LITERATURE REVIEW

Gite et al., (2010) studied on hepatoprotective activity of Enicostemma axillar in paracetamol induced hepatotoxicity in albino rats. In the study the aerial parts of the plant is extracted with water. The liver of the rats were effected with paracetamol. Silymarine (200 mg/kg) was given as reference standard. The water extract of aerial parts of plant have shown very significant hepatoprotection against paracetamol induced hepatotoxicity in reducing serum total bilirubin SGPT, SGOT levels\textsuperscript{19}.

S. Vetriselvan et al., (2011) evaluated the hepatoprotective activity of Andrographis paniculata in ethanol induced hepatotoxicity in albino rats. In the study the aqueous extract of A. paniculata (50mg/kg, 100mg/kg, 200mg/kg body weight) was found to protect the lever from hepatotoxic action of ethanol by significant reduction in the transaminase level\textsuperscript{20}.

Maheswari et al., (2008) aimed to find out the hepatoprotective activity of Orthosiphon stamineus on liver damage caused by paracetamol in rats. The methanolic extract of leaves in the dose of 100mg and 200mg/kg body weight was given to the rats affected by paracetamol and investigated and found that the extract showed significant recovery and suggested that O. stamineus methanol leaf extract possessed hepatoprotective activity\textsuperscript{21}.

Gauri Karwani et al., (2011) studied the hepatoprotective active of Mimosa pudica Linn. In carbon tetrachloride induced hepatotoxicity in rats. Mimosa pudica Linn. Is commonly used herbs against many disease. The hydroalcoholic extract of dried powder of whole plant was investigated in CCl\textsubscript{4} hepatotoxicity rats mode at the dose of 200mg/kg, 400mg/kg and 800mg/kg body weight and found recovery in the liver function biochemical parameters. Histology of liver sections of animals treated with extract showed the hepatic cell regeneration. The results support the hepatoprotective effect of Mimosa pudica Linn\textsuperscript{22}.

R. Selvanayaki et al., (2012) investigated hepatoprotective activity of aqueous extract of Lawsonia Inermis against paracetamol induced liver damage in rats. The aqueous extract of Lawsonia Inermis was administered orally to the animals with hepatotoxicity induced by paracetamol. Silymarin was was given as reference standard. The plant aqueous extract was found to be effective in protecting the liver against the injury induced by paracetamol in rats. The result proved the hepatoprotective activity of Lawsonia Inermis against paracetamol induced rats\textsuperscript{23}.

Pallab K Haldar et al., (2012) studied the hepatoprotective activity of Dregea volubilis fruit against paracetamol induced liver damage in rats. The liver of the rats was affected with paracetamol and the damaged liver were treated with the extract in dose of 100mg/kg and 200mg/kg body weight and sylimerin 25mg/kg body weight was also given as reference standard and compared the different liver function test and found safe recovery of the treated group. The results concluded that the Dregea volubilis fruit has hepatoprotective activity\textsuperscript{24}. 

M.A. Rathi et al., (2010) determined the hepatoprotective activity of Spermaeoece hispida Linn. Extract against nitrobenzene induced hepatotoxicity in rats. The plant is used as traditional herbal medicine in India to treat various disorders. The ethanolic extract of the whole plant was evaluated against nitrobenzene. The treatment of Spermaeoece hispida Linn. (200mg/kg body weight on affected animals resulted in decreased liver marker enzyme activity. Histopathological analysis of the nitrobenzenzene induced animal showed severe centrilobular necrosis, fatty infiltration and lymphocytes infiltration which was recovered by the treatment of plant extract. This proved that Spermaeoece hispida Linn. Is a good hepatoprotector[25].

Siddharth Singh et al., (2011) studied Cajanus cajan plant for the hepatoprotective activity against carbon tetrachloride induced liver damage. Hydorchloride extract of the aerial part of the plant 100, 200,and 400mg/kg body weight was administered orally to the animals with hepatotoxicity by CCl₄. Liv-52 (100mg/ kg body weight) was given as reference standard. The extract was effective in protecting the liver against the injury. Hence, proved the hepatoprotective activity of Cajanus cajan plant[26].

