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A Comprehensive Review on *Ratha taila* for Management of *Rathagaya* namely Infant/ Childhood Atopic Dermatitis

Dushmantha W.K.T.[1*] Herapathdeniya S.K.M.K.[2]

Abstract

Ayurveda is mainly focused on preventive and curative aspects of health. *Ratharoga/ Rathagaya* is a disease that commonly occurs within infants and children, which can correlate with the *Charmadala* in Ayurveda and atopic dermatitis in Paediatrics. According to Traditional Medicine, *Ratha taila* is the commonest external application for *Rathagaya* with *Ratha kalka* internally. This study aims to supply a comprehensive review on *Ratha taila* by analyzing the suitability of the ingredients theoretically, through their Ayurveda and modern pharmacodynamic properties and actions for *Rathagaya* with the modern correlation to atopic dermatitis. The review was conducted by referring related textbooks and online research articles and by analyzing the pharmacodynamic properties and actions listed in each ingredient of *Ratha taila.* The recipe mentioned under the 20th chapter of the 1st volume of the Ayurveda Pharmacopeia was used. Upon analysis of the ingredients and the base oil of *Ratha taila,* it comprises of *Pitta shamaka*, *Tvachya* and *Raktha shodhaka* actions at a higher ratio owing to their *Rasa, Guna, Veerya, Vipaka* and *Dosha karma* comparatively. As per modern medicine, pharmacological actions such as anti-inflammatory, antimicrobial and antioxidant actions present in these ingredients are vital to skin health. *Ratha taila* contributes to pacify the other *Dosha* since *Kushtha roga* (skin disorders) have *Tridosha* origin. It can be concluded that *Ratha taila* is therapeutically useful in the management of *Rathagaya* as a unique external application on the skin.

Keywords: *Ratha roga,* Atopic dermatitis, *Ratha taila, Pitta dosha,* Sri Lankan Traditional Medicine

Introduction

Ayurveda, the main indigenous medical system of India has its roots entwined with the Traditional Medical system in Sri Lanka. This has been called *Deshiya Chikitsa* since the time of creation. Therefore, a great fusion of treatment practices is present to treat ailments through combined modalities of both systems. Ayurveda and Traditional Medicine (TM) have survived for centuries maintaining their authenticity by preserving time-tested potent medical practices. *Rathagaya* is a disease entity mentioned in Sri Lankan TM that mostly occurs within infants or children. It can be correlated with atopic dermatitis (AD) in Paediatrics and *Charmadala* in Ayurveda. According to TM, pathogenesis of *Rathagaya* can be described as simultaneous aggravation of *Pitta dosha* and vitiation of *Raktha dhatu* of the child. *Ratha taila* is used as an external application to pacify the *Pitta dosha* and to purify the *Raktha dhatu*[1]**.** Ayurveda Pharmacopoeia Volume I, chapter 20, *Taila Khanda* mentions more than one recipe for *Ratha taila*[2,3]. *Ratha taila* comprises *Wel keppetiya Kola (Idunu), Rathmal kekulu, Kapu kola* and *Pol kola yusha (Amu)* as the main ingredients and *Tila taila* (sesame oil) as the base oil. The ingredients are mostly comprised of *Tvachya, Tridosha shamaka* properties as well as *Kushtaghna, Kandughna, Shothahara, Daha prashamana* and especially the

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Raktha shodhaka actions used for the conditions due to vitiation of blood[1]. The quality, safety and efficacy of *Ratha taila* for the management of *Rathagaya* need to be analyzed by a theoretical review which has not been conducted up to date. This review was undertaken in order to bridge this knowledge gap. Furthermore, it provides various clinical approaches related to *Rathgaya*, including *Ratha taila*. The study also evaluates the time-tested knowledge and verifies its relevance to modern-day which had been passed down over the generations. The suitability of *Ratha taila* for the treatment of *Rathagaya* is justified as per the norms of reverse pharmacology[4].

Methods and Materials

This research was done by studying the online research articles, reports on ResearchGate, PubMed®, Google Scholar and international research journals in Ayurveda and TM (inclusive of research papers related to *Rathagaya* and atopic dermatitis), referring to some authentic books in Ayurveda, Sri Lankan TM, Paediatrics and Ayurveda Pharmacopeia. *Ratha roga, Rathagaya, Taila,* Dermatitis, Atopy, Skin, Paediatrics were the relevant search terms used. Children who are between the ages of 1 to 16 with a history of atopy are the inclusive facts while congenital skin diseases, carcinomas, kidney disorders, atopic dermatitis in adulthood and past allergic history of external applications are the exclusive facts.

