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The Conceptual Review Of Trayantyadi Kashaya In Alcoholic Fatty Liver Disease (AFLD)

Dr. Rakshith.M.M.[1*], Dr. Deepa C Patil[2], Dr. Shashikala V[3]

[1*]Post Graduate Scholar, Department of PG Studies in Kayachikitsa, JSS Ayurveda Medical College and Hospital, Mysuru, Karnataka, India.
[2]Professor, Department of PG Studies in Kayachikitsa, JSS Ayurveda Medical College and Hospital, Mysuru, Karnataka, India.
[3]Post Graduate Scholar, Department of PG Studies in Kayachikitsa, JSS Ayurveda Medical College and Hospital, Mysuru, Karnataka, India.

ABSTRACT:

Alcoholic Fatty Liver Disease (AFLD) is a liver condition caused by excessive alcohol consumption, leading to fat accumulation in liver cells, inflammation, and potential progression to more severe liver disorders such as cirrhosis and liver failure. Ayurvedic medicine offers several natural remedies for managing liver diseases, and one such formulation is *Trayantyadi Kashaya*. This conceptual review aims to explore the therapeutic potential of *Trayantyadi Kashaya* in the treatment of AFLD by examining its pharmacological properties, clinical applications, and mechanisms of action. *Trayantyadi Kashaya* is a traditional Ayurvedic *Kashaya* composed of multiple herbs known for their hepatoprotective, anti-inflammatory, and antioxidant effects. Key ingredients like *Trayanti*, *Triphala*, *nimba*, *Katuki*, *Maduka*, *Trivrith*, *Patola* and *Masura*, are believed to play an essential role in mitigating the pathological processes associated with AFLD. These herbs work by reducing oxidative stress, promoting detoxification, enhancing lipid metabolism, and protecting the liver from further damage. The review synthesizes the existing Ayurvedic literature and modern scientific findings to present an integrated understanding of how *Trayantyadi Kashaya* can contribute to managing AFLD. The findings suggest that *Trayantyadi Kashaya* holds promise as a supportive, holistic treatment approach for AFLD, offering potential benefits in terms of improving liver function, preventing fibrosis, and supporting overall liver regeneration. This review emphasizes the importance of combining traditional Ayurvedic therapies with modern medical practices in the management of chronic liver diseases.

Keywords: Alcoholic Fatty Liver Disease, *Trayantyadi Kashaya*, Hepatoprotective, Liver Regeneration, Antioxidant, Anti-inflammatory.

INTRODUCTION

Alcoholic Fatty Liver Disease (AFLD) is a liver condition that results from the accumulation of fat in liver cells due to chronic and excessive alcohol consumption. It is one of the most common liver diseases globally, with a significant increase in prevalence, especially in countries with high alcohol consumption rates. AFLD is considered the earliest stage of alcohol-induced liver injury and can progress to more severe conditions such as alcoholic hepatitis, cirrhosis, and ultimately liver failure if left untreated. According to the World Health Organization (WHO), alcohol consumption is responsible for a substantial proportion of liver-related morbidity and mortality, with alcohol-related liver diseases accounting for approximately 4.5% of global deaths annually [(1)]. It is estimated that up to 30% of heavy drinkers may develop AFLD, and the prevalence continues to rise due to increasing alcohol consumption in both developed and developing countries. [(2)]

The pathogenesis of AFLD involves complex mechanisms such as oxidative stress, inflammation, lipid accumulation, and impaired liver regeneration. The liver's inability to efficiently metabolize fat leads to steatosis, which contributes to liver inflammation and fibrosis over time. The key to diagnosis is a history of excessive alcohol intake along with features of liver disease (symptoms, physical signs, laboratory data and imaging). Alcoholic Fatty liver is seen in 4 grades (i.e. Grade1 to Grade 4). Most of patients with Grade1 and Grade2 fatty liver are usually asymptomatic. Patients with Grade3 and Grade4 fatty liver have vague symptoms such as anorexia, malaise, nausea or right hypochondrial discomfort/pain.

