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THERAPEUTIC POTENTIAL OF *KANAKASAVA* IN PURVIEW OF BRONCHIAL ASTHMA: A REVIEW

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ABSTRACT

Kanakasava (KA) is a well-known classical Ayurvedic polyherbal formulation extensively utilized in the treatment of respiratory conditions, especially Tamak Shwasa (Bronchial Asthma). It is prepared through Sandhana Kalpana, a traditional method of fermentation that enhances the stability and bioavailability of its herbal components. Data for this review were collected from classical Ayurvedic texts, contemporary textbooks, and peer-reviewed journals accessed via PubMed, Google Scholar, Scopus, and other academic databases. This review seeks to consolidate and evaluate information on KA from classical Ayurvedic literature, alongside modern scientific studies that support the therapeutic potential of both its individual ingredients and the complete formulation. A comprehensive review of Ayurvedic databases and classical texts was carried out to identify and assess various versions of KA. The same formulation was consistently found in six authoritative Ayurvedic treatises, with minor variations. The constituent herbs of KA are known for their diverse pharmacological properties, which aid in alleviating respiratory disorders and boosting compromised immunity. Evidence from both preclinical and clinical research further supports its efficacy in managing respiratory diseases, particularly Bronchial Asthma.

KEYWORDS: Bronchial asthma, Kanakasava, Fermentation, Ayurveda, Herbal Pharmacology.

INTRODUCTION

Bronchial asthma is a chronic inflammatory disorder of airways characterized by variable airflow obstruction and bronchial hyper-responsiveness. Clinically, it presents as repeated episodes of wheezing, shortness of breath, chest tightness, and coughing, especially during the night or early morning. Asthma can be triggered by various factors, including allergens (e. g. pollen, dust mites), respiratory infections, exercise, cold air and occupational exposures. The pathology of asthma involves persistent airway inflammation, which leads to bronchial smooth muscle contraction, edema, and mucus hypersecretion, ultimately causing airway narrowing. Over time, structural changes such as sub-epithelial fibrosis and airway remodeling may occur, contributing to the chronicity and severity of the disease.[1] In contemporary medical science, various types of drugs are used for the management of asthma according to the severity of the patient, including inhaled corticosteroids (ICS), long-acting beta agonists (LABA), combinations of ICS and LABA, leukotriene receptor antagonists (LTRA), and others. However, prolonged use of ICS medications can result in oral thrush, hoarseness, adrenal gland suppression, and decreased bone density, whereas LABAs may cause tremors, muscle cramps, and irregular heartbeats.[2,3]

The global burden of asthma remains significant. Chronic respiratory disease accounted for 7% of all deaths globally in 2017, making them the third leading cause of death after cardiovascular diseases and neoplasms.[4] There were an estimated 262 million individuals affected by asthma in 2019.[5] In India, the pooled prevalence of asthma among children is approximately 7.9%, with higher rates observed in urban populations and among boys.[6]

In *Ayurveda*, respiratory disorders are classified under *Pranavaha Srotas Vikaras*, encompassing conditions such as *Shwasa Roga* (dyspnoea), *Kasa Roga* (cough), *Swarbheda* (hoarseness), *Urakshata* (pleurisy), and *Rajyakshma* (tuberculosis). These disorders primarily arise from imbalances in the *Vata* and *Kapha* doshas, leading to disturbances in the *Pranavaha Srotas* (respiratory channels). Among the subtypes of *Shwasa Roga*, *Tamaka Shwasa*[7] most closely correlates with bronchial asthma in its clinical presentation. Ayurvedic management of such respiratory disorders focuses on balancing the *Doshas* and clearing obstructed respiratory pathways. Therapeutic approaches may include *Shodhana* (bio-purification) procedures like *Vamana* (therapeutic emesis), *Virechana* (therapeutic purgation), *Swedana* (sudation therapy),

and *Nasya* (nasal administrations of medications). Herbal drugs used in these treatments are expected to have properties such as *Vata-Kapha Shamaka*, *Ushna* (hot potency), and *Vatanulomana* (carminative), while exhibiting mucolytic, expectorant, bronchodilator, mast cell stabilizing and anti-inflammatory actions.[8]