Wan Yong Ho et al., (2012) investigated hepatoprotective activity of Elephantopus scaber on alcohol induced hepatocytes model. The plant traditionally used as liver tonic. They have compared the in vivo hepatoprotective effect of E. scaber with Phyllanthus niruri on the ethanol induced liver damage in mice. High concentration of E.scaber and P.niruri were able to revert the liver damage. Which is comparable to the normal control. The results suggest the potential effect of the extract as a hepatoprotective agent towards ethanol induced liver damage[27].

Cordeiro M.C. et al., (2011) evaluated that bark extract of Bridela retusa spreng have hepatoprotective and nephroprotective activity. The protective activity of the extracts were justified by the significant decrease in the weight of adrenal glands when compared to CCl₄ treated groups. The concentration of protein, carbohydrate DNA, RNA and cholesterol in the liver and kidney were estimated to be significantly (p≤0.05) increased when compared to that of CCl₄ treated groups . This shows that the extract possessed protective activity[28].

Jagruti A. Patel et al., (2009) studied Piper longum to find out the hepatoprotective activity on carbon tetrachloride induced liver damage in Wistar rats. The fruits and roots powder of the plant were used in the Indian traditional system of medicine for treatment of liver ailment and jaundice. The study is carried on CCl₄ induced hepatotoxin at dose of 0.05ml/kg.p.o. The treatment of Piper longum milk extract 200mg/day p.o. decreased the serum enzymes (total bilirubin and direct bilirubin). The result showed hepatoprotective effect of Piper longum which is comparable to the standard drug silymarin 25mg/kg/p.o.[29]

J.M. Sasikumar et al., (2009) investigated in vitro antioxidant of methanolic extracts of Berberis tinctoria Lesch. The plants are found in Nilgiris Hills. Methanol extract was
screened for their *in vitro* antioxidant effect using two assay models. Diphenyl Picryl Hydrazyl (DPPH) quenching assay and ferric reducing power. The extracts were also found to exert a strong reducing power activity. Based on this study, it was concluded that *Beberis tinctoria* possessed a strong antioxidant activity.\[30\].

**S. Paulsamy et al., (2004)** studied that *Berberis tinctoria* Lesch. is an endemic plant. For its conservation through mass multiplication studied made to standardize tissue culture technology. It was found that medium containing BAP and NAA each 0.5mg/l was found to be the optimum for callus formation.\[31\].

**Richa Singh et al., (2012)** investigated *Berberis tinctoria* Lesch. for the macro and microscopical characters, physio-chemical details such as total ash, acid soluble ash hexane, alcohol and water soluble extractive, tannin, sugar and starch percentage was found. The percentage of berberine as berberine chloride was calculated by HPTLC and was found to be 3.05%\[32\].

**Kanda Samy Murugesh et al., (2005)** studied the hepatoprotective and antioxidant role of *Berberis tinctoria* Lesch. leaves on paracetamol induced hepatic damage in rats. The methanol extract of *B. tinctoria* Lesch. was evaluated for its hepatoprotective and antioxidant effect on paracetamol 750 mg/kg body weight induced liver damage in Wistar rats. It was found that the extract at 150mg/kg and 300mg/kg body weight have hepatoprotective activity. The results proved that the extract have potential to cure liver disorder, probably by its antioxidantive effect on hepatocytes.\[33\].

**Neha Pandey et al., (2012)** studied *Arisaema leschenaultia* and found that the ethanolic extract of the plant have hepatoprotective activity against experimentally induced hepatotoxicity models in swiss albino mice. Silymarin was used as standard. The extract shown very high significant protection against paracetamol induced hepatotoxicity in mice by reducing serum total bilirubin, SGPT, SGOT level.\[34\].

**S. Rajan et al., (1992)** discussed about the plant *Mahonia leschenaultia* Takeda. The plant known as Holy leaved berry belonging to family berberidaceae. The plant is having potential as a medicine besides it’s used in religious ceremonies. The stem paste is used orally for the remedy of fever, cold and also to arrest other complication during post natal period by the Toda community.\[35\].