Observations and Results

Ayurveda and Traditional Medicine in Sri Lanka

Ayurveda is called the science of life. *Ayu* means life and *Veda* means science[5]. It is not just a system of medicine but a holistic approach based on Indian philosophy dating back to the 12th century BC. Its main objective is to accomplish physical, mental, social and spiritual well-being which defines a healthy individual beyond the definition put forward by World Health Organization (WHO)[6].

Sri Lanka has its own, traditional system of medicine and Ayurveda medicine as well. The nomenclature of the term 'Ayurveda' used in all traditional medical systems in Sri Lanka including Ayurveda, Unani, Siddha and *Deshiya Chikitsa* according to the Ayurveda Act, No. 31 of 1961[7]. The methods of treatment of these two systems (Ayurveda and TM) are very comparable in terms of systems and principles. In TM, they use recipes handed to them by their ancestors. Those build upon individual practical experiences of specialized expertise in each branch of Sri Lankan TM which has looked after the health of Sri Lankan people for thousands of years. Currently, it is being called *Deshiya Chikitsa* which resembles the treatment system of the country itself. Sri Lanka is the only country from the region of Southeast Asia which, the traditional medical community is used along with the Ayurveda[8].

Introduction of *Rathagaya*

In *Charma roga chikitsa* and *Gedi-Vana-Pilika*, it's mentioned about various types of skin disorders that are common in adults and children[6]. But in TM there is a disease called *Raktaja roga* or *Rathagaya*, which includes many skin diseases that appear in childhood[9]. *Ratha* means blood or blood related and *Gaya* or *Roga* means ailments or disease. Therefore, *Rathagaya* is a skin disorder related to vitiated blood, described in Sri Lankan TM that broadly covers most skin diseases in children.

Etiology of *Rathagaya*

There are two main etiological factors *(Nidana)* of *Rathagaya*

1. Etiology related to the pregnant or lactating mother

Going against *Garbhini paricharya* (code of conduct that should be observed in pregnant period); consumption of foods and drinks like alcohol, hot and spicy foods that can lead to *Raktha* (blood) vitiation. Moreover, unhealthy lifestyles which are deviating from the *Svastha vritta* (healthy lifestyles), psychic conditions like *Lobha* (greediness), *Irshya* (envy), *Krodha* (aversion), *Bhaya* (fear) etc., *Kushta, Peenasa* and *Tamaka shvasa* like *Rasa* and *Raktha* vitiated conditions in

mother also affect the growing fetus and results in *Ratha roga.*

2. Etiology related to the infant

Ksheera dosha (infant nourished by *Pitta* vitiated breast milk), malnutrition and unhealthy dietary habits, congenital malformations, *Sukshma krimi* (microbial infections) and poor hygiene, environmental factors like polluted by chemicals and radiation can affect the mother as well as child directly[10].

Classification of *Rathagaya*

As mentioned in Figure 1, *Rathagaya* can be classified in two main ways; according to the site of lesion (external and internal) and signs and symptoms.

