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A REVIEW ON IMMUNITY ENHANCING EFFECT OF "KAYAM HODDA" USED IN POSTNATAL PERIOD (PUERPERIUM)

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ABSTRAC

Postpartum means the time after delivery of the child. This period is extended up to six weeks after delivery. 'Kayam Hodda' (KH) is mainly used to promote the health of puerperal women in this period. KH is a medicinal and nutritional traditional soup that has been given to postpartum women during puerperal period since ancient times in Traditional system of medicine in Sri Lanka. This research aims to review the effect of the immunity enhancing activity of KH. Ingredients used for KH vary depending on different regions of Sri Lanka. Data was gathered according to random sampling method from 26 Ayurvedic and Indigenous physicians and 60 people from all the districts of 9 provinces across Sri Lanka. The mostly used ingredients of KH were identified as Asafoetida, Fennel, Cumin, Turmeric, Cinnamon, Red chili, Black pepper, Coriander, Curry leaves, Garcinia, Ginger, Garlic, Bark of Moringa, Fenugreek and Common salt. 86.7% of herbal materials show Katurasa, 46.7% Tiktarasa and 33.3% Madhurarasa as the most predominant rasa. 86.7% of herbal materials show Laghuguna, 60%

Thikshna, 53.3% Ruksha and 40% Snigdha. 66.7% of materials show Katuvipaka, 26.7% Madhuravipaka and 93.3% Ushnaveerya with 73.3% Kaphavatashamaka action. As modern pharmacological actions, the medicinal and health potentials of herbals are mainly attributed to its Anti-inflammatory (73.3%), anti-oxidant (86.7%), anti-bacterial (60%), hepatoprotective activity (33.5%) and immunomodulatory properties, which are helpful to strengthen the immunity of the mother during the puerperal period. The current study justifies the use of traditional folklore medicine KH that leads to further specified research.

Key words: Postpartum, Kayam Hodda, Immunity, Puerperal period

INTRODUCTION

Traditional medicine is one of the most valuable medical system in Sri Lanka. It has 3000 years back history. This knowledge is still preserved in rural society. Kayam Hodda is such an inimitable medicinal soup, used for puerperal woman in postnatal period;

Female of every species plays an important role in it than male. Enjoying motherhood is a happiest lifetime event in woman's life. During pregnancy women faces many physiological and anatomical changes in her body. After than during labor woman undergoes tremendous physical exertion, so old people used to term 'labor' as woman's rebirth. (sangwan, 2018). Puerperal women are the women after expulsion of the placenta and this period up to six weeks thereafter is called as puerperal period. In Ayurveda it is termed as sutika kaala and the woman called as sutika.

The immune system is developed to protect the host from of pathogenic microorganisms. It is system of an individual is designed to defend against millions of bacteria, viruses, fungi, toxins, and parasites. In addition, immune system eliminates allergic substances or toxins from host. The system is very complex, made up of several types of cells and proteins that have different jobs to do in fighting against foreign invaders. Our innate immunity is the best way to stay healthy. Mostly used herbals of Kayam hodda are spices. Many herbs and spices have immunomodulating properties. Spices have many roles to play. It can provide aroma and sometimes a delicious flavour to the food but most importantly, they have a role in digestive function. It helps in improving the immune system and gastrointestinal health. Some herbs and spices can have significant oxidative effects. In addition, they provide different kinds of antimicrobial property. (Nevas et al., 2004).

LITERATURE REVIEW

Traditional medicine

Sri Lanka has its own, traditional system of medicine and Ayurveda medicine as well. The methods of treatment of these two systems are very

comparable in terms of systems and principles. In traditional medicine, they use recipes handed to them by their ancestors. Those build upon individual practical experiences of specialized expertise in each branch of Sri Lankan traditional medicine which has looked after the health of Sri Lankan people for thousands of years. In past, there was a great treatment methods and recipes. Kayam Hodda is one of the things among those. It is used for puerperal women in puerperal period. This knowledge is still preserved in rural society. And this traditional medical knowledge was used to keep the people healthy in past. Recipes of Kayam Hodda are vary depend on the regions in Sri Lanka.

Puerperal women and puerperal period

According to Ayurveda, A woman who has just given birth to a child followed by expulsion of the placenta is called as Sutika (Puerperal women). (Yennawar et al, 2020). Also, the puerperium is the period encompassing the first few weeks following birth. The duration of this period is understandably inexact & it is considered by most to be between 4 & 6 weeks. Although, a relatively complex time compared with pregnancy, the puerperium is characterised by many physiological changes. Sutika is considered as Shoonya sharira (empty body) as she becomes weak due to development of fetus, loss of strength of body tissues, excretion of Kleda (moisture) and Rakta (blood) during the delivery process etc. For regaining the lost vitality and strength, special care should be provided for Sutika. (Hashina et al, 2016).

Immune system

The immune system is not a single entity. It would be harmonious and balance to function well. This complex network of cells, tissues and organs work in cooperation to preserve body against

foreign invaders. They are microorganism such as bacteria, fungi or parasites.that can cause infections. The immune system works to keep foreign invaders out from the body, or if they enter to the body to

At that time, the immune system cells are activated and communicate by direct physical contact or communicated by releasing chemical messengers. The skin perform as an initial barrier to invading microbes, but invaders can gain entry through any cuts or cracks. The digestive and respiratory tracts can also be points of entry for foreign invaders but they too, have their own means to protect against invaders by mucus in nose, coughing or sneezing, and destroys invaders by stomach acid in the gut. Once past the surface, the invaders must then get beyond general defenses of the innate immune

find and destroy them. When a foreign invader enters to the body, the immune system is alerted and it is an advanced communication system.

system, which includes chemicals in the blood and immune system cells. If the invaders make it past the general defenses, they meet up with specific weapons of the adaptive immune system, primarily antibodies and T cells which have receptors that direct them to their targets. The immune system has an army of cells at the ready (including lymphocytes and phagocytes). While certain immune cells attack all invaders, others are trained to respond to specific targets only. All immune cells are derived from immature stem cells in the bone marrow our energy, and our inner drive

