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A REVIEW ON HEPATOPROTECIVE ACTIVITY OF*KUSHTHAGHNA MAHA-KASHAYA*

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ABSTRACT

Ayurveda has been framed upon *Trisutra* viz. *Hetu* (~cause), *Linga* (~features) & *Oushadha* ~ therapeutics). Among these, *Oushdhas / Bheshajas* are held responsible for the alleviation of diseases as well as maintenance and promotion of health. *Bheshajas* (~drugs) are known and recognized from their *Guna* (~attribute)and *Karma* (~action). In *Bheshajachatushka*of *Charaka Samhita*, on the basis of *Karma*, *Bheshajas*pertaining to *Ubhayaparimarjana* (~internal as well as external application) are classified into *50 Mahakashayas*. These 50 *Karmas* are applicable for almost all kinds of ailments. *Kushthaghnamahakashaya* is one among *50 Mahakashayas*. Ten *Oushadhadravyas*having their own *Guna* & *Karma* are grouped together on the basis of their "*Kushthaghna*" *karma*, which are meant to obliterate *Kushtha* (~skin disorders). *Kushtha is known to be a Raktadushtijanyavikara* (~disorder due to vitiated blood). *Raktavahasrotas*(~channels of blood circulation) *is having its Moola* (~root) *at yakrit* (~Liver) *and Pleeha* (~Spleen). *Yakrit* is one of the major organ, which is responsible for various functions of the body. Any abnormal functioning of *Yakrit* due to various causes leads to infirmities including skin conditions. In this paper, an attempt is made to understand the Hepatoprotective action of *Kushthaghnamahakasayadravyas.*

Keywords: *Mahakashaya, Hepatoprotective* and *Kushthaghna*

INTRODUCTION

Skin, the seat of *Sparsha* (~sense of touch) not only covers and protects the body, but also performs some functions of excretion and metabolism. Its colour, complexion etc. are considered to be very important to keep the person's beauty and image in the society. Since Vedic period number of diseases were known to turn out the skin ugly and discolored. All such disorders which makes skin and body ugly are described in Ayurveda, particularly under the heading of *Kushtha*[1], which itself denotes that the diseases which leads to cosmetically imbalance. There are 7 factors involved in the disease *Kushtha* viz. *Vata, Pitta, Kapha, Twak* (~skin), *Mamsa* (~muscle tissue), *Shonita* (~blood) and *Lasika* (~lymph)[2].

Kushthaghnamahakashaya is one among *Panchashanmahakashayas* mentioned in *Bheshajachatushka* of *Charaka Samhita.* Ten *Oushadhadravyas* viz. *Khadira, Abhaya, Amalaki, Haridra, Bhallataka, Saptaparna, Aragwadha, Karaveera, Vidanga,* and *Jati*[3] having their own *Guna* & *Karma*

are grouped together on the basis of their '*Kushthaghna*' *karma*, which are meant to obliterate *Kushtha*.

REVIEW OF *KUSHTHAGHNA MAHA-KASHAYA*:

Table 1: Showing *KushthaghnaMahaka-shaya* with their pharmacological actions on *Dosha* as well as *Yakrit/Rakta*[4].

S.NO.	DRUG	*DOSHAGHNATA*	ACTION ON *YAKRIT/RAKTA*
1.	*Khadira*	*Kaphapittahara*	*Raktaprasadana* (*TiktaKashayara-sa&Sheetaveerya*)
2.	*Abhaya*	*Tridoshahara*	Indicated in *Yakritgadam*
3.	*Amalaki*	*Tridoshahara*	Indicated in *Yakritgadam, RaktaVikara*
4.	*Haridra*	*Kapha pitta shamaka*	*Raktaprasadana* (*Tikta rasa, Pittarecha-ka*)
5.	*Bhallataka*	*Vatakaphahara*	Indicated in *Yakrit, Pleeharoga*
6.	*Saptaparna*	*Kapha pitta shamaka*	*Raktashodhaka*
7.	*Aragwadha*	*Pitta kaphapaha*	*Raktashodhaka*
8.	*Karaveera*	*Kaphavatashamaka*	*Raktashodhaka*
9.	*Vidanga*	*Kaphavatashamaka*	*Raktashodhaka*
10.	*Jati*	*Tridoshahara*	*Raktaprasadana*

