3. REVIEW OF LITERATURE

An extensive literature Survey was carried out with the selected plant *Sarcostemma acidum* W&A. Past studies conducted by scientist in the field are briefed as under:

- K.G.Lalitha *et al.* demonstrated that *S.brevistigma* possessed remarkable anti-inflammatory activity and effect of ethyl acetate extract of *Sarcostemma brevistigma* was investigated in rat to evaluate the antiinflammatory activity. Carrageenin-induced rat paw edema model and cotton pellet granuloma methods were employed to test anti-inflammatory activity. It has been reported that edema suppressant effect of ethyl acetate extract was 50%, which is nearly equivalent to that of 10 mg/kg of indomethacin. The ethyl acetate extract (650 mg/ kg) produced the inhibition of carrageenin-induced rat paw edema. The result indicated that the ethyl acetate extract produced significant (P<0.001) anti-inflammatory activity when compared to control. In acute oral toxicity test 2000 mg/kg dose of *S. acidum* was found to be safe. *S. acidum* showed anti-inflammatory activity which may be due to monocyte depletion and anti-oxidant activity which may be due to presence of glycosides.106

- K.G.Lalitha *et al.* investigated analgesic activity of ethyl acetate extract of *Sarcostemma brevistigma* in rat. Acetic acid induced writhing model and hot plate methods were employed to test analgesic activity. The results indicate that the ethyl acetate extract produced significant analgesic activity with respect to control.107

- Samir K Shah *et al.*, investigated the antiarthritic activity of *Sarcostemma brevistigma* (family: Asclepiadaceae) in experimental animals. The alcoholic extract (A) of stem and its different fractions, petroleum ether (B), chloroform (C) and *n*-butanol (D) were studied at the dose of 300 mg/kg orally for their effect against Freund’s adjuvant (FA)
induced arthritis in rats. Body weight changes, serum rheumatoid factor, arthritic index, volume of edema generated by plethysmograph, erythrocyte sedimentation rate (ESR) were studied. Synovial joint was subjected to histopathological study. FA sensitized rats exhibited typical arthritic changes characterized by loss in body weight, increase in serum rheumatoid factor, arthritic index, volume of edema generated and ESR. Histopathological study of synovial joint confirmed the arthritic changes. Treatment with various extracts of S. brevistigma prevented arthritic changes significantly (P<0.05). The results were comparable to that of dexamethasone and cyclophosphamide. The highest protection was found with chloroform extract. It is concluded that S. brevistigma possesses anti-arthritic activity and the chloroform extract was found to be the most effective.

- M.N.Saraf et al. (2007) have evaluated the effect of chloroform soluble fraction (F-A) of twigs of Sarcostemma brevistigma on contractions induced by KCl, histamine, and acetylcholine in the isolated guinea pig ileum and taenia coli smooth muscles. F-A (19.5 µg/ml) significantly inhibited the contraction induced by 40 mM KCl to the extent of 87.6% in the isolated guinea pig ileum. In the isolated guinea pig ileum, F-A (64.3 and 59.2 µg/ml) significantly inhibited the contractions induced by acetylcholine and histamine to the extent of 85 and 83% respectively. In the isolated guinea pig taenia coli, F-A (65.2 µg/ml) significantly inhibited the contraction induced by 40 mM KCl to the extent of 96.0%.