Numerous herbs and Ayurvedic formulations have been used to treat respiratory disorders such as bronchitis, bronchial asthma, COPD, tuberculosis and their associated symptoms. *Kanakasava* (KA) is a classical Ayurvedic polyherbal formulation prominently used in the treatment of respiratory ailments, particularly *Tamaka Shwasa* (Bronchial asthma).[9] It is prepared through *Sandhana Kalpana*, a traditional fermentation process that enhances the bioavailability and stability of herbal constituents. During fermentation, alcohol produced by microbes serves as a natural preservative and helps enhance the delivery and effectiveness of therapeutic compounds. KA is documented in the classical Ayurvedic text *Bhaisajya Ratnavali* under the *Hikka–Shwasa Rogadhikara* chapter, which addresses disorders related to breathing and hiccups. The formulation contains *Dhatura* (*Datura metel* Linn.), known for its bronchodilator effects, along with other botanicals exhibiting anti-allergic, antihistaminic, and anti-inflammatory actions.

This review aims to compile and summarize information on KA from Ayurvedic sources, while also presenting scientific evidence supporting the efficacy of its individual plant components and overall formulation. Key insights from the literature regarding the formulation, its ingredients, therapeutic uses, and possible mechanisms of action particularly in relation to respiratory disorders like Bronchial asthma are outlined.

MATERIAL AND METHODS

Data for this review were collected from a comprehensive range of sources including Classical Ayurvedic texts, contemporary textbooks, and peer-reviewed scientific journals accessed through databases such as PubMed, Google Scholar, Scopus and other relevant academic sources. Each ingredient mentioned in the review was further analyzed for its pharmacodynamic properties with a focus on understanding its potential mechanism in the management of Bronchial asthma.

RESULTS

KA is a classical polyherbal formulations composed of 11 medicinal herbs, along with sweetening agents such as honey and sugar, and is prepared by following the principle of

Sandhana Kalpana (Fermentation technology). Honey, in particular has also been valued for its therapeutic role in respiratory conditions since long times, especially in alleviating cough. Additionally, both honey and sugar serve a dual purpose in the formulation by not only enhancing palatability but also acting as a fermentable substrate essential for the fermentation process. The method of preparation of KA is well explained in Ayurvedic Pharmacopeia of India (API). The therapeutic dose of KA is mentioned as 15- 30 ml per day with water as adjuvant.[10]

Upon reviewing the literature, it was observed that the formulation KA is documented in a total of six authoritative Ayurvedic texts recognized under Drug and Cosmetics Act, 1940. These include Bhaisajya Ratnavali,[9] Bharat Bhaisajya Ratnakar,[11] Ayurveda Sara Sangraha,[12] Rasatantra Sara Va Siddha yoga sangraha,[13] The Ayurvedic Formulary of India[14] and The Ayurvedic Pharmacopeia of India.[10] Notably, all these texts trace their reference for KA back to Bhaisajya Ratnavali, where it was originally described. Consequently, there is no variation in the composition of medicinal herbs across these sources. However, a minor difference was noted in Ayurvedic Sara Sangraha, where the quantity of sugar used in the preparation is double than that mentioned in Bhaisajya Ratnavali. The indication for the formulation remains consistent across all texts.

A number of formulations are mentioned in Ayurvedic classics that are useful for limiting the prognosis and treating pathologies in respiratory disorders such as bronchial asthma. In Ayurveda, the pharmacological actions of individual herbs are explained based on their *Rasapanchaka* (the five fundamental pharmacodynamic attributes)—namely *Rasa* (taste), *Guna* (attributes), *Virya* (potency), *Vipaka* (biotransformation), and *Karma* (specific action). Table I depicted the *Rasa* (taste), *Guna* (attributes), *Virya* (potency), *Vipaka* (biotransformation), and *Doshaghnata* (effect on *Doshas*) of each herbal ingredients of KA. Among the 11 herbs in formulation, there is a predominance of *Katu* (pungent), *Tikta* (bitter) and *Kashaya* (astringent) *Rasa*, while *Madhura* (sweet) *Rasa* is present in relatively smaller proportions. However, *Amla* (sour) and *Lavana Rasa* (salt) are absent in herbs of KA [Figure 1]. Regarding *Guna*, most of the herbs are *Laghu* (easy to digest), *Ruksha* (dry), *Tikshna* (sharp) in nature [Figure 2]. In terms of *Virya*, the majority of ingredients possess *Ushna Virya* (hot potency) [Figure 3]. The predominant *Vipaka* (biotransformative phase of *Rasa*) in KA is *Katu* followed by *Madhura* [Figure 4].

