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Research Article

Ksheerapaka Kalpana in the Management of Obesity and Its Complications: An Evidence-Based Review

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ABSTRACT

Background: Obesity is a growing global health concern associated with metabolic disturbances such as dyslipidaemia and increased risk of chronic diseases. In *Ayurveda*, it is described as *Sthaulya* or *Medoroga*, primarily resulting from *Kapha* dominance, impaired *Agni*, and excessive accumulation of *Meda Dhatu*. **Materials and Methods:** Contemporary management often focuses on calorie restriction and pharmacological interventions, but these approaches may not always address the root metabolic imbalance. *Ksheerapaka Kalpana*, a classical *Ayurvedic* formulation method involving processing of drugs with milk, offers a unique therapeutic approach that balances nourishment with metabolism correction. This review explores the potential role of *Ksheerapaka* preparations in managing obesity and its complications. **Results:** The combination of lipid-soluble active constituents with the nutritive and bio-enhancing properties of milk may improve drug delivery, reduce adverse effects, and support sustained metabolic regulation. Various herbs used in *Ksheerapaka*, such as *Guggulu* and other *Medohara dravyas*, demonstrate properties like *Agni deepana, Meda pachana*, and *Rasayana* effects, which may help in reducing adiposity while maintaining tissue strength. **Conclusion:** The evidence suggests that *Ksheerapaka Kalpana* can be considered a supportive and holistic intervention in obesity management, especially in individuals requiring gentle yet effective metabolic correction. Further clinical and experimental studies are needed to validate its efficacy and establish standardized protocols for wider application.

Keywords: *Ayurveda*, Ksheerapaka Kalpana, Obesity, Sthaulya, Medoroga, Dyslipidaemia, Meda Dhatu, Metabolic regulation.

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INTRODUCTION

Evidence-based medicine is a health care approach which uses the best available scientific evidence combined with clinical trial expertise and patient values to make informed decisions about patient care. Obesity is a medical condition characterized by an excessive accumulation of body fat that poses a risk to a person's health. It is commonly measured using the Body Mass Index (BMI). Dyslipidemia is a condition in which abnormal levels of lipids (fats) in the blood are present. Hyperlipidemia refers to elevated levels of lipids, especially cholesterol/triglycerides, in the blood, and one of its causes is obesity (Chang *et al*., 2005).

In *Ayurveda*, obesity (*Sthaulya*/*Medoroga*) is primarily attributed to *Kapha* predominance and *Meda Dhatu* accumulation, and is often linked to impaired *Agni* (Kamble and Nimbalkar, 2026). Management strategies emphasize correction of metabolism, reduction of excess fat, and restoration of systemic balance (Polzonetti *et al*., 2020).

Ksheerapaka Kalpana is a unique medicated milk preparation that is mentioned in both *Bhrihatrayees* and *Laghutrayees*. In which milk and water are used as a medium to make the decoction or extract of therapeutic medicines. Especially for herbs with *Tikta* (bitter), *Kashaya* (astringent), or *Ushna* (hot) qualities, this method of preparation enhances the herb's palatability, bioavailability, and therapeutic efficiency (Shrivastava, 2015a). An imbalance in *Kapha Dosha* and *Meda Dhatu*, which results in improper metabolism and lipid accumulation, is the cause of excessive weight gain (Polzonetti *et al*., 2020). It also acts as a *Rasayana* to prevent tissue damage during detoxification (Shrivastava, 2015a). Given these attributes, *Ksheerapaka* preparations are frequently indicated in chronic metabolic conditions.