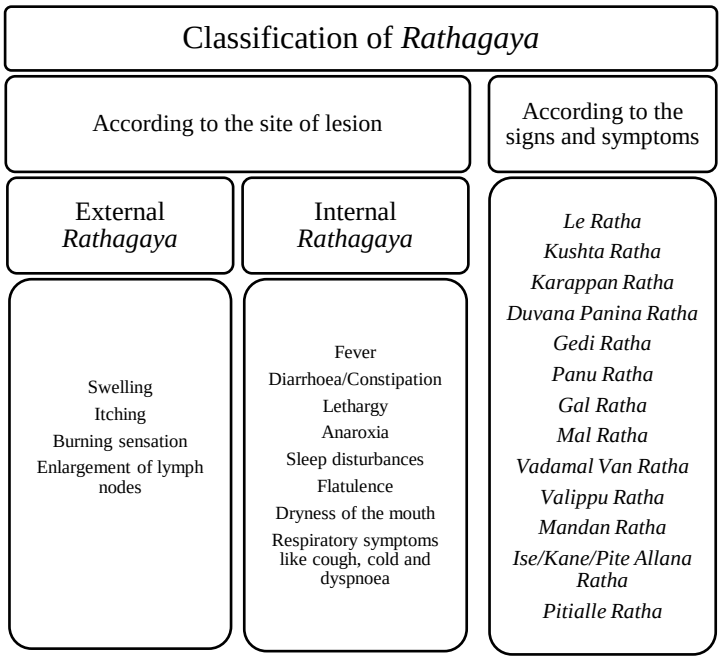

Fig: 1 - Classification of *Rathagaya*

External *Rathagaya*

Common sites of external *Rathagaya* are the scalp, face, neck, upper and lower limbs, groin, below the scrotum and all over the body. There are different types of lesions such as macules, papules and pustules[11]. Complications of external *Rathagaya* include secondary infections, septicemia, malnutrition, immunodeficiency, stomatitis, rhinitis, convulsions and rheumatoid arthritis.

Internal *Rathagaya*

Internal *Rathagaya* is linked with clinical signs and symptoms such as fever, lethargy, anorexia, alterations in bowel habits (constipation or diarrhoea), flatulence etc. as shown in Figure 1.

Line of treatment

Practicing daily oil massage *(Abhyanga)* is routine care for newborns on their proper growth and development. It involves oil application and massage, first on the head then the palms and soles followed by the whole body. The benefits of massage include the elimination of bad body odour, heaviness, drowsiness, itching and anorexia[12]. Treatment protocols of *Rathagaya* are summarized in Table 1.

Table 1: Various treatment protocols for *Rathagaya*[11, 13]

Treatment protocols of *Rathagaya*

Preventive/ *Ratha prathishedhaya*		**Curative/ *Ratha prathikaraya***	
Mother	Infant/ Child	Mother	Infant/ Child
Raktha shodhana	*Ratha kalka*	*Raktha shodhana*	Herbal bath
Avoid poor hygiene		*Anulomana (Mala)*	*Ratha taila*
		Sthanya shodhana	*Visarpahara, Pinda, Neelyadi, Seethodaka, Sarvavishadi taila*
			Ratha kalka (internal)

Charmadala

Charamadala is not distinctly mentioned in authentic Ayurveda books, but this disease is described in the *Charmadala roga adhyaya* under the *Khilasthana* of *Kashyapa Samhita*. It can be correlated to a certain extent with *Rathagaya* or *Ratha roga*. But the *Charamdala roga*, mentioned in chapters of the *Kushta roga* of other *Samhitas*, is different from the *Charamadala roga* mentioned in the *Kashyapa Samhita*. It is mentioned as '*Vriddhi machcharmadalam'* which means constantly

increasing. It has clinical features such as creeping erysipelas, excessive burning sensation, developing in parts of the child's body that bring about great discomfort to the child. *Charmadala* has an etiology similar to *Rathagaya* mentioned in TM. *Charmadala* can be classified as *Vatika, Paittika, Sleshmika* and *Sannipatika*[14]. The diseases like *Phakka, Visarpa* of children along with the pathogenesis and *Charmadala* have not been described by any other authors[15].

Atopic Dermatitis (AD)

Charmadala or *Rathagaya* can be correlated to AD in infants and childhood which is quite similar in onset, age, causative factors and clinical features. It is an acute, sub-acute or chronic recurrent endogenous eczema, characterized by dry and itchy skin. The etiology is unclear, although a genetic predisposition is an important factor. Immune changes include high allergen-specific IgE levels and lymphocyte abnormalities. There are two models of AD named infant model and childhood model. The infant model can start after 3 months of infancy. The main features are erythematous and itchy papulovesicles, which appear on the face, but can be spread all over the body. In 40% of cases, the lesions disappear after 1½ years. The childhood model is characterized by dry, lichen-shaped and crusty spots, appearing mainly on the neck and face in the antecubital and popliteal fossae. Around 70% of cases leave after 10 years. Common complications are the appearance of viral or overlapping bacteria (*Herpes simplex, Molluscum contagiosum*) and fungal infections. The diagnosis of AD is facilitated by 'Hanefin and Rajkar' diagnostic criteria[16]. AD in children are prevented by breastfeeding in the exclusive breastfeeding period of a minimum of 6 months has been shown to reduce the cumulative incidence after 2 years compared to cow's milk. Hydration is achieved through the use of topical softeners with low alcohol and water content to reduce the tingling sensation during application and immediate drying[17].