Review of ingredients of Kayam Hodda

Table 1: Ingredients of Kayam hodda

No	Ingredients	Botanical name	Sinhala name
01	Cumin	<i>Cummin cyminum</i>	<i>Suduru</i>
02	Fennel	<i>Foenium vulgare</i>	<i>Mahaduru</i>
03	Black pepper	<i>Piper nigrum</i>	<i>Gammiris</i>
04	Turmeric	<i>Curcuma longa</i>	<i>Viyali kaha</i>
05	Coriander	<i>Coriandrum sativam</i>	<i>Kottamalli</i>
06	Cinnamom	<i>cinnamomun zylanicum</i>	<i>Kurundu</i>
07	Red chili	<i>Capsicum annum</i>	<i>Viyali miris</i>
08	Curry leaves	<i>Murroya koenigii</i>	<i>Karapincha</i>
09	Ginger	<i>Zingiber officinale</i>	<i>Inguru</i>
10	Fenugreek	<i>Trigonella foenum</i>	<i>Uluhal</i>
11	Asafoetida	<i>ferulan asafoetida</i>	<i>Perumkayam</i>
12	Garlic	<i>Allium sativam</i>	<i>Sudulunu</i>
13	Garcinia	<i>Garcinia zylenica</i>	<i>Goraka</i>
14	Bark of Moringa	<i>Moringa olefera</i>	<i>Murunga pothu</i>
15	Common salt	<i>sodium chloride</i>	<i>Lunu</i>

Detailed description of ingredients

Cummin cyminum

Cumin is the dried fruit of small herbaceous plants belongs to the Apiaceae family. From Latin America to North Africa and all over Asia, cumin is the most popular spice used. An array of medicinal properties of cumin is reported in literature. It is frequently used in treatment of inflammation, pain, digestive disorders, blood purification, in reducing inflammation of uterus and itching. Seeds of *Cuminum cyminum* have been reported to act as hypoglycaemic agent. and its methnolic extract have also been reported for reduction in total serum. (Singh et al. 2012). Pharmacodynamic properties are, Rasa - Katu, Tikta, Guna - Laghu, ruksha, Veerya - Ushna, Vipaka - Katu, Doshagnata – Kapha vata shamaka.

Chemical composition - Cumin oil also called di-Homo - linoleic acid is used as a powerful antioxidant agent. The composition of cumin is oil, proteins, carbohydrates, vitamins, minerals etc. Cumin's distinctive flavor is because of its crucial oil content. The cumin fruits contain fixed oil (approximately 10%) and volatile oil (1–5%) that it is because of the special aroma of cumin, in addition, protein, cellulose, sugar and minerals are also available in Cumin. Volatile oil mainly contains monoterpene hydrocarbons (α -pinene, β -pinene, ρ -cymene and γ -terpinene) and oxygenated monoterpene (1, 8-cineole, cuminaldehyde, cuminyl alcohol and safranal). Cuminaldehyde or 4-isopropylbenzaldehyde (C₁₀H₁₂O) which is the main components of cumin essential oil can induce different biological activities. (roustakhiz and Raissi, 2017). Pharmacological properties are anti-oxidant, anti - microbial, anti-inflammatory, anti-viral, anti-fungal, anti-septic. Also Cumin is an effective

immunomodulatory agent whose administration significantly and dosedependently increased the CD4+ and CD8+ T cell count and modulated T lymphocyte expression. The detailed immunomodulatory and other beneficial properties of *C. cyminum* have also been reported in literature (Allaq et al, 2020).

Foenium vulgare

F. vulgare is an upright, branching perennial with soft, feathery, almost hair-like foliage growing upto 6.6 ft. (2 m) tall. The fennel plant originated in the southern Mediterranean region and through naturalization and cultivation it grows wild throughout the Northern, Eastern, and Western hemispheres, specifically in Asia, North America, and Europe. Phytochemical studies have shown the presence of numerous valuable compounds, such as volatile compounds, flavonoids, phenolic compounds, fatty acids, and amino acids. Compiled data indicate their efficacy in several in vitro and in vivo pharmacological properties such as antimicrobial, antiviral, anti-inflammatory, antimutagenic, antinociceptive, antipyretic, antispasmodic, antithrombotic, apoptotic, cardiovascular, chemomodulatory, antitumor, hepatoprotective, hypoglycemic, hypolipidemic, and memory enhancing property. (Shamkanth et al, 2014).

Ayurvedic pharmacodynamic properties are, Rasa – Madhura, Katu, Tikta, Guna: Lagu, Snigdha, Veerya – Sheeta, Vipaka – Madhura, Doshagnata - Vata Pitta Shamaka (Pharmacopeia, vol. 1, 1961).

Piper nigrum L.

Black pepper (*Piper nigrum* L.) is a flowering vine of the Piperaceae family mainly cultivated for its fruit, which is dried and used as spice and seasoning. Pepper gets its spicy heat mostly from the piperine compound which is found both in the outer fruit and in the seed. Piperine is the chief chemical constituent responsible

for antimicrobial activity. Various pharmacological activities such as antibacterial, antimycotic, analgesic, antipyretic, inflammatory, anti-convulsant, CNS depressant, antimutagenic, antioxidant, anti-insecticidal, synergistic have been reported. Black pepper has both pro-inflammatory and anti-inflammatory properties. Pepper also has potential decreasing in obesity by increasing thermogenesis and fat oxidation. Piperine increases the absorption of selenium, Vitamin B12, β -carotene, and curcumin, as well as other compounds. Thus, it is an understudy for a variety of possible physiological effects (Srinivasan, 2007). It helps in reducing the amount of high fat induced oxidative stress cells it's considered as an antimicrobial agent. (Umakanth et al, 2020).

