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 Bhashajachatushaof Charaka Samhita, on the basis of Karma, Bhashajas pertaining to Ubhayaparimajana (~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 Oushadhadravyashaving 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). Raktavahasrotast (~channels of blood circulation) is having its Moola (~root) at yakrit (~Liver) and Pleeha (~Spleen). Yakrit is one of the major organs, 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 Kushtha¹, 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 Bhashajachatusha of Charaka Samhita. Ten Oushadhadravyas viz. Khadira, Abhaya, Amalaki, Haridra, Bhallataka, Saptaparna, Aragwadha, Karaveera, Vidanga, and Jati³ having their own Guna & Karma
are grouped together on the basis of their ‘Kushthaghna’ karma, which are meant to obliterate Kushtha.

**REVIEW OF KUSHTHAGHNA MAHAKASHAYA:**

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>DRUG</th>
<th>DOSHRAGHNATA</th>
<th>ACTION ON YAKRIT/RAKTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Khadira</td>
<td>Kaphapittahara</td>
<td>Raktaprasadana (TiktaKashayara-sa &amp; Sheetaveerya)</td>
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<tr>
<td>2.</td>
<td>Abhaya</td>
<td>Tridoshahara</td>
<td>Indicated in Yakritgadam</td>
</tr>
<tr>
<td>3.</td>
<td>Amalaki</td>
<td>Tridoshahara</td>
<td>Indicated in Yakritgadam, RaktaVikara</td>
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<tr>
<td>4.</td>
<td>Haridra</td>
<td>Kapha pitta shamaka</td>
<td>Raktaprasadana (Tikta rasa, Pittarechara)</td>
</tr>
<tr>
<td>5.</td>
<td>Bhallataka</td>
<td>Vatakaphahara</td>
<td>Indicated in Yakrit, Pleeharoga</td>
</tr>
<tr>
<td>6.</td>
<td>Saptaparna</td>
<td>Kapha pitta shamaka</td>
<td>Raktashodhaka</td>
</tr>
<tr>
<td>7.</td>
<td>Aragwadha</td>
<td>Pitta kaphapaha</td>
<td>Raktashodhaka</td>
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<td>8.</td>
<td>Karaveera</td>
<td>Kaphavatashamaka</td>
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<tr>
<td>9.</td>
<td>Vidanga</td>
<td>Kaphavatashamaka</td>
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<tr>
<td>10.</td>
<td>Jati</td>
<td>Tridoshahara</td>
<td>Raktaprasadana</td>
</tr>
</tbody>
</table>

The pharmacological actions of all the 10 drugs mentioned in Kushthaghnamahakashaya have been described in Table HEPATO-PROTECTIVE ACTIVITY OF KUSHTHAGHNA 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. Although some scholars considered fortifying, tonic and strengthening.

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

A study conducted by Shirish S. Pingaleinvestigates 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 biochemistry supported by histopathology due to CCl4 induced hepatopathy the marker enzymes leak into the blood. The extent of recovery was compared with the natural liver regeneration after CCl4 damage and normal liver. The heartwood powder of *Acacia catechu* was treated in the form of aqueous slurry. From the findings of blood biochemical parameters it was inferred that the treatment with this plant material is effective against CCl4 induced dysfunction of the liver. The decreased levels of serum bilirubin after treatment with heartwood powder of *Acacia catechu* restores the normal functional status of the liver. This hepatoprotective effect was supported by light microscope studies.

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 hepatoprotective activity was monitored biochemically by estimating serum transaminases, serum alkaline phosphatase, serum bilirubin and serum protein after intraperitoneal injection of ethyl acetate extract of *Acacia catechu* (250mg/kg). Silymarin (5mg/kg.I.P) was given as a reference drug. The histopathological changes of liver sam-
samples 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.²

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.³

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 *Terminaliachebula* was comparable with that of the standard silymarin 100mg/kg. These results suggest that 1% gum acacia suspension of leaves of *Terminaliachebula* 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 CCl₄ and thioacetamide (TAA) induced changes in rat liver. Chronic treatment of CCl₄ 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 *Embilicaofficinalis* (fruit) (EO-50) against antituberculous drugs-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 Mahuya Sengupta et.al. suggested the aqueous extract of turmeric reduced the lev-
el of SGOT, SGPT and bilirubin in CCl4 intoxicated mice. Apart from damaging liver system, CCl4 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 CCl4 on the nonspecific host response in the peritoneal macrophages of CCl4 intoxicated mice.

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.

5. Hepatoprotective Activity of Bhattaka-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.

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.

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 ethanolic extract of Cassia fistula bark in the doses of 200 and 400 mg/kg, further confirmed the hepatoprotective activity.
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.

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 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.

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.

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.

DISCUSSION:

Yakrit is considered as one of the Koshtangas (~internal organs). 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. Again in Vivdhashitapeetyaadhyaya of Charaka Samhita it is mentioned as Rakta pradosha roga. Derangement of Rakta is one among 7 factors (Vata, Pitta, Kapha, Twak, Mamsa, Shonita and Lasika) which are mandatory for the manifestation of kushtha as per the explanation available in Charaka Samhita. Rachhavaha-srotas is having its Moola in Yakrit and Pleeha. 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.

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