



## Review Article

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### EFFECT OF KATUTUMBI TAIL NASYA IN HYPOTHYROIDISM: A REVIEW

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#### ABSTRACT

Hypothyroidism is a common disorder of the endocrine system in which the thyroid gland does not produce enough thyroid hormone. Levothyroxine (synthetic S.T4) is the most efficacious hormone replacement treatment for hypothyroidism. The occurrence of hypothyroidism is increasing gradually and there is great demand to treat the disease through heritage of Ayurveda, as it is completely natural and safe. Here, an effort is put forward to compile and critically analyze the various studies conducted on Ingredients of Katutumbi taila. Katutumbi tail nasya is used to treat chronic galganda. Nasya karma is a special procedure where the drug is administered through the nose and it moves from the nose up to the srigataka from where it spreads to whole of the interior of head. This article discusses Katutumbi tail, its use, methods of preparation, characteristics and possible mode of action.

**Keywords:** Hypothyroidism, Katutumbi tail, Nasya, Galaganda.

#### INTRODUCTION

Hypothyroidism or thyroid hormone deficiency due to abnormality in the thyroid gland is the most common endocrine disease. Hypothyroidism is a hypo metabolic clinical state resulting from inadequate production of thyroid hormones for prolonged periods. Rarely does it occur from resistance of the peripheral tissues to the effects of thyroid hormones<sup>1</sup>. The condition is associated with decreased production of T<sub>3</sub> - T<sub>4</sub> and increased production of TSH, Symptoms are intolerance to cold, receding hairline, facial and eyelid edema, dull- blank expression, extreme fatigue, thick tongue, slow speech, anorexia, brittle nails and hair, hair loss, apathy, lethargy, dry skin, muscle aches and weakness, constipation, weight gain, bradycardia<sup>2,3</sup>. In India 42 million people are suffering from thyroid disorders, out of which Hypothyroidism is the most common<sup>1</sup>. By using the nasya, it is possible to treat only the tertiary Hypothyroidism, where the hypothalamus fails to produce sufficient thyrotropin releasing hormone<sup>5</sup>.

In Ayurveda there is no direct mention of thyroid gland, but a disease by the name Galaganda, characterized by neck swelling, is well known. The symptoms of Galaganda and Hypothyroidism are vaguely similar. According to Acharya Vagabhata Kapha associated Pitta dushti with vitiation of Vata due to Margavarna and predominantly Rasa-vaha, Medo-vaha and Mamsa-vaha Srotodushti can be considered as cause of this disease.<sup>6</sup> Lakshanas of Galganda is explained in Sushruta Samhita Nidana 11<sup>th</sup> chapter, Yogaratnakara nidana 11<sup>th</sup> chapter and Samprapti in Charaka Samhita chikitsa 12<sup>th</sup> chapter. The earliest description of Tumbi Taila is given in Vrndamadhava, Chakradutta and

Vangsen Samhita in which it is found effective in Gandmala and Galganda Chikitsa. Yogratnakar and Bhaishajyaratnavali also state that Tumbi tail cures chronic Gandmala and Galganda.

*"Yasyashlesmaaprakupitogalabaahaawatisthate.  
Shanaihsanjanyetshophagalagandaaoasyajayae"*

If the aggravated kapha is located outside the throat, it causes swelling eventually, called as Galaganda<sup>7</sup>. The signs and symptoms of hypothyroidism nearly relate to a condition called as Galaganda and some of the kaphajananatmaja vyadhis<sup>8</sup>. The Sthana of the thyroid gland being urdhwajatra, which is a kaphasthana<sup>9</sup>, for the elimination of kapha, Shiro Virechna Nasya has been described by Acharyas<sup>10</sup>. The yoga selected here for review Katutumbi taila for Nasya is said to cure Galaganda<sup>11</sup>.

*"Vidangaksharasindugraasnaagnivyoshadaarubhih  
Katutumbiphalaarasekatutailamvipachatyam  
Chirothmapinsyengalndvinashyat"*

Nasya by mustard oil cooked with vidanga, kshara, rock salt, rasna, agni, vyosa, and daruharidra (paste or powder) and juice of katutumbi fruits. The oil prepared from the above drugs when used for nasal instillation cures chronic Galaganda<sup>12</sup>.

The Herbs and the method of preparation which are mentioned by Vrndamadhava, Chakradutta, and Yogaratnakara are quite similar to each other which is described above, but in Bhaishajyaratnavali Hingu is used and in Vangsen Samhita Vacha is used instead of Trikatu, rest of the ingredients beingsame as above in Katutumbi tail.