Ingredients of the *Ratha taila*

There are two types of preparations as primary and secondary (*Prathamika* and *Dvitheeka kalpana*) included in *Bhaisajja Kalpana* (Ayurveda Pharmaceutics). *Taila kalpana* (oil preparations) is a secondary preparation used mainly for *Vataja* diseases. There are oil extractions that can also be used for *Pitta* and *Raktha* vitiated diseases as well as *Kaphaja* conditions. In general, *Taila* should be subjected to *Murchana* process to enhance the quality and potency of the oil. Oils are used for both internal (*Antharparimarjana chikitsa*) as well as external applications (*Bahirparimarjana chikitsa*) in Ayurveda and TM in Sri Lanka[18]. In the system of TM, there is a unique oil preparation method called as *Bhanu paaka* which is used to prepare special kinds of oils without using fire. Here, only the heat of the sunlight to get the correct *Paaka avastha* of the relevant oil. The WHO estimates that approximately 80% of the world population in developing countries relies on traditional herbal medicines for health purposes, much of which is related to herbal compounds or their active principles[19].

Main ingredients of *Ratha taila*

1. *Wel keppetiya* (ripe leaves) - *Croton aromaticus* (Euphorbiaceae)
2. *Rathmal* (flower buds) - *Ixora coccinea* (Rubiaceae)
3. *Kapu* (leaves) - *Gossypium herbaceum* (Malvaceae)
4. Juice of fresh coconut leaves - *Cocos nucifera* (Palmaceae)
5. *Thila taila* - Sesame oil

All the ingredients mentioned in the recipe (1 *Patha* [240 ml] from each) are ground with 240 ml of raw coconut leave juice then mixed with 240 ml of sesame oil and placed on a plate to be heated under the sunlight until the correct *Paaka avastha* obtained[3]. The pharmacodynamic properties of the above ingredients are summarized in Table 2. Many chemical constituents are present in the drugs along with their pharmacological actions (per modern and Ayurveda views). The most relevant actions related to skin diseases are included in Table 3.

Table 2: Ayurveda pharmacodynamic properties of the main ingredients[20, 21,22]

Ingredient	*Rasa*	*Guna*	*Veerya*	*Vipaka*	*Prabhava*	*Dosha karma*
Croton aromaticus (WelKeppetiya)	Not found					
Ixora coccinea (Rathmal/ Rathambala)	*Kashaya Tiktha*	*Laghu*	*Sheetha*	*Katu*	Not found	*Kapha* and *Pittahara*
Gossypium herbaceum (Kapu)	*Madhura Kashaya*	*Laghu Snigdha*	*Mandoshna*	*Madhura*	Not found	*Vata shamaka Kapha* and *Pitta vardhaka*
Cocos nucifera (Pol)	*Madhura*	*Guru Snigdha*	*Sheetha*	*Madhura*	*Keshya*	*Vata and Pitta shamaka*

Table 3: Chemical constituents and pharmacological actions of main ingredients according to Ayurveda and modern science

Ingredient	Chemical constituents	Ayurveda pharmacological actions	Modern pharmacological actions
Leave juice of *Croton aromaticus*	alkaloids, terpinoids, steroids and flavonoids[23]	C*harma roga prashamana* (in TM), an ingredient of *Neelyadi* oil[24]	Insecticide and fungicide[25]
Juice of flower buds of *Ixora coccinea*	lupeol, ursolic acid, oleanolic acid, sitosterol, rutin, lecocyanadin, anthocyanins, proanthocyanidins, glycosides of kaempferol and quercetin[26]	In *Hikka nigrahana, Ratha roga prashamana, Shvetha pradara nashaka, Puya mehaghna*[27]	anti-inflammatory, antimicrobial, antioxidant, anti-ulcerogenic, anti-nociceptive, anti-mutagenicity [28]
Leave juice of *Gossypium herbaceum*	carbohydrates, saponins, steroids, glycosides, tannins and flavonoids[29]	*Vedana sthapana, Vrinaropana, Mutrajanaka, Vishamajvaranashaka* and *Yakruth uttejaka*[21]	antiviral, antibacterial,anticancer, antioxidant, anti-trypanosomal[29]
Leave juice of *Cocos nucifera*	phenols, tannins, leucoanthocyanidins, flavonoids, triterpenes, steroids and alkaloids[30]	*Varnya, Keshya, Daha prashamana, Kushtaghna* and *Vruna ropana*[21]	anti-helminthic, anti-inflammatory, antioxidant, antifungal, antimicrobial, antitumor, analgesic [31]