Physical examination in these patients is unremarkable although a mild smooth, non-tender hepatomegaly without any signs of chronic liver disease (CLD) may be present. [(3)]

Conventional treatment primarily involves alcohol cessation, dietary modification, and managing complications such as liver inflammation and oxidative damage. Pharmacological treatments, including corticosteroids and antifibrotic agents, aim to reduce liver inflammation and prevent further liver damage. However, these treatments often have limitations such as adverse effects, inadequate efficacy in certain cases, and failure to address the root causes of the disease. [(4)] As a result, there is increasing interest in exploring alternative and complementary therapies, particularly those from traditional medicine, which can provide holistic and adjunctive treatment options for AFLD.

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Ayurveda, a traditional Indian system of medicine that dates back over 5,000 years, offers a natural and holistic approach to treating various ailments, including liver disorders. Ayurvedic treatment focuses on restoring balance within the body through the use of herbal remedies, dietary modifications, and lifestyle changes. One such Ayurvedic formulation that has shown potential in managing liver diseases, including AFLD, is *Trayantyadi Kashaya*[5]. *Trayantyadi Kashaya* is a polyherbal decoction composed of several potent herbs known for their hepatoprotective, anti-inflammatory, antioxidant, and detoxifying properties. This formulation is believed to promote liver health by reducing oxidative stress, modulating lipid metabolism, and enhancing liver function.

The key components of *Trayantyadi Kashaya* include *Trayanti, Triphala, nimba, Katuki, Maduka, Trivrith, Patola* and *Masura.* These herbs are known to exert multiple beneficial effects on liver health. These herbs are believed to play an essential role in mitigating the pathological processes associated with AFLD. These herbs work by reducing oxidative stress, promoting detoxification, enhancing lipid metabolism, and protecting the liver from further damage. [6][7]

Despite the promising therapeutic potential of *Trayantyadi Kashaya*, clinical research and scientific studies on its efficacy and safety in AFLD remain limited. This conceptual review aims to evaluate the pharmacological properties of *Trayantyadi Kashaya* and explore its mechanisms of action in the context of AFLD. By reviewing both traditional Ayurvedic texts and modern scientific findings, this article will provide an integrated perspective on how *Trayantyadi Kashaya* can be used as a complementary or adjunctive therapy to current treatment strategies for AFLD, offering a more natural and holistic approach to managing liver disease.

Table No.1: Ingredients of *Trayantyadi Kashaya*[5].

SL.No	***Dravya***	**Part Used**
1.	*Trayanti*	*Moola*
2.	*Hareetaki*	*Phala*
3.	*Vibheeetaki*	*Phala*
4.	*Amalaki*	*Phala*
5.	*Nimba*	*Moola, Twak*
6.	*Katuki*	*Moola*
7.	*Maduka*	*Moola*
8.	*Trivrut*	*Moola Twak*
9.	*Patola*	*Phala, Patra, Moola*
10.	*Masura*	

FIGURE NO-1 : Ingredients Of *Trayantyadi Kashaya*[5]

TRAYANTI | **HARITAKI**

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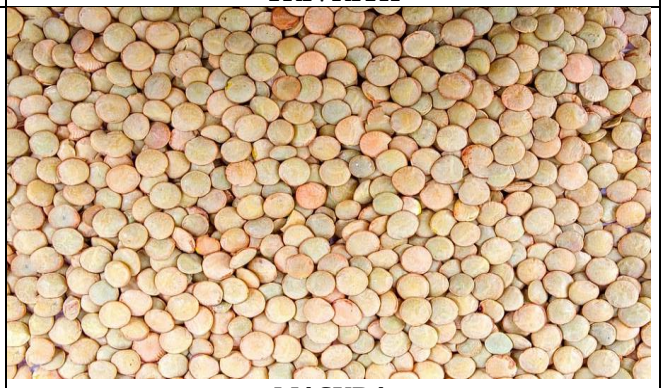
 **VIBHITAKI**	 **AMALAKI**
 **NIMBA**	 **KATUKI**
 **MADUKA**	 **TRIVRITH**
 **PATOLA**	 **MASURA**

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Table No-2: Pharmacokinetics of *Trayantyadi Kashaya*[5].