Table 1: Pharmacodynamic attributes of each ingredient of *Kanakasava.*

S.N.	***Dravya(Plant)***	***Rasa (taste)***	***Guna(attribute)***	***Virya(Potency)***	***Vipaka (biotrans fo rmation)***	***Karma (action)***
1.	*Dhatura* (*Dhatura metel* Linn.)[15]	*Kashaya* (astringent), *Madhura* (sweet), *Tikta* (bitter)	*Laghu* (lightness), *Ruksha* (dryness), *Vyavayi* (quick spread to body without digestion), *Vikasi* (quick spread and quick action in body)	*Ushna* (hotness)	*Katu* (pungent)	*Balances Vata and Kapha dosha, Jwaraghna (antipyretic), Shwasahara (beneficial in respiratory disorders like dyspnea), Madak (intoxicating) Vedanashamak (analgesic), Krimighna (antiparasitic and antimicrobial)*
2.	*Vasa (Adhatoda vasica* Nees.)[16]	*Tikta* (bitter), *Kashaya* (astringent)	*Laghu* (lightness), *Ruksha* (dryness)	*Sheeta* (coldness)	*Katu* (pungent)	Balances Kapha and Pitta dosha Raktasthambhak (hemostatic), Shwas-kasa-jwarprameha- kustha nashak (beneficial in respiratory disorders, fever, skin disorders)
3.	*Yastimadhu (Glycyrrhiza glabra* Linn.)[17]	*Madhura* (sweet)	*Guru* (heaviness), *Snigdha* (unctuousness)	*Sheeta* (coldness)	*Madhura* (sweet)	Balances Vata and Pitta dosha, Kasanashak (relieves cough), Shwasa (beneficial in shortness of breath), Swarbheda Nashak (beneficial in hoarseness of voice, Vrana Shoth Nashak (antiinflammatory), Kandughna (relieves itching or skin irritation)

4.	*Pippali* (*Piper longum* Linn.)[18]	*Katu* (pungent)	*Laghu* (lightness), *Snigdha* (unctuousness)	*Anushna* (moderatel y hot)	*Madhura* (sweet)	Balances Kapha and Vata dosha, Kasa- Shwasahara, Rasayana (Rejuvenator), Deepan, Pachan (digestion and metabolism enhancer)
5.	*Kantakari* (*Solanum Xanthocar pum* Scrad and wendl.)[19]	*Tikta* (bitter), *Katu* (pungent)	*Laghu* (lightness), *Ruksha* (dryness), *Tikshna* (sharpness)	*Ushna* (hotness)	*Katu* (pungent)	Balances Kapha and Vata dosha, Kaphanisarak (cough expectorant), Mutral (diuretics), Jwarhara (antipyretic)
6.	*Nagkeshar* (*Mesua ferrea* Linn.)[20]	*Kashaya* (astringent), *Katu* (pungent)	*Laghu* (lightness), *Ruksha* (dryness),	*Ushna* (hotness)	*Katu* (pungent)	Balances Kapha and Pitta dosha, Jwarahara, Kandughna
7.	*Shunthi* (*Zingiber Officinalis* Rosc.) [21]	*Katu* (pungent)	*Laghu* (lightness), *Snigdha* (unctuousness)	*Ushna* (hotness)	*Madhura* (Sweet)	Kapha Vatahara, Kasa-Shwasahara (alleviates cough and breathlessness), Shothnashak (reduces inflammation), Shulahara (relieves pain) Vrishya (aphrodisiac)
8.	*Bharangi* (*Cleroden drum serratum* Linn.) [22]	*Tikta* (bitter), *Katu* (pungent)	*Laghu* (lightness), *Ruksha* (dryness), *Tikshna* (sharpness)	*Ushna* (hotness)	*Katu* (pungent)	*Kapha Vatahara, Kasa-shwas nashak (relieves cough and breathlessness), Agnideepak (Increase digestive fire) Jwarhagna (alleviates fever)*
9.	*Talispatra* (*Abies webbiana* Lindl)[23]	*Tikta* (bitter), *Madhura* (sweet)	*Laghu* (lightness), *Tikshna* (sharpness)	*Ushna* (hotness)	*Katu* (pungent)	*Kapha Vatahara, Agnimandyahara (Improves appetite), Krimighna (Antimicrobial),*