**B. Dauraiswamy et al., (2006)** investigated the antimicrobial activity of methanolic extract of *Mahonia leschenaultia* Takeda. root and root bark. For antibacterial studies the strain used were *Staphylococcus aureus* and *Escherichia coli* on nutrient agar medium and nutrient broth and ampicillin trihydrate used as standard. For antifungal study, strain used *Trichophytons lignorum* and *Candida crusei*. The result showed significant activity. The antifungal activity was less significant when compared with antibacterial activity.\[36\].
B. Dauraiswamy et al., (2004) studied Berberis tinctoria Lesch. The different parts of the plant were extracted with methanol. Berberine was isolated and characterised. The quantitative estimation of berberine was carried out by HPTLC technique. The antibacterial and antifungal activities of the extract were carried out by Cylinder plate and Serial dilution method. The result showed prominent activities\(^\text{[37]}\).

Srinivasan Durairaj et al., (2009) has reported antibacterial activity of Garlic. The aqueous extract of garlic were used for the evaluation. The strain used was both gram negative and gram positive. The study was carried out by both Serial dilution and Cylinder plate method. The result showed the antibacterial activity\(^\text{[38]}\).

U.S. Patil et al., (2012) has investigated the antimicrobial activity of some crude herbal drugs. (stem of Cryptolepis buchanani, root of Curculigo orchioids Gacrtn, stem of Diospyros melanoxyton) were tested against different Gram-positive and Gram-negative bacteria and yeast, using agar diffusion method. The result showed that the extracts have antibacterial activity and concentration dependent\(^\text{[39]}\).

R. Jeyachandran et al., (2009) has assessed the antibacterial activity of Plumbagin and root of Plumbago zeylanica L. against various pathogenic bacteria. Both have showed antibacterial activity against Escherichia coli, Salmonella typhi and Staphylococcus aureus. The bioactive compound Plumbagin and extract of Plumbago zeylanica root showed a wide spectrum of antibacterial activity\(^\text{[40]}\).

Suba Irshad et al., (2011) has investigated the in vitro antibacterial activity of Aloe barbadensis Miller. (Aloe vera). The Aloe vera leaves and gel were macerated in methanol, ethanol and distilled water. Then by using agar diffusion assay antibacterial activity was estimated. The methanolic extract showed the maximum antibacterial activity as compared to other solvent extract\(^\text{[41]}\).

Priscila Ikeda et al., (2007) has investigated antibacterial activity of medicinal plant extracts. The methanolic extracts of some medicinal plants against Escherichia coli, Staphylococcus aureus and Enterococcus sp. Showed effective antibacterial activity\(^\text{[42]}\).

Ali Sadighain et al., (2011) has aimed to find out the antibacterial activity of aqueous and methanolic extracts of Pomegranate fruit skin. The aqueous and methanolic extracts of the fruits skin were extracted by using soxhalet apparatus. Antimicrobial effect of the extracts were studied and compared with commercial antibiotics using three different methods. Agar dilution, Cylinder plate and Disk inhibition zone techniques. The results showed good antibacterial activity\(^\text{[43]}\).

T.P. Tim et al., (2005) aimed to find out antimicrobial activity of flavonoids. It is found that flavonoids are present in fruits, vegetables, nuts, seeds, stems, flowers, tea, wine and honey.
Many flavonoids are isolated and identified the structure possessing antifungal, antiviral and antibacterial activity [44].

Pavithra Vani Karsha et al., (2010) studied the antibacterial activity of black pepper. The extract of black pepper was evaluated for antibacterial activity by Disc diffusion method. The zone of inhibition against various Gram positive and Gram negative were measured. The result indicated the excellent inhibition of S.aureus, Bacillus cereus and S. faecalis and hence, proved the antibacterial activity of Black pepper [45].

Sunita Dalal et al., (2010) investigated Eclipta alba for antibacterial activity which is already proved for having hepatoprotective. The methanolic extract of E. alba was tested for in vitro antimicrobial studies. It was evaluated by using zone of inhibition studies. The extract exhibited activity against almost all the strains. The result suggest that the Eclipta alba is promising antimicrobial agents [46].

Filomena Silva et al., (2011) aimed to work on antibacterial activity of Coriander (Coriandrum sativum). The essential oil of Coriander was extracted and tested for antibacterial activity against Gram positive and Gram negative bacteria and found that the oil is active for inhibiting almost all the bacteria. The result proved that the coriander oil is having good antibacterial activity [47].