Sesame oil (as the base oil)

Sesame oil pacifies *Vata*, but does not aggravate *Kapha* (rather improves strength), hot in potency (increases stability) and beneficial for the skin in many ways. By the *Ushna veerya*, can pacify both *Vata* and *Kapha doshas*. Due to that, most of the skin disorders having *Vata-Kapha anubandatha* can be easily managed with *Tila taila*[32]. Sesame oil (Gingelly oil) is produced from sesame (*Sesamum indicum*), an annual herb from the Pedaliaceae family that contains the natural antioxidants; sesamolin and sesamin oil. Sesamin is lignin with anti-inflammatory properties and contains vitamin E, which helps to keep skin healthy and supple. It is used in cooking, cosmetics and other health and wellness products. Sesame oil is used by TM in Asia to relieve pain in various tissues such as joints, teeth, and irritated skin[33].

Results

Analyzed Ayurveda pharmacodynamic properties

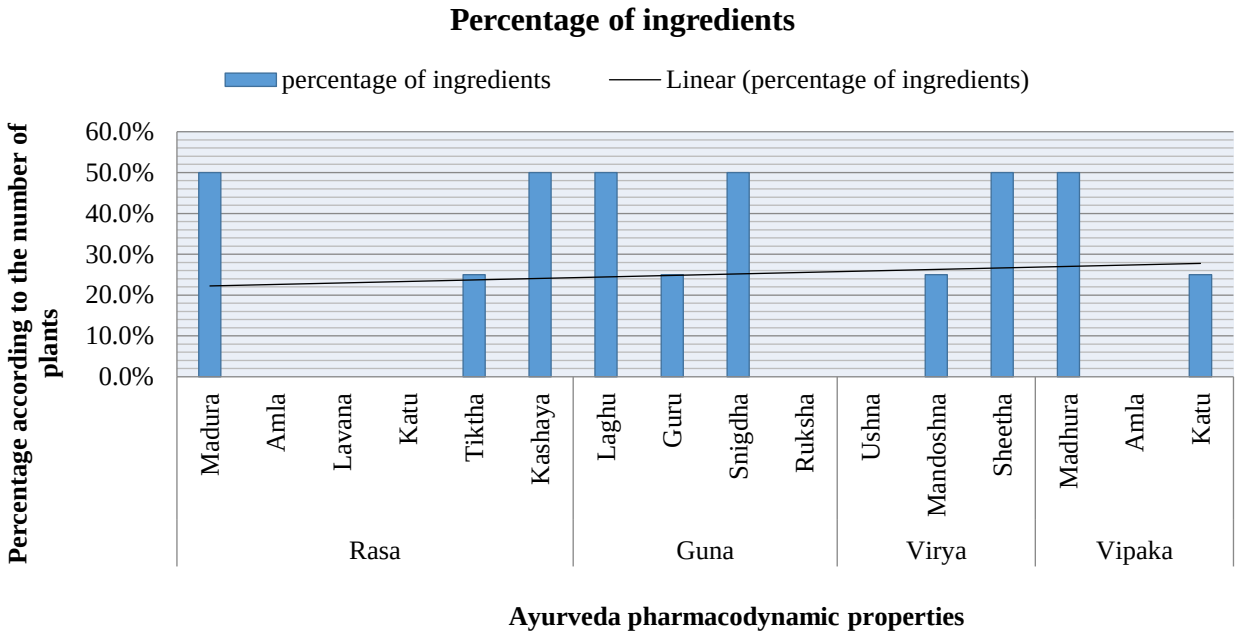

Fig. 2: Summary of the pharmacodynamic properties in the compound drug

Madhura and *Kashaya rasa* are dominantly accompanying the *Tiktha rasa* in this compound drug while *Katu, Amla* and *Lavana rasa* are not present in the ingredients. This compound formula is prominent with *Guru, Laghu* and *Snigdha guna* and devoid of remaining *Gurvadi guna* (attributes). *Sheetha veerya* is predominant and *Ushna veerya* is not present. Also, *Mandoshna veerya* (potency) is also present owing to the ingredients. Madhura and *Katu vipaka* are present, but *Madhura vipaka* is prominent than *Katu* while the *Amla vipaka* is absent (Figure 2).