Ayurvedic pharmacodynamic properties are, Rasa – Katu, Guna: Laghu, ruksha, thikshna, Veerya - Ushna, Vipaka - katu, Doshagnata - Kaphashamaka (Pharmacopeia, vol. 1, 1961).

Karma - Deepan, Pachana,, Lekhana, Shothahara, Vedanasthapana (Thakur et al, 2018).

Curcuma longa

Turmeric is a perennial herb and member of the Zingiberaceae family. (Labban, 2014). The rhizome is used medicinally attributing a wide range of biological activities such as anti-inflammatory, antioxidant, anticancer, wound healing, antifungal, antibacterial activity (Singh et al, 2012).

Pharmacodynamic properties are, Rasa – Katu, Tikta, Guna - Laghu, Ruksha, Veerya – Ushna, Vipaka - katu, Doshagnata - Tridosha Shamaka (Pharmacopeia, vol. 1, 1961).

The active constituents of turmeric are the flavonoid Curcuminoids which is a mixture of curcumin (diferuloylmethane), monodexmethoxycurcumin and bisdesmethoxycurcumin. Curcumin makes

up approximately 90% of the curcuminoid content in turmeric. Other constituents include sugars, proteins, and resins.

pharmacological properties of turmeric as anti-inflammatory, antioxidant, hepatoprotective, anticarcinogenic, antidiabetic, antimicrobial, antidepressant in addition to its use in cardiovascular disease, gastrointestinal and neurological disorders.

Coriandrum sativum

Coriander is plants belonging to the Umbelliferae family. A Small herb having many branches and sub-branches. New leaves are oval but aerial leaves are elongated. Flowers are white, having slightly brinjal like shades while Fruit are round. It is growing throughout India, Italy, Netherlands, Central and Eastern Europe, China and Bangladesh. (Nimish et al, 2011).

Pharmacodynamic properties are, Rasa – Madhura, Katu, Tikta, Kashaya, Guna - Laghu, Ruksha, Thikshna, Veerya – Ushna, Vipaka - Madhura, Doshagnata - Tridosha Shamaka (Pharmacopeia, vol. 1, 1961).

Rogagnata – aruchi, mukha paka, shota, visarpa, raktapitta, deepana, rochana, pachana, hridya, krimi, arsha, kasa, swasa (Paarakh, 2009).

Major active constituents of coriandrum sativum is essential oils and fatty oil. The Monoterpenes, α -pinene, limonene, cymene, camphor, geraniol, coriandrin, flavonoids, and important pharmacological actions of the ingredients are coriandrone and citronellol. Antioxidant, anti-microbial, sedative, anti hypnotic, sedative, anti diabetic, (Nimish et al, 2011).

Cinnamomum zylanicum

Cinnamon is a tropical plant belonging to the Lauraceae family. It is native to Sri Lanka. It has been used for hundreds of years as a flavor additive, but it has also been used in natural Eastern medicine. Cinnamon extracts are vital oils that

contain biologically active compounds, such as cinnamom aldehyde, cinnamic alcohol, cinnamic acid, and cinnamate. It has antioxidant, anti-inflammatory, and antibacterial properties and is used to treat diseases such as diabetes and cardiovascular disease. (Nathalia et al, 2021).

Pharmacodynamic properties are, Rasa – Madhura, Katu, Tikta, Guna - Lagu, Ruksha, Thikshna, Veerya - Ushna, Vipaka – katu, Doshagnata - Vata Kapha Shamaka (Pharmacopeia, vol. 1, 1961).

Capsicum annum L.

The chili (*Capsicum annum* L.), is an annual herbs with short lifetime. It is belongs to solanaceae family. The chili is rich source of provitamins. Vitamins E and C; carotenoids; and phenolic compounds such as capsaicinoids, luteolin, and quercetin. These compounds are dealing with its antioxidant action, as well as other biological activities. Interestingly, *Capsicum* fruits have been used as food additives in the treatment of toothache, parasitic infections, coughs, wound healing, sore throat, and rheumatism. Moreover, it possesses antioxidant, antimicrobial, antiseptic, anticancer, appetite stimulator, anti-inflammatory, and immunomodulator activity. (Cho et al. 2020).

Ayurvedic pharmacodynamic properties are, Rasa – Katu, Guna - Lagu, Ruksha, Thikshna, Veerya – Ushna, Vipaka – katu, Doshagnata - Kapha Vata Shamaka (Pharmacopeia, vol. 1, 1961).

Murroya koenigii

Murraya koenigii, called curry leaves, which belongs to the Rutaceae family. It is a small tree, which is commonly used as a medicinally important herb of Indian origin in the Ayurvedic system of medicine. Previous reports have demonstrated that the leaves, roots, and bark of this plant are rich sources of carbazole alkaloids, which produce potent biological activities and pharmacological

effects. They are used as antihelminthics, analgesics, digestives, and appetizers in Indian cookery. The green leaves of *M. koenigii* are used in treating piles, inflammation, itching, fresh cuts, dysentery, bruises, and edema. The roots are purgative to some extent. They are stimulating and used for common body aches. The bark is helpful in treating snakebites. The essential oil extracted from *M. koenigii* leaves is reported to possess anti-oxidative, hepatoprotective, antimicrobial, antifungal, anti-inflammatory, and nephroprotective activities in animal models. The medicinal properties of *M. koenigii* have been accredited to several chemical constituents of different carbazole alkaloids and other important metabolites, like terpenoids, flavonoids, phenolics, carbohydrates, carotenoids, vitamins, and nicotinic acid from different parts of the *M. koenigii* plant. It has pharmacological activities, like anticarcinogenic, proapoptotic, antiangiogenic, antimetastatic, immunomodulatory, and antioxidant properties (Balasubhramanium et al, 2020).

Ayurvedic pharmacodynamic properties are, Rasa – Katu, Tikta, Kashaya, Guna - Lagu, Ruksha, Thikshna, Veerya – Ushna, Vipaka – katu, Doshagnata - Kapha Vata Shamaka (Pharmacopeia, vol. 1, 1961).