- Sarcostemma brevistigma exhibits uterine relaxant activity, by interfering with the extracellular Ca$^{2+}$. P. Suresh Kumar et al (2006) examined the effect of a chloroform soluble fraction (F-A) of the acetone extract of twigs of Sarcostemma brevistigma Wight on contractions induced by oxytocin and KCl, in the isolated rat uterine smooth muscles, has been evaluated. At concentrations of 32.8 µg/ml, the F-A significantly inhibited (P<0.001) the contractions induced by 60 mM KCl in Ca$^{2+}$, containing physiological salt solution to the extent of 88.7 ± 2.2%. The F-A, at concentrations of 26.3 µg/ml, completely inhibited the rhythmic contractions induced by oxytocin in Ca$^{2+}$, containing physiological salt solution. However, it failed to inhibit the contractions induced by oxytocin in Ca$^{2+}$ free PSS. These results suggest that fraction F-A exhibits uterine relaxant activity, by interfering with the extracellular Ca$^{2+}$.100
According to folklore, this plant extract is used for the treatment of asthma. Shah et al. (2009) evaluated the anti-asthmatic activity of various extracts of *Sarcostemma brevistigma* in egg albumin induced asthma and the results indicated that *S. brevistigma* possesses anti-asthmatic activity and extract with chloroform was found to be the most effective. The alcoholic extract (A) of stem and its different fractions, petroleum ether (B), chloroform (C) and n-butanol (D) were studied at the dose of 300mg/kg orally for their effect against Egg albumin (EA)-induced asthma. Asthma was induced by EA (1 ml, 10% W/V, i.p.). After 15 days of EA injection, airway hyperreactivity symptoms, serum gas analysis, lung weight to body weight, and bronchoalveolar lavage (BAL) fluid analysis for blood cell count were studied. Oxidant parameters like superoxide dismutase, catalase, reduced glutathione and antioxidant parameters like malondialdehyde and nitric oxide were estimated in lung homogenate. Lung tissue was subjected to histopathological study. EA-sensitized rats exhibited asthmatic condition characterized by airway hyperreactivity symptoms, hypoxia, hypercapnia, increased lung to body weight ratio, and increase in number of total leucocyte count including each subtype in BAL fluid. Histopathological study of lung confirmed the asthmatic changes. Increase in oxidant parameters such as malondialdehyde, nitric oxide and decrease in antioxidant parameters such as superoxide dismutase, catalase and reduced glutathione were observed due to EA sensitization. Treatment with various extracts viz. Ext A, Ext C and Ext D of *S. brevistigma* prevented asthmatic changes significantly (P<0.05). The results were comparable to that of dexamethasone (5 mg/kg). The order of protection was found to be Ext C > Ext A > Ext D. However Ext B was not effective in preventing these changes.111

M.N. Saraf, et al. (1988) conducted a study on anti-allergic activity of *S. brevistigma* Wight and the results was indicated that fraction of this plant extract have antiallergic and anti-inflammatory activities.112

M.N. Saraf, et al.(1998) also carried out a study on bronchodilator activity and stated that *S. brevistigma* have bronchospasmolytic activity because it inhibited the contractions induced by acetylcholine and histamine on animal (isolated guinea pig ileum) and produced bronchospasmolytic activity. And according to folklore used of *S. brevistigma* it revealed that herb also have antitussive properties.114
Hepatoprotective activity of *S. brevistigma* was evaluated using CCl4-induced model by Dwijendra Singh *et al.* (2003). The blood was collected and the separated serum was analyzed for various biochemical parameters. Biochemical parameters like serum glutamic oxaloacetic transaminase (SGOT), serum glutamic pyruvate transaminase (SGPT), alkaline phosphatase, total bilirubin and gamma glutamate transpeptidase (GGTP) were analysed.

The results of biochemical parameters revealed the elevation of enzyme level in CCl4-treated group, indicating that CCl4 induces damage to the liver. Liver tissue rich in both transaminase increased in patients with acute hepatic diseases, SGPT which is slightly elevated by cardiac necrosis is a more specific indicator of liver disease. A significant reduction (*P* < 0.001) was observed in SGPT, SGOT, ALP, total bilirubin and GGTP levels in the groups treated with silymarin and ethyl acetate extract of *S. brevistigma*. The enzyme levels were almost restored to the normal.114

*S. acidum* stem extract arrests spermatogenesis in male rats without noticeable side effects. Pramod Kumar Verma *et al.* conducted a study on *S. acidum* stem extract, Sperm motility as well as sperm density was reduced significantly. Treatment caused a 80% reduction in fertility at the 50 mg dose and complete suppression of fertility at the 100 mg dose. There was no significant change in RBC and WBC count, hemoglobin, haematocrit, sugar and urea in the whole blood and cholesterol, protein and phospholipid in the serum. The protein glycogen content of the testes, fructose in the vesicle and protein in epididymides were significantly decreased. Cholesterol in the testes was elevated. Treatment by both of the doses caused a marked reduction in the number of primary spermatocytes (preleptotene and pachytene), secondary spermatocytes and spermatids. The number of mature Leydig cells was decreased, and degenerating Leydig cell was increased proportionately.115