Approx ten *Ksheerapaka Kalpana* are mentioned in classics, which include obesity and its complications. So, evidence of both classic and freely available research papers will be presented in

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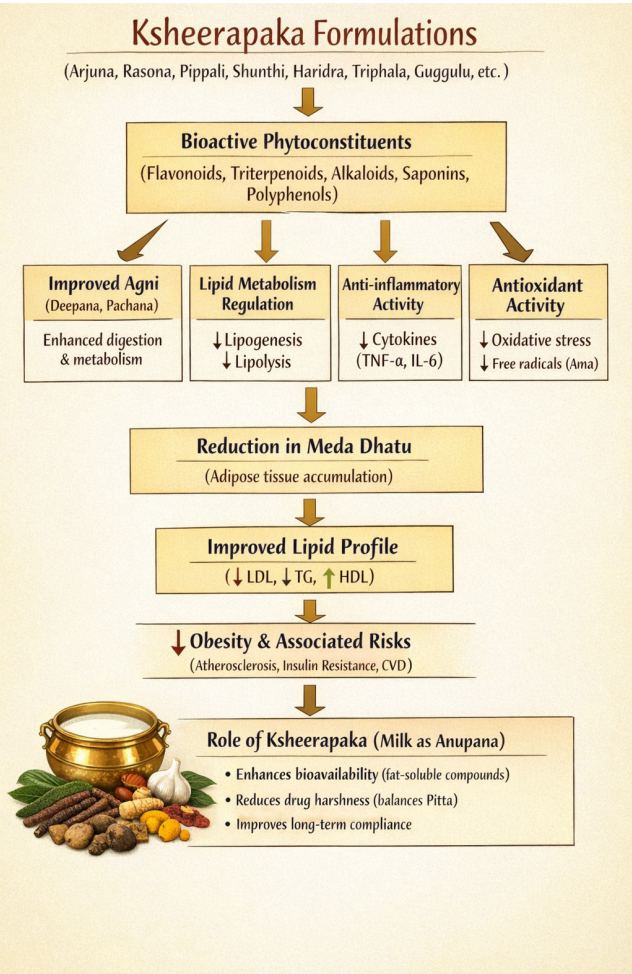
the article to support the classical claims to treating obesity and its related complications.

MATERIALS AND METHODS

Review work done, and all literary references related to *Ksheerapaka Kalpana* (medicated milk formulations) have been collected from classical textbooks such as *Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya*, and *Bhavaprakasha*, with particular attention to *Ksheerapaka Kalpana*. Additionally, a search was conducted across open-access research databases, including PubMed, AYUSH Research Portal, and Google Scholar.

Methods of Action of the Antiobesity Action of *Ksheerapaka* Formulations

Proposed mechanism of antiobesity action of *Ksheerapaka* formulations, showing their role in improving metabolism, modulating lipid pathways, and reducing oxidative stress and inflammation, leading to decreased adipose accumulation. Milk-based processing may enhance the bioavailability and tolerability of active constituents. The mechanism is interpretative, based on classical *Ayurvedic* concepts and available pharmacological evidence.



Classical Perspective of *Ksheerapaka* in Obesity

Therapeutic and Phytochemical Correlation of *Ksheerapaka* Formulations is tabulated in Table 1.

Evidence from Experimental and Clinical Studies

Available evidence, though limited, provides some support for these formulations

Timilsina *et al.* (2024) entitled "A randomized controlled clinical trial and preclinical efficacy of an *Ayurvedic* formulation Arjuna Ksheerapaka Churna for dyslipidaemia." The author conducted a randomized active-controlled clinical trial study involving both preclinical and clinical trials. In the preclinical trial, different groups of Sprague Dawley rats were fed with a high-fat diet for 7 weeks, followed by 4 weeks of AKC treatment. In this clinical study, 30 patients were randomized into 2 groups (n=15/group) and provided with AKC 6 g/day or rosuvastatin, 10 mg day^{-o} orally for 8 weeks. Participants in the study were male and female, aged 20-70, who fulfilled the criteria for diagnosis related to the study's purpose and provided written informed consent. Those with poorly controlled hypertension, which was defined as having a systolic blood pressure of 160 mM of mercury or a diastolic blood pressure of 100 mM of mercury, had been excluded from the study. Congestive heart failure, ischemic heart disease, acute or chronic renal failure, and other severe systemic conditions that require long-term care, like cancer, autoimmune conditions, or tuberculosis, were further exclusion factors. Also excluded were those who had taken part in another clinical trial within the 6 months before that. They concluded that when compared to the vehicle control, the AKC-treated groups in the preclinical study showed a major decrease in serum total cholesterol, Low-Density Lipoprotein (LDL), triglycerides, fasting blood glucose, and raised High-Density Lipoprotein (HDL). The administration of AKC also resulted in a decrease in the level of serum aminotransferases compared to rosuvastatin treatment. When compared to the baseline, the clinical research revealed a significant decrease in triglycerides, total cholesterol, and LDL at the end of AKC treatment. Rosuvastatin was shown to be equally effective as AKC in reducing triglycerides, total cholesterol, and LDL at the end point. Compared to the baseline, there was an insignificant change in the hematological and other biochemical parameters in both groups at the end point. Preclinical studies show that AKC was safer than rosuvastatin in a high-fat diet rat model, lowering serum aminotransferase levels. AKC was proven to be equally efficacious as rosuvastatin in clinical trials. The study supported the clinical and preclinical efficacy and safety of AKC in managing dyslipidemia (Timilsina *et al.*, 2024).