Zingiber officinale

Ginger has warm, sweet, pungent and aromatic flavor. Rhizome is used fresh and dried ginger is used in spice mix. In addition to rhizome, essential oil and oleoresin are parts of medicinal importance. Major constituents of the essential oil are zingiberene and ar-curcumene. The pungent taste constituents are gingerols, shogaols and zingerone. One of the traditional uses of ginger is to treat dyspepsia and nausea, cough, stomach pain. In addition, ginger is known to have other health benefits such as antibacterial, antioxidant, anti-

inflammatory, immunomodulatory, anti-ulcer, gastro protective, cholesterol lowering, antifungal. 23Ginger reduces release of prostaglandin and thromboxane in lung parenchyma suggesting its role in anti-inflammatory activity. (Johnson & Narayana, 2021).

Pharmacodynamics properties are, Rasa – Katu, Guna - Lagu, Snigdha, Veerya – Ushna, Vipaka – Madhura, Doshagnata - Kapha Vata Shamaka (Pharmacopeia, vol. 1, 1961).

Trigonella foenum

Fenugreek is the ancient spice known since 4000 B.C. Fenugreek has spicy aroma, pungent bitter taste. Seeds are plant parts of economic importance. Essential oil and oleoresin is also obtained and are equally important. Seeds contain flavonoids, trigonelline, choline, gentianine and saponins. Essential oil contains β -pinene, camphor, β -caryophyllene and nerylacetate. Fenugreek's pharmacological importance has been well recognized. (Johnson and Narayana, 2021). Fenugreek has various activities like antidiabetic, antioxidant, anticarcinogenic, antiulcer, antifertility, immunomodulatory and many more discussed last three decades. High fiber, protein content and other bioactive compounds make it a naturally several health promoting herb. Anti-cataract effect of this plant is a significant pharmacological activity. (Jhajhria and kumar, 2016).

Pharmacodynamic properties are, Rasa - Katu, Guna - Lagu, Snigdha, Veerya – Ushna, Vipaka – Katu, Doshagnata - Kapha Vata (Pharmacopeia, vol. 1, 1961).

ferulan asafotida

The genus *Ferula* is characterized by the presence of oleo-gum-resins (asafotida, sagapenum, galbanum, and ammoniacum) and their use in natural and conventional pharmaceuticals. The main

phytochemicals present in the genus *Ferula* are as follows: coumarin, coumarin esters, sesquiterpenes, sesquiterpene lactones, monoterpene, monoterpene coumarins, prenylated coumarins, sulfur-containing compounds, phytoestrogen, flavonoids and carbohydrates. This genus is considered to be a valuable group of medicinal plants due to its many different biological and pharmacological uses as volatile oils (essential oils). Numerous biological activities are shown by the chemical components of the essential oils obtained from different *Ferula* species. Because this genus includes many bioactivities such as antimicrobial, insecticidal, antioxidant, cytotoxic, anti-plasmodic, hepatoprotective, anthelmintic, anticancer, anticytotoxicity etc., researchers are now focusing on this genus. Several reviews are already available on this particular genus, including information about the importance and the uses of all the phytochemicals found in the species of *Ferula*. (Amalraj and Gopi, 2017). Use of *assafoetida* is beneficial in treatment of asthma, excessive and painful menstruation, tooth ache, sexual impotency fever, and whooping cough. There is reporting that *assafoetida* also possesses anti-influenza A (H(1)N(1)), antiviral and cytotoxic effects. (Singh et al, 2012)

Ayurvedic pharmacodynamics properties are, Rasa – Katu, Guna - Lagu, Snigdha, Tikshna, Veerya – Ushna, Vipaka – Katu, Doshagnata - Kapha Vata Shamaka (Pharmacopeia, vol. 1, 1961).

Allium sativum Linn.

Garlic is belongs to Alliaceae family. It has sulfur compound like diallyl, allicin, s- allylcysteine and trisulfide in higher concentration. They are responsible for its medicinal properties. (Tsfaye, 2021). Garlic is incredibly nutritious with low calorie and rich in Vitamin C, Vitamin B6 and manganese. It has beneficial effects on the cardiovascular system. It is

also known for its antimicrobial, anticancer, antiinflammatory, improve the immune system, hypoglycemic, and hormone-like effects. Garlic extracts have been used to treat infections for thousands of years. Its typical pungent odor and antibacterial activity depend on allicin, which is produced by enzymatic (alliin lyase) hydrolysis of alliin after cutting and crushing of the cloves. Garlic possess very effective antibacterial activity and is used to treat different kinds of clinical pathogens. It is used in the treatment of hyperlipidemia, some kinds of cancer, infectious diseases and heavy metal intoxications (lead etc). Garlic has the properties strengthening the immune system and also acts as an antioxidant. (Umakanth et al, 2020).

Pharmacodynamic properties are, Rasa – Madura, Lavana, katu, Tikta, Kashaya, Guna - Guru, Snigdha, thikshna, Sara, Pichchila, Veerya – Ushna, Vipaka - katu Doshagnata - Vata Kapha Shamaka (Pharmacopeia, vol. 1, 1961).

Garlic has been used to treat high blood pressure, cancer, high cholesterol, cardiovascular disease, fever. Diabetes, osteoarthritis, allergic rhinitis and BP hyperplasia and bacterial and fungal infections it has action of immunity boosting, (Tesfaye, 2021).

Garcinia zyleneica

Garcinia contains active compound including garcinol, xanthochymol, isoxanthoehmol, isogarcinol, and hydroxy citric acid. These are benzophenones, flavonoids, xanthone, phenolic acid, and lactones.

(Ashwaryya et al, 2020). It has antioxidant and antimicrobial activity.