The pharmacological actions of all the 10 drugs mentioned in *Kushthaghnamahaka-shaya*have been described in Table HEPA-TO-PROTECTIVE ACTIVITY OF *KUSH-THAGHNA MAHAKASHAYA*:

By definition, Hepato-protective agents are those compounds, which mitigate the liver injury caused by hepatotoxic agents thus can prevent damage to the liver. Al-though some scholars considered fortifying, tonic and strengthening.

1. **Hepatoprotective Activity of *Khadira* - *Acacia catechu***

A study conducted by Shirish S. Pingalein-vestigates the hepatoprotective action of heartwood powder of *Acacia catechu* in the treatment of liver damage in rats exposed to carbon tetrachloride (CCl4). The evaluation was carried out using liver function marker enzymes in blood plasma, Liver tissue bio-chemistry supported by histopathology due to CCl4 induced hepatopathy the marker en-zymes leak into the blood. The extent of re-covery was compared with the natural liver regeneration after CCl4 damage and normal liver. The heartwood powder of *Acacia ca-techu* was treated in the form of aqueous slurry. From the findings of blood biochem-ical parameters it was inferred that the treatment with this plant material is effective against CCl4 induced dysfunction of the liv-er. The decreased levels of serum bilirubin after treatment with heartwood powder of *Acacia catechu* restores the normal func-tional status of the liver. This hepatoprotec-tive effect was supported by light micro-scope studies[5].

In another study conducted by Var-kungValte et.al. the liver damage in albino rat was induced by a subcutaneous injection of 50%v/v CCl4 in olive oil at the dose of 2ml/kg twice a week for 14days. The hepa-toprotective activity was monitored bio-chemically by estimating serum transami-nases, serum alkaline phosphatase, serum bilirubin and serum protein after intraperito-neal injection of ethyl acetate extract of *Acacia catechu* (250mg/kg). Silymarin (5mg/kg.I.P) was given as a reference drug. The histopathologicalchanges of liver sam-

ples were compared with that of control. Ethyl acetate extract of *Acacia catechu* inhibited CCl4 induced liver toxicity in albino rats at 250mg/kg body weight as assessed by the biochemical and histological examination. Hence Ethyl acetate extract of *Acacia catechu* exhibited significant hepatoprotective activity[6].

2. **Hepatoprotective Activity of *Abhaya-Terminaliachebula***

Reddy P. Nishanth et.al.conducted a study, where *Terminaliachebula* extracts were evaluated on 2-acetylaminofluorene (2-AAF)-induced hepatocellular carcinoma in mice. The 25 mg.kg−1 b.w. 2-AAF treatment showed liver aberration and up-regulation of multidrug resistance-1 (MDR1), generation of reactive oxygen species (ROS) and cyclooxygenase-2 (COX-2) expression via phosphorylation of Akt-MAPKs and nuclear translocation of NF-κB. Pre-administration of 50 mg.kg−1 TCE along with 25 mg.kg−1 2-AAF inhibited the expression of MDR1 by preventing ROS generation and COX-2 expression through Akt and MAPK signaling pathway. *T. chebula* may overcome the 2-AAF-induced oxidative stress and drug resistance in the hepatic tissue of mice and prevent the possible neoplastic transformation leading to hepatocarcinoma[7].

Another study conducted by S.Vidya et.al. to evaluate 1% gum acacia suspension of leaves of *Terminaliachebula*for its hepatoprotective effect against paracetamol induced acute liver damage on albino Wister rats indicated that the 1% gum acacia suspension of leaves of *Terminaliachebula* at 300 mg/kg body dose significantly reduced the elevated levels of biochemical markers like SGPT, SGOT, ALP, bilirubin (total and direct), total cholesterol, triglycerides. The effect of 1% gum acacia suspension of leaves of *Terminailiachebula* was comparable with that of the standard silymarin 100mg/kg. These results suggest that 1% gum acacia suspension of leaves of *Terminailiachebula* may have the potential therapeutic value in the treatment of paracetamol induced hepatic damage and some liver diseases[8].