SL. No	*Dravya*	Latin name	Family	*Rasa*	*Guna*	*Veerya*	*Vipaka*	*Dosha ghnata*	*Karma*
1.	*Trayanti*	Gentiana kurroo	Gentianaceae	*Tikta, Kashaya*	*Laghu Rooksha*	*Ushna*	*Katu*	*Pitta-Kapha hara*	*Kapha, Vata shamaka*
2.	*Hareetaki*	Terminalia chebula	Combretaceae	*Lavana Varjita Kashaya pradhana Pancha Rasa*	*Laghu Rooksha*	*Ushna*	*Madhura*	*Tridosha hara*	*Anulomana, Rasayana*
3.	*Vibheeetaki*	Terminalia bellirica	Combretaceae	*Kashaya*	*Ruksha laghu*	*Ushna*	*Madhura*	*Kapha pitta hara*	*Deepana, Anulomana*
4.	*Amalaki*	Phyllanthus emblica	Euphorbiaceae	*Pancha rasa lavana varjitha*	*Guru, Ruksha sheeta*	*Sheeta*	*Madhura*	*Tridosa shamaka*	*Rasayana*
5.	*Nimba*	Azadirachta indica	Meliaceae	*Tikta, Kashaya*	*Laghu*	*Sheeta*	*Katu*	*Kapha-Pittahara*	*Krumighna, Kushtaghna*
6.	*Katuki*	Picrorrhiza kurroa	Plantaginacee.	*Tikta*	*Laghu, rooksha*	*sheeta*	*Katu*	*Kapha pittahara*	*Bhedana , deepana*
7.	*Maduka*	Glycyrrhiza glabra	Fabaceae	*Madhura*	*Guru Snigdha*	*Sheeta*	*Madhura*	*Tridosha hara*	*Rasayana, Vrusya, Chakshushya*
8.	*Trivrut*	Operculina turpethum	Convolvulacee	*Madhura Kashaya Katu Tikta*	*Bhedaniya*	*Ushna*	*Katu*	*Kapha pitta shamaka*	*Bhedhana , Rechana, lekhaniya, shothahara, sukha virechana*
9.	*Patola*	Tricosanthes dioica	Cucurbitaceae	*Tikth, Katu*	*Laghu rooksha*	*Ushna*	*Katu*	*Kapha-Pittahara*	*Deepana, Vrushya, Varnya*
10.	*Masura*	Lens culinaris	Leguminaceae	*Madhura ,Tikta*	*Laghu, Rooksha*	*Sheeta*	*Madhura*	*Kapha-Pittahara*	*Grahi*

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Analytical Review

Table No.3 Describing the Phytoconstituents and Pharmacological actions present in the *Trayantyadi Kashaya*.

SL NO	DRUG	PHYTO CONSTITUENTS	PHARMACOLOGICAL ACTIONS
1.	***TRAYANTI*** (8)	Tannins Alkaloids Saponins Glycosides Gentiopicrine Gentianine Terpenes Flavonoids Phenolics Carbohydrates Genianic Acid Pectin	Anti Bacterial Anti Oxidant Anti Arthritic Anti Inflammatory Analgesic
2.	***HARITAKI*** (9)	Casuarinin Gallic Acid Chebulinic Acid Chebukagic Acid Rutin Elagic Acid Ferugic Acid Caffeic Acid Vannilic Acid Corilagin Ethyl Gallate Methyl Gallate	Immunomodulatory Anti-Oxidant Hepato-Protective Cytoprotective activity
3.	***VIBHITAKI*** (10)	Tainternilignan Thannilignan Anolignan B Gallic Acid Beta Setosterol Belleric Acid Galactose Chebulagic Acid	Immunomodulatory Anti-Oxidant Analgesic Antidiarrheal Anti-Inflammatory
4.	***AMALAKI*** (11)	Phyllemblin Phyllemblic Acid, Gallic Acid Emblicol Quercetin Hydroxymethyl Furfural Ellagic Acid Pectin Emblicannin A Emblicannin B Punigluconin Pendunculagin	Hepato-Protective Immunomodulator Cytoprotective Antioxidant Anti-Inflammatory
5.	***NIMBA*** (12)	Nimbin Nimbinin Nimbidine Nimbasterol Quercetin	Hepato-Protective Immunomodulator
6.	***KATUKI*** (13)	D-Mannitol Kutkiol Kutkisterol	Hepato-Protective Immunomodulator Anti-Oxidant