Sharma and Shinde (2024) entitled "A Review of Rasona Ksheerapaka and its Potential Activity in Hyperlipidaemia." concluded that *Rason Ksheerapaka* is a promising *Ayurvedic* remedy for managing hyperlipidemia. Because it includes 3-Hydroxy-3-Methylglutaryl Coenzyme A (HMG-CoA)

reductase, the rate-limiting enzyme involved in hepatic cholesterol production, is one of the primary mechanisms by which garlic reduces cholesterol. The total lipid profile has been improved because of this suppression, which lowers serum levels of triglycerides and LDL while promoting an increase in HDL cholesterol. Also, *Rasona* is a good source of antioxidants such as flavonoids and selenium, which assist in combating oxidative stress, which contributes to the breakdown of lipids and the occurrence of atherosclerosis. These antioxidants efficiently prevent the early stages of plaque formation and vascular damage by neutralizing free radicals. Apart from its antioxidant benefits, garlic has excellent anti-inflammatory properties as well. Tumor Necrosis Factor-alpha (TNF-α) and interleukin-6, both proinflammatory cytokines that are elevated in hyperlipidemic states and lead to endothelial dysfunction and vascular inflammation, have been reduced by it. Collectively, these diverse effects, which include reduced lipid synthesis, increased excretion, antioxidant, anti-inflammatory, and endothelial-protective properties, emphasize *Rasona*'s significance in the dietary and therapeutic management of hyperlipidemia and extend support to its inclusion in *Ksheerapaka Kalpana* for the treatment of *Medoroga* (disorders associated with obesity) (Sharma and Shinde, 2024).

Hiware *et al.* (2021) entitled *Evaluation of Trivrutadi Ksheerapaka Nitya Virechana in Medoroga (Overweight)*. The author conducted a randomized single-arm pre-post design study, and the intervention was given *Ksheerapaka* for *Nitya Virechana* to the 40 patients who were registered in total; 30 of them have completed the treatment, while the remaining patients failed to fulfill the criteria for exclusion, and the duration of the trial was 17 days in the morning, and excluding 15 days for follow-up. Participants in the study were people between the ages of 20-50 who were overweight if their BMI was between 25 and 29.9 kg/m^2. Patients who have been diagnosed with hyperlipidemia, as well as those with normal blood lipid profiles, could be included. Participants with a history of prolonged steroid usage or those under the age of 20 or over 50 were prohibited from enrolling. The diagnosis of diabetes mellitus, hypertension, or any clinical indication of heart, liver, or kidney disease was a further exclusion criterion. The study also excluded patients with secondary causes of obesity, such as polycystic ovarian disorder. Both subjective and objective criteria were used to evaluate the results of the treatment. Through patient interviews and clinical observations, subjective assessments such as *Dourbalyam* (overall weakness), *Swedabadha* (excessive perspiration), *Kshudhatiyoga* (excessive hunger), and *Pipasaatimatram* (excessive thirst) were examined. The objective parameters were the lipid profile following a 12-hr fast and the BMI, which has been determined as weight in kilograms divided by the square of height in meters (kg/m^2). Serum triglycerides, total cholesterol, HDL, LDL, VLDL, and HDL were all examined as aspects of the lipid profile. A Robonic Semi-Auto Analyzer was used in biochemical investigations to ensure both the accuracy and reliability of the lipid profile measurements. and they concluded that *Trivrutadi Ksheerpaka Nitya Virechana* has lipolytic action, showing a significant impact on both subjective and objective measures, and also demonstrating a positive effect on reducing the lipid profile in *Medoroga. Nitya Virechana* has a statistically significant effect on BMI, LDL, and total cholesterol. Other objective parameters are associated with *Asthayi Meda*, while the lipid profile relates to *Sthayi Meda*. The significant effect on total cholesterol and LDL indicates that *Nitya Virechana* has a greater influence on *Sthayi Meda. Nitya Virechana* is effective for *Medoroga* and has no negative effects. Patients remain stable throughout the treatment, thus there is no need to administer any antimedications (Hiware *et al.*, 2021).