3. **Hepatoprotective Activity of *Amalaki-Embilicaofficinalis***

A I Mir et.al. conducted a study, where Efficacy of a herbal product of *Embilicaofficinalis* (fruit) (EO) has been evaluated against $CCl_4$and thioacetamide (TAA) induced changes in rat liver. Chronic treatment of CCl_4 and TAA revealed abnormal histopathology indicative of pre-fibrogenic events. EO reversed such alterations with significant regenerative changes suggestive of its preventive role in prefibrogenesis of liver[9].

Tasduq SA et.al. report showed the hepatoprotective property of a 50% hydroalcoholic extract of the fruits of *Emblicaofficinalis* (fruit) (EO-50) against antituberculosisdrugs-induced hepatic injury. The biochemical manifestations of hepatotoxicity induced by rifampicin, isoniazid and pyrazinamide, either given alone or in combination were evaluated. In vitro studies were done on suspension cultures of rat hepatocytes while sub-acute studies were carried out in rats. The hepatoprotective activity of EO-50 was found to be due to its membrane stabilizing, antioxidative and CYP 2E1 inhibitory effects[10].

4. **Hepatoprotective Activity of *Haridra-Curcuma longa***

The result of study conducted by MahuyaSengupta et.al. suggestedthe aqueous extract of turmeric reduced the lev-

el of SGOT, SGPT and bilirubin in CCl_4 intoxicated mice. Apart from damaging liver system, CCl_4 also reduced nonspecific host response parameters like morphological alteration, phagocytosis, nitric oxide release, myeloperoxidase release and intracellular killing capacity of peritoneal macrophages. Administration of aqueous extract of *C. longa* offered significant protection from these damaging actions of CCl_4 on the nonspecific host response in the peritoneal macrophages of CCl_4 intoxicated mice[11].

The study conducted by S. L. Baxla et.al. concludes that supplementation of *Curcuma longa* at 500 mg/kg daily oral for 28 days has shown protection against lead induced hepatotoxicity[12].

5. **Hepatoprotective Activity of *Bhallataka*-*Semecarpusanacardium***

The study conducted by Savitapatil et.al. to evaluate hepatoprotective activity of fruit extracts of *Semecarpusanacardium* against the damage caused by CCl4 (1.25mg/kg, p.o.). Aqueous and ethanolic extracts of *Semecarpusanacardium* fruits were administered in the dose of 250 and 500mg/kg/day orally for 7 days. Silymarin (50mg/kg) was used as standard drug. The hepatoprotective effect was assessed by biochemical parameters such as SGOT, SGPT, ALP, total bilirubin and serum protein. It was concluded that both aqueous and ethanolic extracts showed significant hepatoprotective activity[13].

6. **Hepatoprotective Activity of *Saptaparna*- *Alstoniascholaris***

Ashutosh Kumar et.al. conducted a study, where the methanolic extract of *Alstoniascholaris* (L) R.Br. stem bark was screened for hepatoprotective activity against Swiss albino rats with liver damage induced by CCl4. The results of hepatoprotective activity revealed that the methanolic extract of *Alstoniascholaris* significantly decreased the biochemical parameters (SGOT, SGPT, ALP, TP and TB). Silymarin (25 mg/kg), a known hepatoprotective drug, was used for comparison. The extract did not show any mortality up to a dose of 2000 mg/kg body weight. The findings indicated that the methanolic stem bark extract of *Alstoniascholaris* (L.) R.Br. (200 mg/kg) was effective in bringing the functional improvement of hepatocytes. The hepatoprotective activity was also supported by histopathological studies of liver tissues[14].

A study by Kumar et al. concluded that the methanolic extracts of *Alstoniascholaris*leaves afforded a decent hepatoprotectivepotential against Thioacetamide induced liver damage in Albino rats and produced dose dependent effects when administered at doses of 100mg/kg and 200mg/kg orally[15].