						Kaphanisharak (expectorant)
10.	*Dhataki (Woodford Ia fruticose* kurtz.)[24]	*Katu* (Pungent), *Kashaya* (astringent)	*Laghu* (lightness), *Ruksha* (dryness),	*Sheeta* (coldness)	*Katu* (pungent)	*Kapha Pittahara, Raktapitta (hemostatic), Atishar nashak (antidiarrheal), Kriminashak (antihelmenthic)*
11.	*Draksha (Vitis vinifera* Linn.)[25]	*Kashaya* (astringent), *Madhura* (sweet)	*Snigdha* (unctuousness), *Guru* (heaviness)	*Sheeta* (coldness)	*Madhura* (sweet)	*Vata Pittahara, Vrishya (aphrodisiac), improves voice complexion, Daha, trishnashamak (alleviates burning sensation and thirst)*

Table 2: Pharmacological action of herbal ingredients of *Kanakasava.*

S.N.	Plants name	Botanical name	Part used	Phytochemical constituents	Pharmacological action
1.	*Dhatura*	*Dhatura metel* Linn.	Whole plant	Tropane alkaloids such as atropine, hyoscyamine, scopolamine, Flavonoids, tannins, saponins and withanolides[26]	Antioxidant, antiinflammatory, antimicrobial, analgesic, anti-pyretic, wound healing capacity[27]
2.	*Vasa*	*Adhatoda vasica* Nees.	Root	Alkaloids- vasicine, Vasicinone, Flavonoids, essential oil [28]	Anti-allergic and antiasthmatic activity[29], Antibacterial, antiinflammatory[30]
3.	*Yastimadhu*	*Glycyrrhiza glabra* Linn.	Root	Glycyrrhizin, isoliquiritin, glycyrrhizic acid, triterpene saponins, flavonoids, isoflavonoids[31]	Antibacterial, antioxidant activity [32]anti-asthmatic, antitussive, antiallergic[33,34]
4.	*Pippali*	*Piper longum* Linn.	Fruit	Piperine, piperlonguminine, Rosin, lignanoids, terpenoids, sterols and volatile oils[35]	Anti-inflammatory and antitumor activity, antibacterial, antioxidant,[36,37]Antiasthmatic[38]
5.	*Kantakari*	*Solanum xanthocarpum* Scrad and	Whole plant	Apigenin, Scopletin, Esculetin,	Anti-allergic and anticancerous activity[39] Anti-asthmatic[40]

		wendl.		carpesterol, campesterol, solasodine [39]	anti-inflammatory and immunomodulatory activity[41]
6.	*Nagkeshar*	*Mesua ferrea* Linn.	Stamen	mesuone, 1,5- dihydroxyxanthone , mesuaferrol, euxanthins, leucoanthocyanidin , β-sitosterol, mesuanic acid, euxanthins, 7-methyl ether, alpha and beta-amyrin[42]	Antioxidant,[43] antiinflammatory,[44] anti-asthmatic[45]
7.	*Shunthi*	*Zingiber officinalis* Rosc.	Rhizome	Gingerol, Zingerone, Volatile oils, Terpenoids, Flavonoids, diarylheptanoids[46]	Antimicrobial,[47] Antiinflammatory,[48] antitussive, antiallergic, bronchodilator, Antioxidant[49]
8.	*Bharangi*	*Clerodendrum serratum* Linn.	Root	Serratagenic acid, Icosahydropicenic acid, Flavonoids, β-sitosterol, Lupeol, Ferulic acid, Ursolic acid[50]	Anti-allergic, Antibacterial, Antioxidant, Antiinflammatory[51] Anti-asthmatic,[52,53] Immunomodulatory,[54] Antipyretic[55]
9.	*Talispatra*	*Abies webbiana* Lindl.	Leaf	flavonoids, triterpenoids and steroids, saponins, alkaloids[56]	Bronchodilator [57] antiinflammatory,[58] antitussive,[59] antimicrobial[60]
10.	*Dhataki*	*Woodfordia Fruticose* kurtz.	Flower	Flavonoids, tannins, elagic acid, quercetin[61]	Antioxidant, Antiasthmatic, antiinflammatory[62]
11.	*Draksha*	*Vitis vinifera* Linn.	Fruit	polyphenols, anthocyanins, flavonols, stilbenes, phenolic acids, protein, fats, and vitamins C.[63]	Anti-asthmatic,[64] antioxidant, antiinflammatory, analgesic,[65] antimicrobial, antiviral[66]