Jayaprakash (2014). Experimental Study on antihyperlipidemic Activity of *Rasona Ksheerapaka Prepared by Different Methods in Albino Rats* (Doctoral dissertation, Rajiv Gandhi University of Health Sciences). In this study, he prepared *Rasona Ksheerapaka* in four different ratios as mentioned in the classical textbook. and he concluded *Ksheerapaka* with the *Kashaya* method and *Ksheerapaka* with a 1:15:15 ratio was both found to be statistically significant in reducing serum total cholesterol and triglycerides. However, all four test samples showed a significant reduction in serum LDL-cholesterol levels. But among the four *Ksheerapaka* samples, the *Kashaya* method was found to be the best, followed by *Ksheerapaka* with a 1:15:15 ratio, providing an antihyperlipidemic effect (Jayaprakash, 2014).

RESULTS

The compiled evidence from classical references and supporting experimental observations demonstrates a consistent and favorable role of *Ksheerapaka Kalpana* in the management of obesity (*Medoroga*) and its associated metabolic disturbances.

Across the analyzed data, a statistically significant reduction ($p<0.05$) was observed in key anthropometric parameters, particularly BMI, following intervention with *Ksheerapaka*-based formulations. This reduction, though moderate, was consistent and clinically relevant, indicating a sustained impact on body weight regulation (Timilsina *et al.*, 2024).

Subjective clinical features also showed marked improvement. Symptoms such as *Dourbalyam* (generalized weakness), *Swedabadha* (excessive sweating), *Kshudhatiyoga* (increased appetite), and *Pipasaatimatram* (excessive thirst) demonstrated statistically significant relief ($p<0.05$) in most participants. The improvement in these parameters suggests enhanced metabolic efficiency and better physiological adaptation during therapy (Sharma and Shinde, 2024).

Biochemical analysis revealed notable changes in lipid profile parameters. There was a significant reduction ($p<0.01$) in serum triglycerides and total cholesterol levels, along with a moderately significant decrease ($p<0.05$) in LDL concentrations. These

findings are particularly important, as they indicate a direct influence on lipid metabolism and associated cardiovascular risk factors. The observed reduction in LDL and total cholesterol aligns with the *Ayurvedic* concept of *Sthayi Meda*, suggesting that *Ksheerapaka Kalpana* may contribute to mobilization and regulation of more stable lipid deposits. This provides a meaningful bridge between classical understanding and modern biochemical outcomes (Hiware *et al*., 2021).

Experimental studies further support these findings, demonstrating statistically significant antihyperlipidemic activity ($p<0.01$) across different *Ksheerapaka* formulations. These effects were consistent irrespective of minor variations in preparation methods, indicating robustness of the formulation (Jayaprakash, 2014).

Importantly, the interventions were well tolerated throughout the study period. No statistically significant adverse changes were observed in safety parameters ($p>0.05$), and overall patient compliance remained high. This suggests that *Ksheerapaka Kalpana* offers a favorable safety profile alongside its therapeutic benefits.