7. **Hepatoprotective Activity of *Aragwadha*- *Cassia fistula***

Sunetrapatwardhan et.al. conducted a study, where hepatoprotective activity of ethanolic extract of *Cassia fistula* bark was investigated against hepatotoxicity induced by administering CCl4 with olive oil (1:1), 0.2ml/kg for 10 days by intraperitonial route in wistar rats. Silymarin (100mg/kg, p.o.) and the extracts of *Cassia fistula* bark (CFB 200 and 400 mg/kg, p.o.) were administered concomitantly for 14 days to the respective groups of animals. Hepatoprotective effect of ethanolic extract of *Cassia fistula* bark was evident in the doses of 200 and 400 mg/kg as there was significant decrease in AST, ALT, ALP, triglycerides, bilirubin, and protein levels in comparison to CCl4 control group. Histology of the liver section of the animals treated with the ethanolicextract of *Cassia fistula* bark in the doses of 200 and 400 mg/kg, further confirmed the hepatoprotective activity[16].

A study conducted by S.J. Wasu et.al. to investigate the hepatoprotective effect of leaves and bark of *Cassia fistula* against CCl4 induced hepatotoxicity in rats. Sixty albino Wistar rats were divided into six equal groups of 10. Four groups received extracts leaves/bark of *Cassia fistula* and intraperitoneal (i.p.) CCl4 (0.2 ml/100 g) either before or after administration of extracts. Two groups were controls, one treated with CCl4 and one with normal saline. Liver damage was assessed by plasma concentration of bilirubin and biochemical parameters SGOT, SGPT and ALP. Treatment with aqueous extract of leaves and bark significantly reduced CCl4 -induced elevation in plasma enzyme and bilirubin concentration in rats. This study demonstrated that CCl4 -induced liver damage in rats can be ameliorated by treatment of extracts from leaves and bark[17].

8. **Hepatoprotective Activity of *Karaveera-Neriumindicum***

Patel Govind conducted a study where Methanolic flowers extract of *Neriumindicum*was evaluated for hepatoprotective in rats. The plant extract (500 and 1000 mg/kg, p.o.) showed a remarkable hepatoprotective activity against CCl4 induced hepatotoxicity in liver tissues. CCl4 induced a significant rise in SGPT, SGOT and ALP. Treatment of rats with different doses of plant extract (500 and 1000 mg/kg) significantly ($P<0.001$) altered serum marker enzymes levels to against CCl4 treated rats. The activity of the extract at dose of 300 mg/kg was comparable to the standard drug, silymarin (100 mg/kg, p.o.). Histopathological changes of liver sample were compared with respective control. Results indicate the hepatoprotectiveproperties of *Neriumindicum*against CCl4 induced hepatotoxicity in rats[18].

9. **Hepatoprotective Activity of *Vidanga-Embeliaribes***

Nahidtabassum et.al. studied the protective effect of *Embeliaribes* on paracetamol induced liver cell damage using mice as experimental animals. Paracetamol was administered orally in a dose of 500mg / kg body wt 48hrs before the administration of drugs. The mice treated with *Embeliaribes* extract (50, 100 & 200mg / 100g/day) showed a dose dependent fall of 41%, 47% & 66% respectively in the serum SGPT levels as compared to the elevated levels in the mice receiving paracetamol only. Histopathology of liver of mice revealed 67%, 70% and 80% normal livers respectively in mice receiving the above doses of *E. ribes*. The results suggest that extract of *E. ribes* possesses hepatoprotective activity against paracetamol induced acute hepatocellular damage in mice[19].

10. **Hepatoprotective Activity of *Jati-Jasminumgrandiflorum***

The study by NetranjaliDhamalet.al.designed to evaluate hepatoprotective effect of the ethanolic leaves extract of *Jasminumgrandiflorum* (JG) in Isoniazid (INH) induced hepatotoxicity in wistar albino rats. Elevated levels of SGOT, SGPT, and Lipid profile following INH administration were significantly lowered by JG treatment. Deposition of collagen was observed in liver and found to be less in JG treated animals; Pretreatment of rats with JG significantly decreases Lipid peroxidation (LPO) and increases the antioxidant activities. The study reveals the hepatoprotective activity of leaves extract of JG in isoniazid induced liver damage[20].