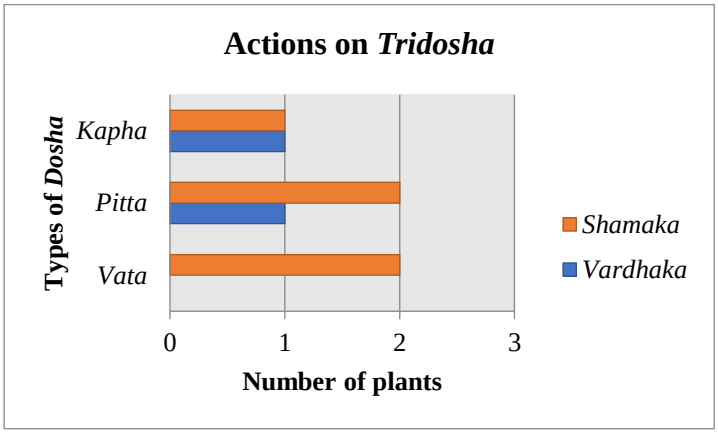

Fig. 3: Distribution of the actions on *Tridosha* in the compound drug

Actions on *Tridosha*

As mentioned in the following Figure 3, these ingredients contain highly *Vata shamaka* and *Pitta shamaka* properties. *Kapha shamaka* and *Vardhaka* properties are equal in quantity but the specific feature of this analyzed data is the absence of *Vata* v*ardhaka* action.

Limitations

Several limitations were found in this review. Out of several recipes mentioned in Ayurveda Pharmacopoeia, *Sarartha Samgrahaya* etc. one in the *Taila khanda* of Volume I in Ayurveda Pharmacopeia had been used. Due to limited information on *Croton aromaticus* the results were solely based upon the rest of the ingredients. Therefore, the results of this review are exposed to prejudices.

Discussion

Upon analysis of the aforementioned quantitative data, the pharmacodynamic properties such as *Madhura* (50.0%) and *Kashaya* (50.0%) r*asa* are predominant along with the *Tiktha* (25.0%) *rasa* in this compound drug. They are opposite to the *Rasa* that aggravate *Pitta dosha. Katu, Amla* and *Lavana rasa* are not present in the ingredients. Therefore, no aggravation of *Pitta* by *Rasa* (tastes). This compound formula is prominent with *Guru* (25.0%), *Laghu* (50.0%) and *Snigdha* (25.0%) *Guna* and devoid of remaining *Guna* (attributes). *Guru guna* reduces the aggravating *Pitta dosha, Laghu* has excessive *Kapha* reducing action and *Snigdha* displays the ability to pacify *Vata dosha. Sheetha veerya* (50.0%) is predominant and *Ushna veerya* is not present. However, due to *Mandoshna veerya* (25.0%), skin diseases caused by *Vata* and *Kapha dosha* can pacify to an optimum level. Also, due to *Sheetha veerya, Pitta* and its related vitiated *Rakthadhathu* will be pacified. *Madhura* and *Katu vipaka* are present, but *Madhura vipaka* (50.0%) is prominent than *Katu* (25.0%). The absence of *Amla vipaka* expresses that there can be no aggravation of *Pitta dosha.*

According to the analyzed Ayurveda pharmacodynamic properties and actions, it can be concluded the final product consists of highly *Pitta shamaka, Daha prashamana, Varnya, Tvachya, Keshya, Kushtaghna, Krmighna, Vrina ropana* and *Raktha shodhaka* actions along with other *Dosha* pacifying actions. Also, the presence of actions such as antioxidant, anti-microbial and anti-inflammatory emphasizes this *Ratha taila* for being more suitable in paediatric *Ratharoga.*

The present review confirms the therapeutic efficacy of *Ratha taila* and its usage against *Rathagaya* or atopic dermatitis occurring in infants and children. These research findings may lead to further development of a novel pharmaceutical product of *Ratha taila* in the future.

Acknowledgement

All the authors who compiled and published the research findings related to *Rathagaya* and atopic dermatitis and the traditional practitioners who are using *Ratha taila* as an external application to this date are acknowledged.

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