Pharmacodynamic properties are, Rasa - Madura, Amla, Katu, Guna - Lagu, Ruksha, Veerya – Ushna, Vipaka – Amla, Doshagnata - Vata Kapha Shamaka (Pharmacopeia, vol. 1, 1961).

Moringa oleifera

Moringa oleifera Lam is a small genus of quick-growing trees distributed in India, Arabia, Asia Minor and Africa. It is a frost and drought resistant plant of the monogeneric family Moringaceae, it is characterized by its versatile applications as a food additive and supplement therapy. Moringa is suitable for food application because of its abundant nutritional ingredients, such as essential amino acids, oleic acids, vitamins, and minerals. Moringa is recognized for its medicinal uses, such as treating various moringa contains an active antibiotic principle, pterygospermin. Two alkaloids (total alkaloids, 0.1%), viz. moringine which is identical with benzylamine and moringinine belonging to the sympathomimetic group of bases. It also contains traces of an essential oil with a pungent smell, phytosterol, waxes and resins. An alkaloid, named spirochin, has been isolated from the roots. Hypotensive principles niazinin A, niazinin B, niazimicin, and niaziminin A and B were obtained from ethanolic extracts of the fresh leaves.

Pharmacodynamics properties are, Rasa – Katu, Tikta, Guna - Lagu, Ruksh, Tikshna, Veerya – Ushna, Vipaka – Katu, Doshagnata - Kapha Vata Shamaka (Pharmacopeia, vol. 1, 1961).

It is used in traditional medicine for the treatment of various diseases including fertility control and as an abortifacient. M. oleifera Lam. has been reported to exhibit antitumour, anti-inflammatory, anti-ulcer and anti-convulsant activities. Anti infections, modulating the immune system, and displaying antioxidant, anti-diabetic, or anti-tumor effects (Xiao et al, 2020).

Sodium chloride

Sodium chloride (NaCl), also known as salt, is an essential compound our body uses to absorb and transport nutrients, maintain blood pressure, maintain the right balance of fluid, transmit nerve

signals. Contract and relax muscles Salt is an inorganic compound, It's made when crystalline cubes. Body needs salt to function, but too little or too much salt can be harmful to your health. Salt is required for the maintenance of extracellular, and therefore plasma volume, and given the limited salt composition of this natural diet, humans evolved under an intense evolutionary pressure for the selection of

Na (sodium) and Cl (chloride) come together to form white, salt-conserving genes. It contains anti-inflammatory action.

Ayurveda pharmacodynamics properties are, Rasa – Lavana, Guna - Snigdha, Tikshna, Veerya – Ushna, Vipaka – Madhura, Doshaghna - Vata Shamaka (Pharmacopeia, vol. 1, 1961).

Table 2: Ayurveda pharmacological properties of each ingredient

No	Ingredients	Botanical name	Rasa	Guna	Veerya	Vipaka	Dosha karma
01	Cumin (suduru)	<i>Cuminum cyminum</i>	Katu	Lagu, Ruksha	Ushna	Katu	Kapha Vata Shamaka
02	Fennel (Mahaduru)	<i>Foeniculum vulgare</i>	Madhura, Katu, Tikta	Lagu, Snigdha	Sheeta	Madhura	Vata Pitta Shamaka
03	Black pepper (Gammiris)	<i>Piper nigrum</i>	Katu	Lagu, Thikshna	Ushna	Katu	Kapha Vata Shamaka
04	Turmeric (Viyali kaha)	<i>Curcuma longa</i>	Katu, Tikta	Lagu, Ruksha	Ushna	Katu	Tridosha Shamaka
05	Coriander (Kottamalli)	<i>Coriandrum sativum</i>	Madhura, Katu, tikta, Kashaya	Lagu, Ruksha, Thikshna	Ushna	Madhura	Tridosha Shamaka
06	Cinnamom (Kurundu)	<i>cinnamomum zylanicum</i>	Madhura, Katu, Tikta	Lagu, Ruksha, Thikshna	Ushna	Katu	Vata Kapha Shamaka
07	Red chili (Viyali miris)	<i>Capsicum annum</i>	Katu	Lagu, Ruksha, Thikshna	Ushna	Katu	Kapha Vata Shamaka
08	Curry leaves (Karapincha)	<i>Murroya koenigii</i>	Katu, Tikta, Kashaya	Lagu, Ruksha, Thikshna	Ushna	Katu	Kapha Vata Shamaka
09	Ginger (Inguru)	<i>Zingiber officinale</i>	Katu	Lagu, Snigdha	Ushna	Madhura	Kapha Vata Shamaka
10	Fenugreek (Uluhal)	<i>Trigonella foenum</i>	Katu	Laghu, Snigdha	Usna	katu	Kapha Vataghna

11	Asafoetida (Perumkayam)	<i>ferulan anthex</i>	Katu	Lagu, Snigdha, Tikshna	Ushna	Katu	Kapha Vata Shamaka
12	Garlic (Sudulunu)	<i>Allium sativam</i>	Madura, Lavana, katu, Tikta, Kashaya	Guru, Snigdha, thikshna, Sara, Pichchila	Ushna	Katu	Vata Kapha Shamaka
13	Garcinia (Goraka)	<i>Garcinia zyleneica</i>	Madura, Amla, Katu	Lagu, Ruksha	Ushna	Amla	Vata Kapha Shamaka
14	Murunga pothu (Bark of Moringa),	<i>Moringa olefera</i>	Katu, Tikta	Lagu, Ruksh, Tikshna	Ushna	Katu	Kapha Vata Shamaka
15	Common salt (Lunu)	<i>sodium chloride</i>	Lavana	Snigdha, Tikshna	Ushna	Madhura	Vata Shamaka