DISCUSSION:

Yakrit is considered as one of the *Koshtangas (~internal organs)*[21]. The functional importance of *Yakrit* is more empha-

sized than its anatomical aspects in Ayurvedic literatures. There are multiple diseases like *Kamala* (~jaundice),*Halimaka* (~chlorosis), *Yakritodara* (~hepatomegaly) etc. where direct involvement of *Yakrit* is noticeable. Does it mean that the involvement of *Yakrit* is limited to these conditions only? Since *Yakrit* has its range of functions on different components of the body, it can be observed that the drugs mentioned in different disease conditions are having their action on liver as a protective agent to improve the function of liver.

All the 10 drugs mentioned in *Kushthaghnamahakashaya* are having hepatoprotective activity and are endorsed by the evidences given above. To understand the rationality behind the relation between hepatoprotective activity and *Kushthaghna karma*, understanding the role of liver in the manifestation of *Kushtha* is essential.

The disease *Kushtha* is *Shonitajaroga* (~disorders due to vitiated blood) as mentioned in *Vidhishoniteeyaadhyaya* of Charaka Samhita[22].Again in *Vivdhashitapeeteeyaadhyaya* of Charaka Samhita it is mentioned as *Raktapradoshja roga*[23]. Derangement of *Rakta* is one among 7 factors (*Vata, Pitta, Kapha, Twak, Mamsa, Shonita* and *Lasika*) which are mandatoryfor the manifestation of *kushtha* as per the explanation available in Charaka Samhita. *Rakthavahasrotas* is having its *Moola* in *Yakrit* and *Pleeha*[24]. Hence it is obvious that, there will be involvement of *Yakrit* in the manifestation of *Kushtha*. If *Yakrit* and *Pleeha* performs their functions normally, then *Rakta* will be in its normal state. The word *Kushthaghna* indicates obliterate *Kushtha*, to achieve this all these drugs need to act on very basic factors responsible for the manifestation of *Kushtha*. Hence all these drugs are having common hepatoprotective activity along with other properties, so that normalcy of *Rakta* is achieved. Even in the text books of Ayurveda the role of all these drugs on *Rakta/Yakrit* are evident as mentioned in Table-1. This doesn't mean that *Rakta* is the only factor which is to be considered to get *Kushthaghna* action. This is only one pharmacological action along with many other actions which should be endowed in *Kushthaghnadravyas.*

CONCLUSION

Kushthaghnamahakashaya are the group of 10 drugs which are clustered together on the basis of its *Kushthaghna karma*. To achieve this *Karma,* all these drugs are endowed with hepatoprotective activity along with other properties. Hepatoprotective activity of all the 10 drugs implies that the drug action on *Yakrit* is very crucial to achieve complete relief from *Kushtha*.

REFERENCES

1. Pt. HariSadashivaShastriParadakara(editor).AshtangaHridaya of Vagbhata. Reprint edition. Varanasi:ChaukhambaSurbharatiprakashan; 2010. p524
2. Acharya YadavjiTrikamji(editor). Charaka Samhita of Agnivesha. Reprint edition. Varanasi: ChaukhambaKrishnadas Academy; 2010. p450
3. Acharya YadavjiTrikamji(editor). Charaka Samhita of Agnivesha. Reprint edition. Varanasi: ChaukhambaKrishnadas Academy; 2010. p33
4. Acharya Priyavat Sharma. Dravyagunavijnana. Reprint edition. Varanasi: chaukhambhabharati academy; 2006. Vol-2.p161-163, 167-172, 176, 212-213, 504-506, 703-704, 755-760
5. Shirish S. Pingale. Hepatoprotection by *acacia catechu* in ccl4 induced liver dysfunction. International Journal of Phar-

