino

	acid, quinines and sterol) present in seeds[23]
09. Vasawasi	(myristic, stearic, palmitic, oleic, linoleic, and lauric acids) and 10% of essential oil. The major chemical constitutes are terpene hydrocarbons (α-pinenes, Myristic,palmitic,oleic,lauric acid,steric, camphene, eugenol, isoeuglenol, isoelemicin,sabinene,limonene,terpinene,[24]

4.0 Bioactivities of the Ingredients

The activities of some of this Phytochemical of the ingredients of *Sama Guliya* are scientifically proven by various researches [Table 5]. However, there is no scientific evidence to confirm the presence of all the phytochemicals in the *Sama Guliya*

Table 5: Scientifically proven Bioactivities of the Individual Ingredients

Ingredient	Bioactivities
01.Kutaja	Antidiarrhoeal,Antidysenteric,Anthelmintic,Antimoebic,Antihemorroid,Antiinflamatory,Antioxidant,Antibacterial,Antiparasitic,Analgesic,Antidiabetic[25]
02.Shunti	Anti-inflammatory, Antioxidant, Analgesic[26]
03Ativisha	Analgesic, Anti-inflammatory, Antioxidant
04Mustaka	Analgesic, Antispasmodic, Anti-inflammatory, Antibacterial
05.Abaya	1. Anti-inflammatory, Antioxidant, Analgesic, Anti lipid, per oxidative ,anti arthritic, anticancer, ant diabetic, antifungal, antihyperlipidemia, , antimalarial, anti-osteoporotic, antiviral, hepato-protective, hypo-sexuality, immunomodulatory
06Haridra	Antiparasitic,antispasmodic,anti-inflammatory,Antioxidant,Chemopreventive,Antiproliferative,Proapoptotic
07.Lavanga	Antimicrobial,Antioxidant,analgesic
08.Vacha	Anticonvulsant, antidepressant, antihypertensive, anti-inflammatory, immunomodulatory, neuroprotective, cardioprotective, and anti-obesity effects
09. Vasawasi	Antioxidant,Antimicrobial,Antiinflammatory,Antiallergic,

Some active ingredient compounds are Alkaloid, flavanoid, tannin, steroids, Glycosides &etc. Gastrointestinal (GI) tract plays a central role in the absorption, distribution, metabolism, and excretion of flavonoids, which ultimately define the health effects of these bioactives. These aspects are modulated by the interactions of flavonoids with other dietary components environmental factors, the host, and the GI microbiota. [29] Flavonoid can target molecules in the luminal content, the different GI tract cell types, and the microbiota. Alkaloids exert vast neuroprotective actions,purified tannin are involved with GI tract antiinflammotory actions & impede digestion and utilization. The flavonoid, a hypoglycaemic agent, can regulate carbohydrate and glucose metabolism. Therefore, the effect of phytochemicals may help to manage inflammatory, degenerative as well as metabolic disorders in the body [28]

4.0 Analysis of Ayurveda Pharmacodynamic Properties

Collectively the ingredients of *Sama guliya* contains 70% of *Tikta Rasa*, 60% of *Katu Rasa* and 50% of *Kashaya Rasa* & 20% *Madhura rasa*. None of the ingredients contains *Amla Rasa & lavana Rasa*. Ingredients are having 80%, 50%, 30% ,20%,10% of *Laghu, Ruksha,Theekshna,Snigdha,Guru guna* respectively. Half of the ingredients are *Ushna* in their potency (50%) other half of the ingredients are *Sheeta* in potency while 80% possess *katu Vipaka* and 20% possess *madhura Vipaka*.While considering the effects on *Dosha*, 60% of the ingredients are capable of pacifying *Kapha* and *Vata Dosha* together. 30% of the ingredients can mitigate vitiated *Vata* and *Pitta Dosha*. 20% of ingredients mitigate *kapha & pitta dosha.*60% of ingredients perform *Deepana* and *pachana* actions while 50% of ingredients perform *vedanasthapana* action. Furthermore, 20% of ingredients exhibit *adhmanahara* action while 40% are *jvaraghna*. 40% of ingredients show *krimighna* & *Jantuhara* effect. 60% of ingredients have *vibandahara ,vishahara* action.Most of ingredients show *vamihara* action ,good for *vatatisara* 70% ingredients exhibit *Balya Nadibalakara, Rasayana* action which is most important for *maandam roga* (nutritional deficiency) of children. According to *Vatikaprakarana* breastmilk used for preparing the *sama guliya* and also used as a *anupana* for children. Breastmilk has *Madhura rasa &kashya anurasa,laghu guna, sheeta virya* & *madhura vipaka*. Breastmilk plays an important role to increase the effect of the drug. Also, breastmilk adds palatability for *sama guliya* as specially used for children. [*kumaruta Guliyak Tanakiri samagin]*