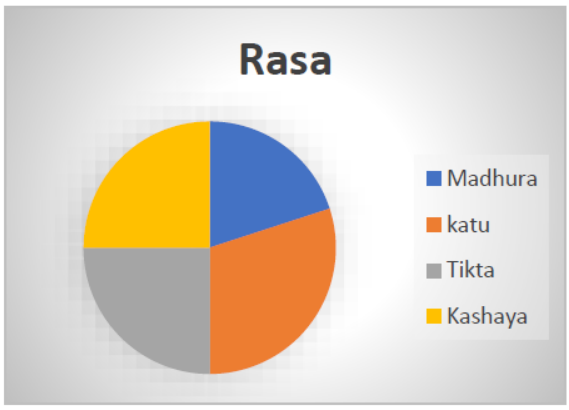

Figure 1. Predominance of *Rasa* in herbal ingredients of *Kanakasava.*

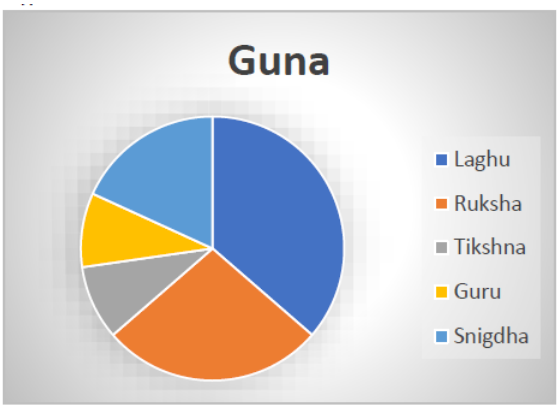

Figure 2. Predominance of *Guna* in herbal ingredients of *Kanakasava.*

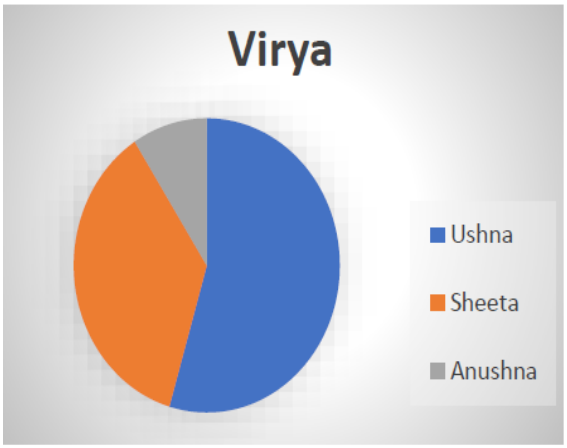

Figure 3. Predominance of *Virya* in herbal ingredients of *Kanakasava.*

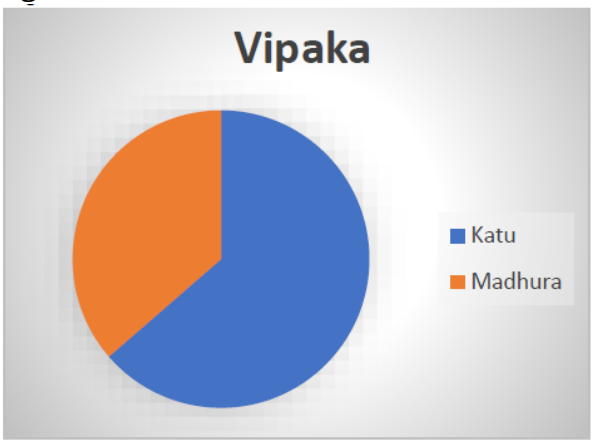

Figure 4. Predominance of *Vipaka* in herbal ingredients of *Kanakasava.*

DISCUSSION

According to *Ayurveda*, *Shwasa Roga* mainly develops as a result of the imbalance of the Vata and *Kapha doshas*. A review of the ingredients of *Kanakasava* reveals that the majority of its constituents possess *Laghu, Ruksha,* and *Tikshna Gunas*, acts as a *Srotosodhak* (helps to clear channels or passage and reducing excess mucous secretion). The dominant *Katu, Tikta,* and *Madhura Rasa* in formulation play a significant role to reduce inflammation, clear mucus secretion and promotes the strength and function of respiratory organs. In terms of *Virya* (potency), most herbs exhibit *Ushna (hot)* nature, which helps liquefy and expel excess *Kapha*—the primary *dosha* involved in respiratory disorder. The prevalent *Vipaka* is *Katu* (pungent), supporting detoxification and metabolic enhancement. Collectively, these pharmacological attributes play a crucial role in pacifying the aggravated *Vata* and *Kapha doshas*, thereby helping to manage respiratory conditions such as *Shwasa* by reducing symptoms like breathlessness, cough, and congestion.