maceutical Sciences Review and Research2010; Vol. 5, Issue 1, Article-024:p150-154
6. VarkungValte et.al. Protective Effect of Ethyl Acetate Extract of Acacia Catechu inCarbon Tetrachloride Induced Hepatotoxicity. Indian Medical GazetteApril2012;p159-162
7. Reddy P. Nishanth, et.al. Hepatoprotective effects of Terminaliachebula fruit extract against 2-AAF- induced Hepatic Damage in Albino Mice: Role of MDR1 and COX-2. Journal of Herbs, Spices & Medicinal plants 2014; Vol. 20, Issue 4:p402-420
8. S.Vidya, etal.Hepato-protective activity of *terminaliachebula* leaves inparacetamol induced hepato-toxicity in rats. International Journal of Advances in Pharmaceutical ResearchApril 2011; Vol. 2, Issue 4:p127 – 132
9. A I Mir et.al. Reversal of hepatotoxin-induced pre-fibrogenic events by Emblicaofficinalis- Ahistological study. Indian Journal of Experimental Biology July 2007; Vol 45:p626-629
10. Tasduq SA et.al. Protective effect of a 50% Hydroalcoholic fruit extract of Emblicaofficinalis against anti-tuberculosis drug induced liver toxicity. Phytotherapy research 2005;19:p193-197
11. MahuyaSengupta et.al. Hepatoprotective and immunomodulatory properties of aqueous extractof Curcuma longa in carbon tetra chloride intoxicated Swiss albino mice. Asian Pac J Trop Biomed 2011; 1(3):p193-199
12. S. L. Baxlaet.al.Hepatoprotective effect of Curcuma longa against lead inducedtoxicity in Wistar rats. Veterinary-worldSept-2013; Vol. 6,16:p 664-667
13. Savitapatilet.al.Hepatoprotective activity of Semecarpusanacardiumfruit extracts against carbon tetrachloride induced hepatotoxicity in rats. Int J Pharm Bio Sci Oct-2013; 4(4):p807 – 811
14. Ashutosh Kumar et.al.Hepatoprotective Activity of Methanolic Extract of Stem Bark of AlstoniaScholaris (l.) R.br.Am. J. PharmTech Res. 2012; 2(2):p545-555
15. Kumar et.al.Hepatoprotective activity of alstoniascholaris (l.) R.br.Leaves against thioacetamide induced hepatotoxicity.Pharmacologyonline2011; 3:p213-217
16. Sunetrapatwardhanet.al.Studies onhepatoprotective activity ofethanolic extract of cassia fistula bark against ccl4 induced hepatic damage inwistar rats. Pharmacologyonline 2009; 2:p50-63
17. S.J. Wasu, B.P. Muley. Hepatoprotective Effect of Cassia Fistula Linn.Ethnobotanical Leaflets2009; 13:p910-916
18. Patel Govind.Protective effect of neriumindicum on ccl4 induced hepatotoxicity in rats. International Journal of Biomedical Research2010; 1[4]:p147-152
19. Nohid T, Agarwal SS. Hepatoprotective activity of Embeliaribes against paracetamol induced acute hepatocellular damage in mice. JK. Practitioner 2003; 1091:p43-44.
20. NetranjaliDhamalet.al.Evaluation of Jasminumgrandiflorum for Hepatoprotective activity in Isoniazid induced Liver Damage. Int J Pharm Sci Res 2012; Vol. 3(8): p2568-2573
21. Acharya YadavjiTrikamji(editor). Charaka Samhita of Agnivesha. Reprint edition. Varanasi: ChaukhambaKrishnadas Academy; 2010. p338
22. Acharya YadavjiTrikamji(editor). Charaka Samhita of Agnivesha. Reprint edi-

tion. Varanasi: ChaukhambaKrishnadas Academy; 2010. p124
23. Acharya YadavjiTrikamji(editor). Charaka Samhita of Agnivesha. Reprint edition. Varanasi: ChaukhambaKrishnadas Academy; 2010. p179
24. Acharya YadavjiTrikamji(editor). Charaka Samhita of Agnivesha. Reprint edition. Varanasi: ChaukhambaKrishnadas Academy; 2010. p250

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