**Table 1: Description of Tumbi Taila in different literature**

Ingredients	Chakradutta <sup>13</sup>	Vangsen <sup>14</sup>	Yogratnakar <sup>15</sup>	Bhaishjyarnavali <sup>16</sup>
Vidanga	+	+	+	+
YavaKshar	+	+	+	+
Saindhav	+	+	+	+
Rasna	+	+	+	+
Chitraka	+	+	+	+
Sunthi	+	-	+	+
Maricha	+	-	+	+
Pippali	+	-	+	+
Daruharidra	+	+	+	+
Katutumbi	+	+	+	+
Sarshapa	+	+	+	+
Hingu	-	-	-	+
Vacha	-	+	-	-

**Table 2: Ingredients of Katutumbi Taila**

S.Name	B.Name	Family	Rasa	Guna	Virya	Vipaka	Karma
Vidang <sup>17</sup>	<i>Emblica ribes</i>	Myrsinaceae	Katu Kashaya	Laghu, Ruksh	Ushna	Katu	Kapha Vatahara
YavaKshar <sup>18</sup>	-	-	Katu	Laghu, Snigdha	Ushna	-	Kapha Vatahara
Saindhav <sup>19</sup>	-	-	Lavan	Snigdha	Sheet	-	Tridoshashamaka
Rasna <sup>20</sup>	<i>Pluchea lanceolata</i>	Compositae	Tikta	Guru	Ushna	Katu	Kapha Vatahara
Chitraka <sup>21</sup>	<i>Plumbago zeylanica</i>	Plumbaginaceae	Katu	Laghu Ruksha	Ushna	Katu	Kapha Vatahara
Sunthi <sup>22</sup>	<i>Zingiber officinale</i>	Zingiberaceae	Katu	Guru ruksha	Ushna	Madhur	Kanthroghan
Maricha <sup>23</sup>	<i>Piper nigrum</i>	Piperaceae	Katu	Laghu Ruksha	Ushna	Katu	Kapha Vatahara
Pippali <sup>24</sup>	<i>Piper longum</i>	Piperaceae	Katu	Laghu Ruksha	Ushna	Katu	Kaphahara Medohara
Daruharidra <sup>25</sup>	<i>Berberis aristata</i>	Berberidaceae	Tikta Kashaya	Laghu Ruksha	Ushna	Katu	Sophagna
Katutumbi <sup>26</sup>	<i>Lagenaria siceraria</i>	Cucurbitaceae	Tikta	Laghu Ruksha	Seet	Katu	Sophagna
Sarshap <sup>27</sup>	<i>Brassica nigra</i>	Crucifereae	Katu	Guru Ruksha	Ushna	Katu	Sophagna

**Phytochemical constituents of ingredients of Katutumbitaila**

Ingredients	Chemical Constituents
<b>Vidanga</b>	Embelic acid, tannin, cinnamic acid, potassium embelate, 2,5-dihydroxy,3-undecyl-1,4-benzoquinone, embelin, quercitol (5-Deoxyinositol), vilangin <sup>28</sup>
<b>Shunthi</b>	Phenolic compounds, flavonoids, carbohydrates, proteins, alkaloids, glycosides, saponins, β-phellandrene, curcumin, cineole, geranyl acetate, terpineol, terpenes, borneol, geraniol, limonene, βelemene, zingiberol, linalool, α-zingiberene, βsesquiphellandrene, β-bisabolene, zingiberenol and α-farnesene <sup>29,30</sup>
<b>Maricha</b>	Brachyamide B, Dihydro-piperidine, (2E,4E)-N-Eicosadienoyl-pereridine, N-trans-Feruloyltryamine, N-Formylpiperidine, Guineensine, pentadienoyl as piperidine, (2E,4E)- Nisobuty- ldecadienamid, isobutyl-eicosadienamid, Tricholein, Trichostachine, isobutyl-eicosatrienamid, Isobutyl-octadienamid, Piperamide, Piperamine, Piperettine, Pipericide, Piperine, Piperolein B, Sarmentine, Sarmentosine. <sup>31</sup>
<b>Pippali</b>	Piperine, piperlongumine, piperlonguminine, n-nonadecane,n-eicosane, pipernonaline, methyl-3-4,5-trimehoxyccinnamate. <sup>32</sup>
<b>Daruharidra</b>	Berbamine, Berberine, oxycanthine, epiberberine, palmatine, dehydrocaroline and columbamine <sup>33</sup>
<b>Chitraka</b>	Alkaloids, flavonoids, naphthaquinones, glycosides, steroids, saponins, triterpenoids, tannins, phenolic compounds, coumarins, carbohydrates, fixed oil and fats and proteins <sup>34-37</sup>
<b>Hingu</b>	Ferulic acid, umbelliferone, asaresinotannol, farnesiferols A, B, and C etc., ferulic acid, valeric acid, and traces of vanillin <sup>38</sup>
<b>Katutumbi</b>	Vitamin C, β-carotene, vitamin B-complex, pectin, triterpenoids, 22-deoxocucurbitacin-d, and 22-deoxoisocucurbitacin <sup>39</sup>
<b>Sarshap</b>	Alkaloids, flavonoids, glycosides, carbohydrates, sinapine, myrosin, sinigrin, inosite, albumins, fatty oil, proteins, phenyl propane derivatives: including sinapine (choline ester of sinapic acid, 1%), and glucosinolates: chiefly sinigrin (allylglucosinolates) <sup>40</sup>