Most of the ingredients are abundant in secondary metabolites such as flavonoids, alkaloids, tannin, steroids and phenols. Almost all the ingredients perform anti-inflammatory and analgesic, antimicrobial activities. More than 75% of the ingredients provide the antioxidants to the *Sama Guliya.* The ability to pacify vitiated *Dosha* can be explained through *Rasa, Guna, Virya* and *Vipaka* of the ingredients.

Most predominant *Rasa* of all ingredients is *Tikta*. *Tikta Rasa* is formed by the combination of *Akasha* and *Vayu Mahabhutas*. It is easily digestible, cures anorexia, thirst and fever. It eliminates the poisons and purifies the blood. It dries up the moisture and fat. Next dominant Rasa *Katu* is digestive, increase hunger and improves taste. The collective effect of the ingredients of *Sama guliya* pacifies vitiated *Vata Dosha* by *Ushna Virya* and *Kapha Dosha* by *Katu Vipaka*. Administration of *Sama Guliya* is helpful to eliminate *Ama* from the body. Having *Deepana* and *Pachana Rochana* actions, *Sama guliya* directly influences the *Koshthagni* and thereby *Dhatvagni*. These properties can digest and to stop the formation of Ama by increasing *Jatharagni*.[30] Thus, these ingredients are capable of removing the obstruction of *srotas* due to *ama* and *kapha*.According to authentic text *sama guliya* is indicated for *Vamana badarujawa,panudos,mandam,athisara*.
Here the collaborative action of the ingredients [table 3] proven that *sama guliya* will be indicated for all those diseases. *Ama* act as a *visha* in the body while most of the ingredients shows *vishaghna* action Specially *Ativisha* having *vishahara prabhava*

CONCLUSION

It can be justified that the use of *samaguliya* for the Gastrointestinal disorders as mentioned in the classical texts such as *Vamana*(emesis), *badaruja*(abdominal pain), *panudos*(worm infestations), *maandam* (nutritional deficiency). According to *Rasadi panchaka* predominant *rasa* is *Tikta* and *katu rasa*, Out of *guna laghu ruksha guna* and *katu vipaka*. among *dosha karma* majority of ingredient possess *kapha vata shamaka* action. Mainly *vamihara,adhmanahra,krimighna,vtattisar ahara vishahara, shoolahra* actions also presented. Active Phytochemical are flavonoid, alkaloid, tannin, steroids. That perform anti dysenteric, antimicrobial, anti diarrhoeal, anti-inflammatory ,analgesic ,antioxidant activities etc.

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Corresponding Author: Dr. K T C Dilrukshi, Demonstrator-Faculty of Indigenous Medicine, University of Colombo, Rajagiriya, Sri Lanka. BAMS Hons (UoC)(SL), Pg.Dip. in HD (UoC)(SL)(Reading), Dip.in Ayurveda Beauty Cul-ture and Panchakarma (OCATM)(SL), Dip.in Counselling Psychology(MHF)(SL), Higher Dip in Psychotherapy(MHF)(SL), Cer.in Korean Acupunture (OCATM)(SL)

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