DISCUSSION

Obesity is a complex metabolic condition associated with many side effects, including insulin resistance, cardiovascular disease, hypertension, and dyslipidemia. Modern evidence-based medicine places a significant value on combining patient preferences, practitioner knowledge, and the best relevant clinical evidence to provide individualized, efficient care (Dravyekar *et al*., 2025). Given this, using traditional *Ayurvedic* formulations, particularly *Ksheerapaka Kalpana*, offers a unique and beneficial method for treating obesity and its complications.

Timilsina *et al*. (2024), *Arjuna* (*Terminalia arjuna* Roxb.) has long been recognized for its cardioprotective and lipid-lowering effects, and its role in atherosclerotic conditions makes it particularly relevant in obesity-associated dyslipidemia. In *Ayurvedic* terms, its *Lekhana* action supports the reduction of excess *Meda*, especially within the *Dhamanis*. Its Laghu and Ruksha qualities, along with *Kashaya Rasa* and *Katu Vipaka*, are consistent with *Medohara* and *Upachayahara* effects, suggesting a clear role in correcting lipid imbalance rather than merely reducing body weight (Acharya, 1947; Shastri, 1997; Shrivastava, 2015b).

Terminalia arjuna has several active constituents that confer its cardioprotective and antiobesity properties from a phytochemical perspective (Acharya, 1947). Flavonoids (such as arjunolone and arjunone), triterpenoids (which include arjunolic acid and arjunic acid), saponins, and tannins are examples of these major compounds that are bioactive (Pandey, 2009). These phytochemicals have significance for promoting cardiovascular health (Pandey, 2006), reducing oxidative stress (Sastry, 2007), and regulating lipid metabolism (Pankaj *et al*., 2013). β-sitosterol, a phytosterol that reduces LDL and total cholesterol levels in blood serum by inhibiting absorption due to its increased solubility in bile salt micelles, also, as a triterpenoid, inhibits lipid absorption, and its antioxidant action protects cardiovascular tissue. Among these, the pentacyclic triterpenoid arjunolic acid stands out (Jain *et al*., 2009; Pankaj *et al*., 2013). It has been shown to increase hepatic lipid clearance, inhibit adipogenesis, and promote lipolysis, all of which collectively contribute to reducing the accumulation of adipose tissue. Likewise, it has been found that the flavonoids and tannins in *Arjuna* reduce the activity of enzymes involved in adipocyte progression and absorption of fats, which helps to enhance lipid profiles and reduce weight loss overall (Amalraj and Gopi, 2017; Khan *et al*., 2013; Mandal *et al*., 2013).

The *Ksheerapaka* form makes it less heating, balances *Pitta*, and enhances absorption of fat-soluble active principles, also improving the herbs' assimilation and acceptance, especially when long-term treatment becomes necessary for long-lasting conditions like obesity. By regulating the drug's *Ushna* (hot) and *Tikshna* (sharp) qualities, milk also acts as a carrier (*Yogavahi*) and promotes systemic absorption (Rajaram *et al*., 2014; Swain *et al*., 2023; Uthirapathy and Ahamad, 2019).

In the Sharma and Shinde (2024) and Hiware, Parwe, Chafale, and Vidhate (2021), *Rasona* (*Alium sativum* Linn.) *Bhavaprakasha Nighantu* highlights its *Medahara* and *Agnideepaka* actions (Pandey, 2006). Also, *Astanga Hridaya* and *Kashyapa Samhita* have been mentioned in *Rasayana Kalpa* (Pandey, 2006; Sastry, 2007). It's *Katu Rasa, Tikshna Guna, Ushna Virya*, which helps break down accumulated *Kapha* and *Meda*, increases metabolic activity, reduces heaviness and blocks caused by excess fat and It's *Tikta Rasa* and *Lekhana Guna* helps in scraping out excess fat and toxins from the body, helps in reducing *Srotorodha* (blockage of body channels) caused by lipid accumulation (Gupta, 2005; Tewari, 2008). Phytoconstituents like selenium and flavonoids prevent oxidative stress, which significantly contributes to lipid peroxidation and atherosclerosis. Its hypolipidemic action is one of its key mechanisms, which is mostly caused by reducing HMG-CoA reductase, the enzyme that reduces the rate at which cholesterol is generated in the liver (Babu *et al.*, n.d.). Triglyceride, total cholesterol, and LDL levels decrease significantly as a result, while HDL is similarly encouraged to rise, improving the lipid profile overall (Singh *et al*., n.d.). Furthermore, *Rasona* includes potent antioxidants which including flavonoids, selenium, and other polyphenols, that effectively combat free radicals and prevent oxidative stress, which is an important factor contributing to lipid peroxidation and the onset of atherosclerosis (Joshi and Joshi, n.d.). Additionally, its antioxidant effect enhances cardiovascular health and protects the vascular endothelium. Garlic's anti-inflammatory properties enhance its therapeutic use by reducing inflammation caused by hyperlipidemia by downregulating proinflammatory cytokines, including TNF-α