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		Apocyanin Androsim Kutkoside Picrorhizin Arvenin Kutkin	
7	***YASHTI MADU*** (14)	Glycyrrhizin Glycyrrhetinic Acid Glabridin Quercetin Liquiritigenin Isoliquiritigenin Licochalcone Glycyglabrone Glabrin	Hepato-Protective Anti-Inflammatory
8	***TRIVRITH*** (15)	Turpethin Turpethinic Acid B-Sitosterol Scopoletin Betulin	Anti-Oxidant Analgesic Hepato-Protective Anti-Inflammatory Antidiarrhoeal
9	***PATOLA*** (16)	Elaeosteric Acid Linoleicacid Oleic,Acid Colocynthin, Hentriacontane	Anti-Oxidant Hepato-Protective Anti-Inflammatory
10	***MASURA*** (17)	Flavan-3-Ols Flavanols Anthocyanins Phenolic Acids Anthocyanidins Proanthocyanidins	Anti-Oxidant Anti-Inflammatory

DISCUSSION

Trayantyadi Kashaya is a formulation which is explained in *Astanga Hridaya Vidradhi chikitsa Adhyaya* . These drugs contain *Tikta, Katu Rasa Pradhanya Dravyas* which might reduce symptoms of Anorexia as they pacify the *dooshita Doshas* and promote the *Dhatu Poshana* and thus reducing the *Dourbalya*. *Amapachana* effect of *Patola* and *Haritaki* present in the *Kashaya* might help in the reduction of the nausea. *Ruchya karma* of *Vibhitaki, Amalaki, Nimba,Yashtimadhu* and *Katuki* might have reduced Anorexia. *Deepana Karma* of *Haritaki, Katuki, Patola* and *Pachana Karma* present in Patola might have corrected *dooshita pachaka pitta* and *bodhaka kapha* and might reduce Anorexia.
Agni vriddhi caused by *Deepaniya* drugs like *Haritaki, Katuki, Patola* present in *Kashaya* leading to proper digestion and assimilation of the consumed food further facilitates the proper *dhatuposhana* leading to increase in the *bala* of the patient. *Shoolahara* property of *Trayanti*, Gentiopicrin, Gentianine of *Trayanti,* Turpethin, Turpethinic acid of *Trivrith* has Analgesic property,which might help in the reduction of Right Hypochondrium abdominal pain.
Masoora is having *madhura rasa, madhura vipaka, sheeta veerya, kapha pittagna* properties.[18] It is good source of vitamin B1 & B2. Nutritive values of *Masoora* per 100 gms are as follows, Proteins-25.1g, Fat-0.7g, carbohydrates-59.7 gm, Iron-2 mg, Energy- 346 k.cal. [19] In AFLD the patients are under nourished & suffers from protein deficiency, hence a high calorie and high protein diet should be administered[20]. *Masoora* contain bioactive compounds like flavonoids (Flavan-3-Ols, Flavanols, Anthocyanins) and polyphenols (Phenolic Acids, Anthocyanidins, Proanthocyanidins), which possess antioxidant properties. These antioxidants help reduce oxidative stress in the liver, a major contributor to the progression of AFLD. Oxidative stress, caused by an imbalance between free radicals and the liver's ability to neutralize them, leads to liver cell damage. By neutralizing free radicals, *Masoora* can mitigate oxidative damage and reduce inflammation in the liver. Chronic inflammation is a hallmark of AFLD, driven by alcohol-induced liver injury. Lentils contain various micronutrients, including vitamins (e.g., B-vitamins) and minerals (e.g., magnesium), which have anti-inflammatory effects. These compounds help reduce the inflammatory cytokine response in the liver, promoting tissue repair and protecting the liver from further damage [21].
Thus *Trayantyadi Kashaya* might help in arresting the production of inflammatory cytokine and activation of Kupffer cells and hepatic stellate cells and might help in hepatic cell regeneration.

CONCLUSION

The conceptual review of *Trayantyadi Kashaya* in the context of alcoholic fatty liver disease (AFLD) suggests that this Ayurvedic formulation holds potential as a therapeutic agent for managing liver damage caused by chronic alcohol consumption. The key mechanisms of *Trayantyadi Kashaya*, including its anti-inflammatory, antioxidant, and hepatoprotective properties, align well with the pathological processes involved in AFLD, such as oxidative stress, inflammation, and lipid accumulation in hepatocytes.

Despite promising traditional uses, scientific validation through clinical studies is essential to establish the effectiveness of *Trayantyadi Kashaya* for AFLD management. Future research combining Ayurvedic and modern medical approaches could offer a holistic treatment strategy, improving the overall management of AFLD and contributing to the integration of traditional medicine into contemporary healthcare.

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