*Sarcostemma brevistigma* Wight was selected for investigating larvicidal potential by A.Rahuman *et al.* (2009) against second and fourth instar larvae of the laboratory-reared mosquito species, *Culex quinquefasciatus* Say, in which the major lymphatic filariasis was used.116

According to the statement of Prakrutiremedies.com website *S. brevistigma* strengthens the immunity system against all types of cold. Soma complex (marked product) also
accords that *S. brevistigma* contains a unique array of immune-promoting phyto-nutrients to support multiple systems of the body including the nervous system, cardiovascular system and immune system.

- Li-She Gan *et al* (2005) carried out a study on lignans and degraded derivatives of *sarcostigma acidum* and have given statement that *S. brevistigma* contain four lignans Sacidumlignan A-D among which Sacidumlignan A, has Antimicrobial activity against two gram positive bacteria in vitro.\(^{118}\)

- According to the statement of Prakrutiremedies.com and oocities.org/ tanhoard website *S. brevistigma* possess antisyphilic and anthelmintic properties, However deep research study is necessary for confirmation of this activity.\(^{119,120}\)

- Siddharthan Surveswaran *et al.*, have given statement that the stems of *Sarcostemma brevistigma* exhibited the highest xanthine oxidase inhibitory activity.\(^{121}\)

- Articles in http://iiacm.com/AyurvedicMedicinalPlants.htm website account that *S. brevistigma* has astringent properties however deep research study is necessary for confirmation.

- P. Suresh Kumar *et al.* (2006) examined the tocolytic activity of *Sarcostemma brevistigma*. Plant extract exhibits uterine relaxant activity, by interfering with the extracellular Ca\(^{2+}\) which was used in treatment of preterm labour. The major cause of perinatal morbidity and mortality, is preterm labour. During term, oxytocin (OT) and prostaglandins act on the uterus, and induce contractions, that result in preterm labour. OT binds to the specific receptors, and increases the intracellular Ca\(^{2+}\) level through release of Ca\(^{2+}\) from both sarcoplasmic reticulum via inositol-1, 4, 5-triphosphate (IP\(_3\)) pathway, and extracellular fluid through voltage operated calcium channels. Preterm labour has been conventionally treated with calcium channel blockers, OT antagonists, \(\beta_2\)-agonists, magnesium sulphate, and prostaglandin synthetase inhibitors. However, these drugs are sometimes inadequate, and have adverse effects like tachycardia, increased cardiac output, pulmonary edema, hyperglycemia, cardiac depression, and inhibition of neuromuscular transmission.\(^{112}\)

- Gupta *et al.* (2010) estimate the *Sarcostemma brevistigma* may be use as a source of biomass fuel, survey was done in selected plant species of Western Ghats, Tamil Nadu, which show that *Sarcostemma brevistigma* has the highest concentration of
hydrocarbon of 3.6%. While species such as *Tylophora asthmatica*, *Euphorbia tirucalli*, *Cryptostegia grandiflora*, *Ficus ealstica* and *Euphorbia antisyphylitica* contained more than 2%. The gross heat value of hydrocarbon fraction in Sarcostemma brevistigma is 8733 Cal/g, which is comparable to fuel oil calorific value. This study showed the significant importance of this plant in light of the decline in global supplies of hydrocarbons, which has led to a search for alternate sources of fuels.\textsuperscript{122}

- A.S. Wabale \textit{et al.} (2010) studied on the basis of a questionnaire prepared containing the information about the tribals, their living style, source of income, ethnomedicinal uses of plant species and their style of treatment with references of tribal vaidyas of Kalsubai and Ratangad and concluded that *S.brevistigma* was used externally as ethnomedicinal plants in the treatment of dog and different animal bites. There is need for further scientific research.\textsuperscript{130}

- C. Sudharkar Reddy \textit{et al.} (2009) Studied in traditional medicinal plants in Seshachalam hills Andhra Pradesh, India and giving the ethno medicinal use of sarcostemma acidum that it is use during burning maturation (A teaspoonful of plant powder administered with two cups of toddy).\textsuperscript{131}