Modern pharmacological properties of each ingredient

Table 3: modern pharmacological properties of each ingredient

No	Ingredients	Chemical composition	Modern pharmacological action
01	Cumin (suduru)	Cuminaldehyde, cymene, terpenoids, cuminic alcohol, pyrazines, 2-ethoxy-3-isopropylpyrazine, 2-methoxy-3-sec-butylpyrazine, 2-methoxy-3-methylpyrazine, γ -terpinene, safranal, p-cymene, β -pinene	Anti-inflammatory, Stimulant, Cardioprotective, Immunomodulator, Digestive, Dyspepsia, Neuroprotective,
02	Fennel (Mahaduru)	Anethole, Pentanone, benzaldehyde-4-methoxy	Anti-Fungal, Antimicrobial, Analgesic, Antipyretic, Improve Milk Flow, Increase Urine Flow
03	Black pepper (Gammiris)	Piperine, Piperidine, Peperatin, Protine, Chavicine, Volatile oil,	Anti-Inflammatory, Analgesic, Antifungal, Antipyretic, Digestive
04	Turmeric (Viyali kaha)	Curcuminoid, (curcumin, demethoxycurcumin and bisdemethoxycurcumin)	Antibacterial, anti-viral, Antioxidant, Anti-Inflammatory, Hepatoprotective, Immunomodulator
05	Coriander (Kottamalli)	Linalool Borneol terpinene, α -pinene, camphor, limonene, geranyl acetate, p-cymene	Antibacterial, Hepatoprotective, antiplasmodic, Immunomodulator

06	Cinnamom (Kurundu)	cinnamon aldehyde, cinnamic alcohol, cinnamic acid, and cinnamate	Anti-Inflammatory, antimicrobial, anticancer, antioxidant, lippid Lowering Effect
07	Red chili (Viyali miris)	Capsaicin, Oleoresin	Antioxidant, Anti-Inflammatory
08	Curry leaves (Karapinch a)	Sabinene Pinene Terpinene	Anti-Microbial, Antiulcer, Cholesterol Reducing, Cardio Proactive
09	Dry Ginger (Viyali Inguru)	zingiberene curcumene gingerols, shogaols and zingerone	Anti-Inflammatory, Antiulcer, Analgesic
10	Fenugreek (Uluhal)	Diosgenin , Gitogenin, galactomannan, 4-OH isoleucine, and steroidal saponin	Anti-Inflammatory, Antioxidant, antidiabetic, anticarcinogenic, antiulcer, antifertility, immunomodulatory
11	Asafoetida (Perumkayam)	(Z)-b-ocimene, (E)-1-propenyl-sec-butyl-disulfide, Umbelliprenin, ferulic acid	Anti-Inflammatory, Antispasmodic, Antibacterial, Antiulser, Anticancer
12	Garlic (Sudulunu)	sulfur compounds, allicin, diallyl disulfide, S-allylcysteine, and diallyl trisulfide	Anti-Bacterial, Antioxidant, Hepatoprotective, Cardioprotective, Lipidlowering
13	Garcinia (Goraka)	Gambogic acid Cambogin, phenols, flavonoids, alkaloids, saponins, steroids and terpenoids	Anti-Inflammatory, Antibacterial, Antiseptic, Antiulcer, Hepatoprotective
14	Bark of Moringa (Murunga pothu)	4-(alpha-L-rhamnopyranosyloxy) benzylglucosinolate	Increase Milk Production, Antioxidant, Anti-inflammatory, Swelling, Anemia, Immunomodulator
15	Common salt (Lunu)	Sodium chloride	Fluid balance, Anti Inflammatory

METHODOLOGY

Recipes of Kayam Hodda were gathered according to random sampling method from 26 Ayurvedic and Indigenous physicians and 60 people from all districts of 9 provinces across Sri

Lanka. Among those, the mostly used 15 ingredients were selected to assess the effectiveness of immunity enhancing activity of Kayam Hodda according to Ayurveda and modern pharmacological properties and actions. The review was conducted by studying authentic books, web published research articles, reports on

Google scholar, PubMed, Research gate and international research journals in Ayurveda and Traditional medicine.

DATA ANALYSIS AND RESULTS

Table 4: Pharmacodynamic Properties – According to Rasa

No	Ingredients	Rasa					
		Madhura	Amla	Lavana	Katu	Tikta	Kashaya
01	Cumin	-	-	-	+	-	-
02	Fennel	+	-	-	+	+	-
03	Black pepper	-	-	-	+	-	-
04	Turmeric	-	-	-	+	+	-
05	Coriander	+	-	-	+	+	-
06	Cinnamon	+	-	-	+	+	-
07	Red chili	-	-	-	+	-	-
08	Curry leaves	-	-	-	+	+	+
09	Ginger	-	-	-	+	-	-
10	Fenugreek	-	-	-	+	-	-
11	Asafoetida	-	-	-	+	-	-
12	Garlic	+	-	+	+	+	+
13	Garcinia	+	+	-	+	-	-
14	Bark of Moringa	-	-	-	+	+	-
15	Common salt	-	-	+	-	-	-

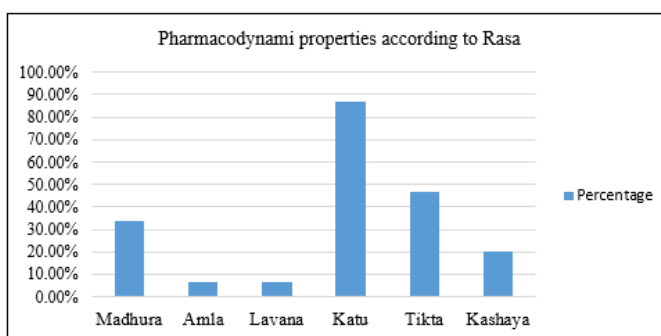


Figure 1 – Distribution according to the to the rasa of ingredients

According to figure 1, katu rasa is most predominant rasa of the ingredients of kayam hodda madura, tikta and kashaya rasa are dominantly accompanying the amla and lavana rasa.