## Pharmacological action of Katutumbitaila

### Vidanga

Ethanollic extracts of *Embelia ribes* having lipid-lowering activity. Embelin is an active component of Vidanga, its direct action on the hypothalamus and releasing factors interfering thereby with the secretion of gonadotropins<sup>41</sup>.

### Saindhava

According to Ayurveda, rock salt is a fat burner. It improves metabolism in the body and inhibits craving for foods. The fat burner effect of rock salt is due to trace minerals present in it<sup>42</sup>.

### Shunthi

Mukharjee *et al*<sup>43</sup> reports that gingers decrease oxidative stress by decreasing the level of lipid peroxidation marker, malondialdehyde and increasing the activity of antioxidant enzymes (catalase and glutathione).

### Maricha

Piperine, the main alkaloid of *Piper nigrum* fruits, was evaluated for its thyroid hormone in adult male Swiss albino mice. Its daily oral administration (2.50 mg/kg) for 15 days lowered the serum levels of both thyroid hormones, thyroxin (T<sub>4</sub>) and triiodothyronine (T<sub>3</sub>). The decrease in T<sub>4</sub> and T<sub>3</sub> concentration and in Glucose-6-phosphate (G-6-Pase) was comparable to that of a standard antithyroid drug, Propylthiouracil (PTU). The action of *P. nigrum* on thyroid function is mediated through its main alkaloid piperine in higher dose.<sup>44</sup>

### Pippali

It increases the absorption of selenium, whose deficiency can impair thyroid function because of conversion of T<sub>4</sub> into T<sub>3</sub> catalyzed by specific selenoproteins<sup>45</sup>.

### Daruharidra

Zarei *et al*<sup>46</sup> surveyed the effects of the root extract of barberry and atorvastatin on thyroid hormone levels in rats with hypercholesterolemia. The results showed that in the groups receiving the extract of barberry roots and atorvastatin the levels of thyroid hormones T<sub>3</sub> and T<sub>4</sub> increased while the level of thyroid stimulating hormone (TSH) decreased in the groups receiving atorvastatin. The increased levels of T<sub>3</sub> and T<sub>4</sub> with no effects on TSH levels in the experimental groups receiving barberry root extract indicated euthyroid hyper thyroxinemia.

### Chitrak

A study by Sudha R *et al*<sup>47</sup> suggests that the administration of aqueous extract of *Plumbago zeylanica* for a treatment period of 15 days at the dose of 40 and 80 mg/kg demonstrated a significant ( $p < 0.05$ ) reduction in triglycerides and cholesterol levels with respect to the high fat diet control group. It also shows an inhibitory effect on lipid peroxidation. The IC<sub>50</sub> of aqueous extract was 147.49 microgram/ml.

### Hingu

Extract of *Ferulaassa-foetida* L. (200 and 400 mg/kg) and *Ferulatenuissima* (400 mg/kg) showed considerable antioxidant potential. It shows *in vitro* significant elevation in the activities of superoxides dismutase (SOD), glutathione peroxides (GPx),

catalase (CAT) and level of reduced glutathione (GSH) in liver. The anti hyperlipidemic effect of *Ferulaassa-foetida* extract was demonstrated by a significant reduction in Plasma Triglycerides (TG), Total Cholesterol (TC), Low Density Lipoprotein Cholesterol (HDL-C). The present data suggests that *Ferulaassa-foetida* have anti-hyperlipidemic effects.<sup>48</sup>

### Katutumbi

It is aphrodisiac and act as alternate purgative. The fruits are considered as good source of Vitamin-C, Beta-carotene, Vitamin-B complex, Pectin and also contain highest choline level – a lipotropic factor. It is having anti-hyperlipidemic properties. Hyperlipidemia is seen in hypothyroidism<sup>49</sup>.