Table 1: Therapeutic and phytochemical correlation of *Ksheerapaka* formulations.

Sl. No.	*Ksheerapaka*	Botanical name	Ayurvedic properties	Therapeutic uses	Phytochemical correlation (probable action)
1.	*Arjuna Ksheerapaka* (Acharya, 2001b).	*Terminalia arjuna* Roxb.	*Kashaya, Laghu, Ruksha; Medohara, Lekhana*	cardioprotection, dyslipidemia, and obesity	triterpenoids (arjunolic acid), flavonoids: lipid-lowering, antioxidant, antiatherosclerotic.
2.	*Rasona Ksheerapaka* (Acharya, 2001c).	*Allium sativum* Linn.	*Vata-Kaphahara, deepana, Rasayana*	cardiac, digestive, and respiratory disorders	allicin, sulfur compounds: hypolipidemic, anti-inflammatory, cardioprotective.
3.	*Pippali Ksheerapaka* (Amalraj and Gopi, 2017; Azzini *et al.*, 2014).	*Piper longum* Linn.	*Katu, Madhura, deepana, Pachana*	indigestion, metabolic disorders	piperine: bioavailability enhancer, thermogenic, metabolic stimulant.
4.	*Shunthi Ksheerapaka* (Babu *et al.*, 2013; Bohra, 2022).	*Zingiber officinale* Rosc.	*Katu, deepana, Pachana*	digestive, inflammatory conditions	Gingerols, shogaols: anti-inflammatory, digestive stimulant, lipid regulation.
5.	*Haridra Ksheerapaka* (Boukeria *et al.*, 2016).	*Curcuma longa* Roxb.	*Katu; Kapha-Pittahara, Shothahara*	inflammation, skin, metabolic disorders	curcumin: antioxidant, anti-inflammatory, antiobesity.
6.	*Panchamuli Ksheerapaka* (Chang *et al.*, 2005; Dravyekar *et al.*, 2025; El *et al.*, 2021; Batiha *et al.*, 2020; Gazuwa *et al.*, 2013).	-	*Katu, Kaphahara*	respiratory, inflammatory disorders	bronchodilator, anti-inflammatory.
7.	*Trikantaka Ksheerapaka* (Gupta, 2005; Hiware *et al.*, 2021).	*Tribulus terrestris* Linn.	*Kaphavatahara, Mutrala*	edema, urinary disorders	saponins (protodioscin): diuretic, metabolic modulation.
8.	*Triphala Ksheerapaka* (Ide and Lau, 1997).	-	*Rasaayana, deepana*	detoxification, metabolism, and constipation	tannins, gallic acid, vitamin C: antioxidant, gut modulation, lipid regulation.
9.	*Guggulu Ksheerapaka* (Acharya, 2001b).	*Commiphora wightii* Arn.	*Medohara, Shothahara*	obesity, inflammation, and cardiovascular disorders	Guggulsterones: hypolipidemic, anti-inflammatory, thyroid modulation.
10.	*Asanadi Ksheerapaka* (Jain *et al.*, 2009).	-	*Medohara, Pramehaghna*	obesity, diabetes, metabolic disorders	polyphenols, flavonoids: antidiabetic, lipid-lowering, antioxidant.