Table 5: Pharmacodynamic Properties – According to Guna

No	Ingredients	Guna						
		Laghu	Ruksha	Thikshna	Snigdha	Guru	Pichchila	Sara
01	Cumin	+	+	-	-	-	-	-
02	Fennel	+	-	-	+	-	-	-
03	Black pepper	+	-	+	-	-	-	-
04	Turmeric	+	+	-	-	-	-	-
05	Coriander	+	+	+	-	-	-	-
06	Cinnamom	+	+	+	-	-	-	-
07	Red chili	+	+	+	-	-	-	-
08	Curry leaves	+	+	+	-	-	-	-
09	Ginger	+	-	-	+	-	-	-
10	Fenugreek	+	-	-	+	-	-	-
11	Asafoetida	+	-	+	+	-	-	-
12	Garlic	-	-	+	+	+	+	+
13	Garcinia	+	+	-	-	-	-	-
14	Bark of Moringa	+	+	+	-	-	-	-
15	Common salt	-	-	+	+	-	-	-

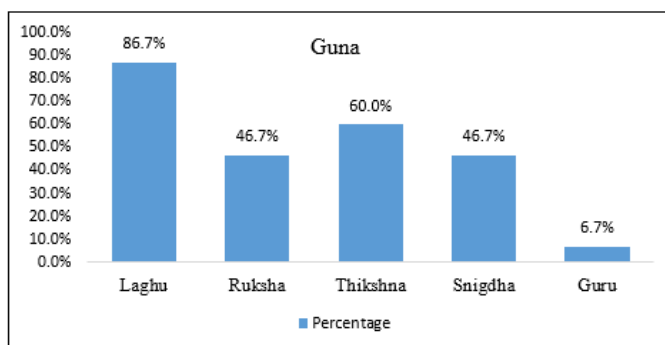


Figure 2 – Distribution according to the Guna of ingredients

Majority of (86.7%) of herbal materials show Laghu guna. As well as the formula prominent with thikshna (60%), ruksha (46.7%) and snigdha guna (46.7%)

Table 5: Pharmacodynamics Properties – According to Vipaka and Veerya

No	Ingredients	Vipaka			Veerya	
		Madhura	Amla	Katu	Sheeta	Ushna
01	Cumin	-	-	+	-	+
02	Fennel	+	-	-	+	-
03	Black pepper	-	-	+	-	+
04	Turmeric	-	-	+	-	+
05	Coriander	+	-	-	-	+
06	Cinnamom	-	-	+	-	+
07	Red chili	-	-	+	-	+
08	Curry leaves	-	-	+	-	+
09	Ginger	+	-	-	-	+
10	Fenugreek	-		+		+
11	Asafoetida	-	-	+	-	+
12	Garlic	-	-	+	-	+
13	Garcinia	-	+	-	-	+
14	Bark of Moringa	-	-	+	-	+
15	Common salt	+	-	-	-	+

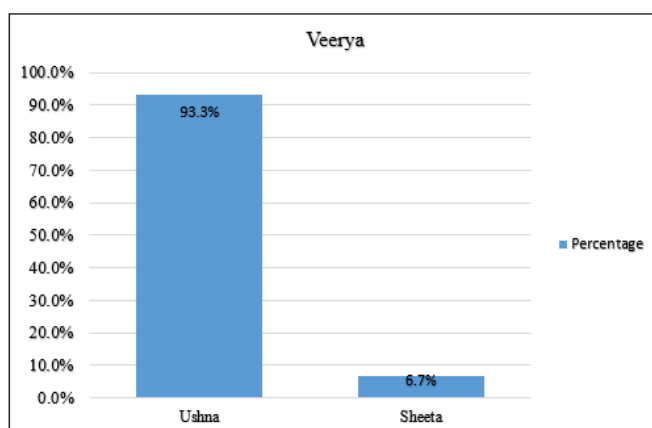


Figure 3 – Distribution according to the to the veerya of ingredients

While considering veerya of the ingredients, ushna veerya is dominant with 93.3% of herbal materials. Sheeta veerya is also present. But less in quantity.

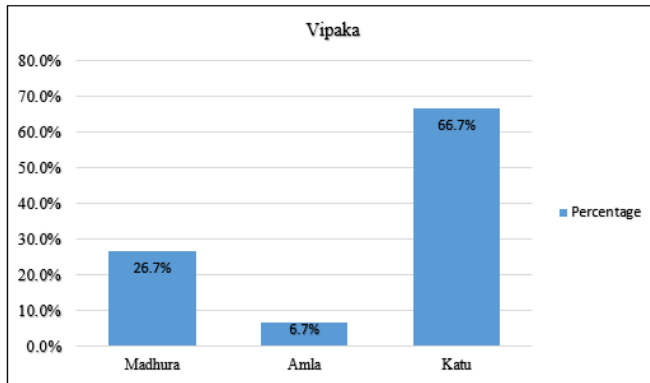


Figure 4 – Distribution according to the to the vipaka of ingredients

Majority 66.7% of herbal material show Katu in vipaka. As well as madhura and amla vipaka also present.

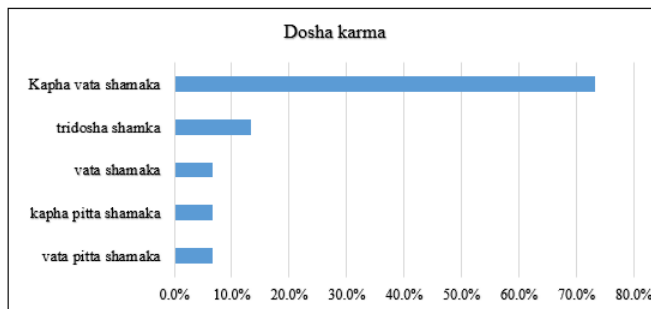


Figure 5 – Distribution according to the to the Dosha karma of ingredients

According to figure 5, these ingredients contain highly Kapha vata shamaka properties. kapha pitta shamaka, vatha shamaka and vata pitta shamaka are equal in quantity.