### Sarshapa

It contains triglycerides, which improves the body's sluggish metabolism seen in hypothyroid patients. High amounts of selenium found in mustard seeds help regulate thyroid gland activity and prevent metabolic problems associated thyroid hormone disorders. Thirty adult male rabbits were treated with 2 g/d of the mustard oil, amiodarone 8 g/kg and combined mustard oil 2 g and amiodarone 8 mg for two weeks. The results showed that the combination of mustard oil and amiodarone caused significant increase in the thyroid hormones like T<sub>4</sub> and T<sub>3</sub>, and this effect was supported by significant increase in the thyroid gland weight and reduction in the body weight. In addition, mustard oil in combination form reduced the liver function enzymes especially SGOT.<sup>50,51</sup>

### Possible drug absorption and path way

The drug administered intra nasally enters the nasal cavity through superior, middle and inferior meatus which further has six sinus openings<sup>52</sup>. According to Ayurveda Nose is an entrance of the Cranial Cavity, the nasal medicine enters in Shringatakamarma and spreads in the cranial cavity, eyes, ears, throat and the minute capillaries of face and the doshas are removed from the site<sup>53</sup>. The same can be explained with the help of Anatomy. The olfactory cells get stimulated by the drug administered and stimulation carried further through olfactory axons it crosses the cribriform plate of ethmoid bone. Axons form olfactory bulbs synapses with dendrils of the mitral cells and many such synapses form olfactory glomeruli, axons of mitral cells continue to form olfactory tract finally they end in olfactory cortex.<sup>54,55</sup>

### DISCUSSION

In present era Hypothyroidism is a common disorder across the world. Although many modern medicinal therapies and medicines are available for the treatment of this disease, but these are not devoid of side effects and high rate of re-occurrence. Hypothyroidism is often correlated with galaganda mentioned in Ayurvedic literature. The disease Hypothyroidism is Kapha prominent; hence the drugs which are having Kaphashamaka properties such as Ushna, Teekshnaguna should be used in curing the disease. Katutumbi taila have Ushna, teekshna and Kaphashamaka properties. The Sthana of the thyroid gland being urdhwajatu, which is a kaphasthana, hence the management of Hypothyroidism is by katutumbi tail Nasya may be a better option. As in Ayurveda, nose is considered as the door of head. Hence nose is the suitable route for drug administration in case of Urdhva-jatrugata disease<sup>56</sup>. With the help of previous Pharmacological research, we found that all the herbs evaluated here act on Hypothalamus and pituitary gland directly or indirectly and stimulate the thyroid gland by Nasya action i.e.

Peripheral olfactory nerve, which acts as chemo receptors are stimulated by nasya dravya which stimulates the olfactory bulb. This further stimulates higher centers of hypothalamus and pituitary, thus having the effect on endocrine system secreting the normal secretion of thyroid hormones<sup>57</sup>. Katutumbi tail reaches the brain and acts on important centers controlling endocrine functions and thus having systematic effects. Embelin, which is the active component of Vidandga, shows direct action on the hypothalamus and its releasing factors. In Shunthi Zingiberene is the main alkaloid of *Zingiber officinale* which decrease lipid peroxidation and increase the activity of antioxidant enzymes. In Maricha Piperine is the main alkaloid of *Piper nigrum* fruits, when evaluated for its thyroid hormone in adult male Swiss albino mice, showed decrease in T<sub>4</sub> and T<sub>3</sub> concentration and the G-6-Pase were comparable to that of a standard antithyroid drug, Propylthiouracil (PTU). In Pippali and Sarshap high amounts of selenium found in mustard seeds and pippali fruit which help to regulate thyroid gland activity and prevent metabolic problems associated thyroid hormone disorders. Daruharidra shows effects on thyroid hormone levels in rats with hypercholesterolemia. Chitrak and Hingu shows significant reduction in triglyceride and cholesterol levels with respect to the high fat diet control group. Katutumbi fruits are considered as good source of Vitamin-C, Beta- carotene, Vitamin-B complex, Pectin and also contain highest choline level –a lipotropic factor. It is having anti-hyperlipidimic properties. Hypothyroidism is an endocrine disorder in which thyroid gland does not produce enough thyroid hormones. Most of the herbs, used in the preparation of Katutumbi tail, evaluated above have their action upon thyroid gland. This Ayurvedic preparation of Katutumbi taila not only provides relief in various symptoms but also directly alters the secretions of different hormones involved in pathogenesis of the disease and stimulates the normal functioning of thyroid gland.

## CONCLUSION

From this review we can conclude that hypothyroidism can be very well managed with nasya of katutumbi taila and its ingredients have been tested in various experimental models and proved efficacious in breaking pathogenesis of hypothyroidism at different levels.

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