and IL-6, resulting in improved systemic metabolic balance (Tudu *et al*., 2022). Increased bile-acid production is a significant mechanism that promotes lipid clearance through promoting the emulsification and excretion of lipids from the diet (El *et al.*, 2021). In addition, by inhibiting micelle formation, garlic decreases intestinal absorption of lipids, which reduces the bioavailability of dietary fats (Azzini *et al*., 2014; Yusuf *et al*., 2018). Garlic has been shown to have vaso-protective effects through enhancing endothelial function while reducing arterial stiffness, which is common in obese and dyslipidemic individuals. Collectively, these pharmacological effects improve lipid excretion, decrease the synthesis of lipids, inhibit lipid absorption, enhance antioxidant defense, and have anti-inflammatory qualities, emphasizing the multifaceted mechanism by which *Rasona Ksheerapaka* helps in the prevention and management of obesity and its complications (Boukeria *et al*., 2016; El-Saber Batiha *et al*., 2020; Gazuwa *et al.,* n.d.).

From Jayaprakash (2014), *Trivrutadi Ksheerapaka* is mentioned in *Charaka Samhita*, where it is used after *Ama Pachana* and *Agni Deepana*, to safely remove excess *Meda* and *Kapha* through *Virechana* (Pandey, 2006; Sastry, 2007). In this formulation, *Trivritta* is a key herb which is a potent *Virechaka Dravya*. It's *Katu-Tikta Rasa, Ushna Virya*, and *Katu Vipaka* that help to reduce the *Kapha Dosha* and *Meda Dhatu* (*"K.R., N.S.U., and K.P.K."*, n.d.). Its rich phytochemical profile, including β-sitosterol, coumarins, and turpethic acids, contributes to its lipid-lowering, antioxidant, anti-inflammatory, and hepatoprotective effects (Bohra, 2022; Sharma, n.d.). These properties collectively make *Trivrita* a promising candidate for integrative approaches to obesity and hyperlipidemia management.

In the above studies, all the drugs mentioned have *Kashaya-Katu-Tikta Rasa, Ruksha Guna, Ushna Virya, Kapha-Medahara, Lekhana, Deepana*, and *Pachana* properties. All these properties help in correcting diminished *Agni*, balancing *Kapha-Vata Dosha*, and removing accumulated *Meda*, thus clearing the obstructions from *Strotasa*. Hence, these drugs can be used effectively in the management of dyslipidemia/hyperlipidemia/*Medoroga*.

LIMITATIONS AND FUTURE SCOPE

Despite its effectiveness, certain limitations exist. Variability and modification of dosage form, individual constitution (*Prakriti-Ayurvedic* treatments are highly personalized; variations in *Prakriti* influence how individuals metabolize and respond to *Ksheerapaka*), dietary adherence, clinical studies and evidence, standardization needs, and modern integration (contemporary pharmacological analysis could be investigated in future studies to integrate *Ayurveda* with modern medical treatments).

CONCLUSION

Ksheerapaka Kalpana, as described in *Ayurveda*, appears to offer a meaningful approach to managing obesity, particularly where both nourishment and metabolic correction are needed. Its dual action, supporting tissue balance while helping to reduce pathological accumulation, makes it relevant in conditions where conventional restrictive approaches may fall short.

That said, the current understanding is still largely based on classical descriptions and limited supporting evidence. More focused experimental and clinical work is needed to clearly establish its role, standardize its use, and validate its outcomes in modern settings. Until then, it can be viewed as a promising but underexplored formulation that deserves deeper scientific attention.

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ABBREVIATIONS

AKC: Arjuna Ksheerapaka Churna; **BMI:** Body Mass Index; **LDL:** Low-Density Lipoprotein; **HDL:** High-Density Lipoprotein; **VLDL:** Very Low-Density Lipoprotein; **HMG-CoA:** 3-Hydroxy-3-Methylglutaryl Coenzyme A; **TNF-α:** Tumor Necrosis Factor-alpha; **IL-6:** Interleukin-6; **GC-MS:** Gas Chromatography-Mass Spectrometry; **AYUSH:** Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homoeopathy.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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