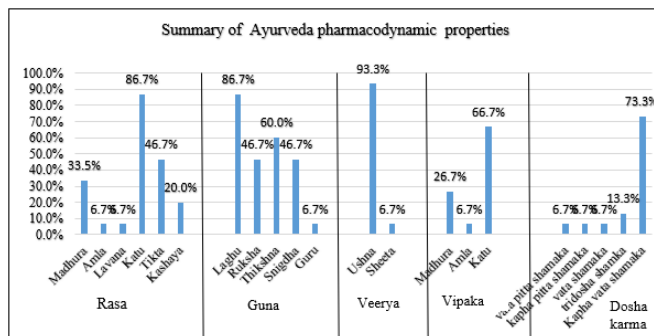


Figure 6 – Summary of the pharmacodynamics properties of ingredients

According to the data analysis of Ayurveda pharmacodynamics properties of ingredients of Kayam hodda, 86.7% of herbal materials show Katu rasa, 46.7% show Tikta rasa, 33.5% show Madhura rasa as the predominant rasa. 86.7% of herbal materials show Lagu guna, 60% Thikshna guna, 53.3% Rukshna guna and 40% Snigdha guna, as well as 66.7% of materials show Katu vipaka, 26.7% Madhura vipak and 93.3% of materials show Ushna veerya. 73.3% of ingredients show Kaphavata shamaka action as their dosha karma.

Table 6: Pharmacological action – According to Modern science

No	Ingredients	Anti-microbial	Antioxidant	Anti-inflammatory	Immunomodulatory	Anti-pyretic	Anti-fungal	Anti-viral	Hepatoprotective	Anti-influenza	Cardioprotective
01	Cumin	+	+	+	+	-	+	-	+	-	-
02	Fennel	+	+	-	-	-	+	-	+	-	-
03	Black pepper	-	+	+	-	+	+	+	-	-	-
04	Turmeric	+	+	+	+	-	-	-	+	-	-
05	Coriander	+	+	+	-	-	-	-	-	-	-
06	Cinnamon	+	+	+	-	+	-	-	-	-	-
07	Red chili	-	+	+	-	-	-	-	-	-	-
08	Curry leaves	+	+	+	+	-	-	-	+	-	-
09	Ginger	-	+	+	-	-	-	-	-	-	-
10	Fenugreek	-	+	+	-	-	-	-	-	-	-
11	Asafoetida	+	-	+	-	-	-	+	-	+	-
12	Garlic	+	+	+	-	-	-	-	+	-	-
13	Garcinia	+	+	+	-	-	-	-	-	-	-
14	Bark of Moringa	-	+	+	+	-	-	-	-	-	-
15	Common salt	-	-	+	-	-	-	-	-	-	-

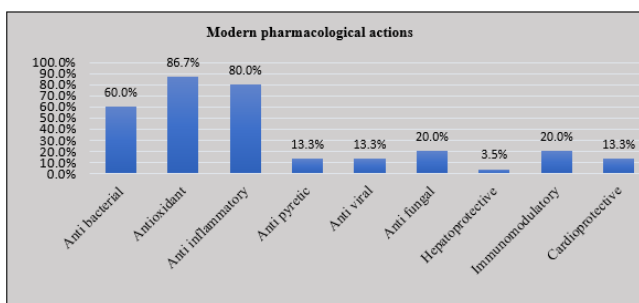


Figure 7 – Distribution according to the Modern pharmacological actions of ingredients

DISCUSSION

The main focus of this regimen is woman herself, if she is healthy; the child is going to be healthy. The use of locally available resources in preventive and promotive regimen reduces cost of curative obstetric services. The approach underlying this regimen can become one of the core strategies essential to improve overall health of the women. (Sangawan, 2018). So, health of a mother in puerperal period is more important and special care & attention is needed to prevent all these complication. Due to vitiation of vata after delivery, digestive power as well as immunity and strength of mother become weak and lady remains in a compromised state where a minor ailment can cause a lot of harm to the body (Hashina et al, 2016). According to Ayurveda the process of labour is initiated and controlled by Vata dosha. The fully stretched uterus is suddenly vacated after delivery thus filling with Vata dosha which means there is vitiation of Vata. So Vata shamana is important during postnatal period. Loss of body fluids and blood along with exhaustion during labour causes dhatu kshaya and reduction of immunity. Therefore puerperal woman becomes more prone to diseases and complications which is why she must be improved in immunity with cleansing of uterus which should be free of remnant parts of placenta to avoid further infections. According to evidence of Ayurveda pharmacodynamics properties of kayam hodda, it pacifies vitiated Vata dosha due to Madura rasa, Snigdha guna, Ushna veerya, and Madura vipaka. Having Laghu, Ruksha guna and Katu vipaka, it also pacifies vitiated Kapha dosha. Consequently the ingredients in Kayam Hodda show Kaphavata shamaka action. It helps to reduce pain and increase the immunity in Sutika. According to Ayurveda the Sleshma (kapha) in its state of normalcy is known as the Bala (immunity). When Kapha is vitiated, it

acts as a waste product in the body. Healthy Kapha dosha itself can be considered as Ojas (immunity factor). When it is imbalanced, it causes diseases while it is balanced it helps to ward off diseases. Kayam Hodda balances both Vata and Kapha dosha and helps to improve immunity. According to modern pharmacological values, the medicinal and health potentials of herbals are mainly attributed to its Anti-inflammatory, anti-oxidant, anti-bacterial, hepatoprotective and immunomodulatory properties with their chemical compounds.

CONCLUSION

According to the evidence of both Ayurveda pharmacodynamics properties and modern pharmacological actions in this study it could be concluded that the "Kayam Hodda" consists with considerable effects for puerperal woman for enhancing immunity during postnatal period. Further studies to determine the immunity enhancing effect of "Kayam Hodda" along with clinical and scientific studies are needed. And these findings may lead to develop a new pharmaceutical product of "Kayam Hodda" in the future.

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