The main ingredients of formulation such as *Dhatura* contains tropane alkaloids such as

atropine, hyoscyamine, and scopolamine, which relax airway muscles and promote bronchodilation, *Vasa* is rich in vasicine and essential oils that reduce airway resistance, inflammation, and steroid resistance while restoring mitochondrial function. Similarly, *Yastimadhu* provides glycyrrhizin and flavonoids that contribute to anti-inflammatory, antioxidant, and anti-allergic effects by inhibiting IgE production. *Pippali* fruit contains piperine and terpenoids, which are recognized for their bronchodilator, antihistamine, and anti-allergic properties. Additionally, *Dhataki* flowers, provide antioxidant benefits due to their flavonoid and tannin content. *Talishpatra* and *Draksha* are also included in the formulation, both of which have demonstrated antiasthmatic properties through various preclinical studies.[48,49] Collectively, all the herbs of formulation help alleviate asthma symptoms by promoting bronchodilation, reducing inflammation, and modulating immune responses. A preclinical study conducted on KA in an anti-asthmatic model also demonstrated its anti-inflammatory and analgesic effects by significantly reversing elevated levels of IgE, cytokines, nitrites, and the influx of eosinophils and neutrophils in blood and BALF.[67] Consequently, an in vitro study on KA using splenic cells of BALB/c mice demonstrated its immunostimulant potential by inducing lymphocyte proliferation and enhancing IgM production.[68] Clinical studies conducted on *Kanakasava* in combination with other medicines have also found it beneficial in relieving symptoms in asthmatic patients.[69,70]

When reviewed through Ayurvedic classics, recent pharmacological research, and preclinical trials, it becomes clear that each ingredient in *Kaṇakasava* possesses unique properties—anti-inflammatory, antioxidant, anti-allergic, anti-microbial, bronchodilator, and expectorant—that directly target asthma and related respiratory disorders. Although all the individual herbs used in this formulation are beneficial for respiratory diseases, our *Acharyas* have deliberately combined them for the fermentation process**.** The primary rationale behind this is to enhance the potency, improve preservation**,** and increase the efficacy of the herbal ingredients. One notable component of this formulation is *Dhatura*, which is traditionally classified under *Upavisha Dravyas* (semi-poisonous substances) in Ayurvedic texts.[71] While *Dhatura* is known to possess toxic properties, especially in large doses, its use requires careful handling and appropriate dosage**.** Interestingly, fermentation may play a critical role in reducing the toxicity of such ingredients. Studies conducted on various poisonous plants before and after fermentation have shown a significant decrease in toxicity post-fermentation.[72]

Moreover, the Sandhana process plays a pivotal role by simultaneously extracting both water- and alcohol-soluble phytoconstituents, thereby enhancing bioavailability and preserving essential active compounds. The naturally formed alcohol acts both as a preservative - enhancing shelf life and as a pharmaceutical agent, facilitating rapid absorption of active ingredients into the bloodstream and lungs. These combined factors contribute to *Kaṇakasava's* ability to deliver quick relief, clearing bronchial passages, reducing inflammation, stabilizing mast cells, reducing IgE responses, and helping clear mucous within a short time—making it a robust, holistic remedy for immediate symptoms management in asthma sufferers.

CONCLUSIONS

Based on currently available data, *Kanakasava* demonstrates potential effectiveness in the management of various respiratory disorders, including chronic cough, allergic rhinitis, bronchial asthma, chronic obstructive pulmonary disease (COPD), and conditions associated with weakened immunity. Its key herbal components, *Dhatura* (*Datura metel* Linn.) and *Vasa* (*Adhatoda vasica* Nees.) are known for their bronchodilatory, anti-inflammatory, and expectorant properties, which contribute to improved respiratory function.Consumption of *Kanakasava* may help slow the progression of respiratory diseases, enhance immune response, and strengthen the respiratory tract. These actions collectively contribute to the reduction of clinical symptoms and support its potential as a complementary approach in the management of bronchial asthma and related conditions.

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