CHAPTER II
REVIEW OF RELATED LITERATURE

A careful search and exploration of the related literature with regard to the present study was essential to have an insight into the work already done. Very little research has been done in this area and the scholar with the available literature has gained valuable methodological hints from their procedures and findings that were of great importance and help in the course of this study.

Although many studies on Herbs and Herbal medicines have been carried out on general sedentary population and on patients, very few studies were found to be done on physical fitness, exercise and sports competitions not only related to other Herbs and Herbal medicines but also to the Herbal Medicine Lakshadi Choornam (powder)

DRUG REVIEW
Lakshadi Choornam (Kottakal Aryavaidyasala)

According to Kottakkal Aryavaidhyasala the above drug can be given in conditions like Cardio Respiratory injuries, bleeding, cough, asthma, tuberculosis, energy boosting etc.
Lassifer Lacca:

It is used in diseases caused by vitiation of blood, hiccough, cough, ulcer, diseases of the thoracic cavity, erysipelas, worm infestation and skin diseases, apart from that it improves complexion. (Singh, 2007)

According to Ayurveda and Siddha it is energy boosting, reduces Kapha and pitta (Nadkarni, 2005)

According to Unani, it can be given as a tonic for liver, kidney, stomach and intestine, haemostatic, resolvent of obstruction, jaundice, dropsy, besides reducing fat in adipose persons.

It is mixed with honey and prepared in the form of an electuary. Lac is a specific application for caries and diseased teeth. It is also used for inunctions in the form of several medicinal oils as Laksadi Taila. This oil is much used for inunctions in chronic fever and is applied to the chest in remittent fevers accompanied by cough, also used in lumbago, epilepsy and hysteria, as an application to the nape of the neck and spine. If this oil is applied to the body of pregnant woman, the fetus grows faster. A decoction of the Lac is also used in the preparation of other medicinal oils such as Chandradi Taila, Angraika Taila etc. Locally, Lac is used as a stimulant application to indolent, scrofulous and scorbutic ulcers.

Atharva Veda, Wisdom of Ancient Truth-seers of India is estimated to be several thousand years old, do clearly says that, both Lac as well as Lac dye were served as effective & valuable medicine. The Veda also reports that,
an extract of Lac made with water, which contains mainly Lac dye or Laccaic acid, was widely used on open wounds for quick healing and tissue regeneration. Besides, use of Lac in joining up of broken bones was also common. The Veda finally indicates slurry of Lac paste in water (which would mainly contain Lac dye) mixed with ghee (butter oil) and milk were commonly taken orally by sick or wounded persons so as to get back health. Thus this valuable old manuscript indicates that, Lac dye was not only safe enough to be used on open wounds but was also taken orally quite often to recoup health and vigor.

In Atarvaveda, mention is made of a decoction, Lakshadi tail, or 'Lac oil', said to be effective in curing chronic fevers and rheumatism.

Panini (550 B.C) mentioned the medicinal properties of Lac in his book, the Ashtdhyayi.

**Mimosa Pudicca:**

According to Ayurveda, it cures ‘Kapha’ biliousness, leprosy, dysentery, vaginal and uterine complaints, inflammations, burning sensations, fatigue, asthma, leucoderma and diseases of the blood. (Kirtikar and Basu, 2003).

According to Unani, it is useful in diseases arising from corrupted blood and bile, bilious fevers, piles, jaundice, ulcers, leprosy, smallpox etc.

A decoction of the root of this plant is considered on the Malabar coast to be useful in gravelliest complaints. The Ayurvedic Vidyans of the
Coromandal side of India prescribe the leaves and root for cases of piles and fistula.

In Konkan, the leaves are rubbed into a paste and applied to hydrocele; and their juice, with equal quantity of horse’s urine, is made into an *anjan* (eye) so as to, be used to remove films of conjunctiva by setting up an artificial inflammation. Besides, the juice of the leaves is used to impregnate cotton wool for a dressing, in any form of sinus.

In Guiana, the leaves are used as a powerful soporific; a light infusion is given as a bitter tonic and the seeds and roots are used as emetic; the latter is irritant and even toxic in large dose.

In Brazil, the root is used as an emetic; the leaves are given in scrofula.

The leaves and stem in combination with other drug are recommended for the treatment of snake bite (*Bavanaprakasha, Rasaratnakara, Yogaratnakara*) and scorpion-sting (*Rasaratnakara, Vaidyvinoda*).

The whole plant is used medicinally in Cambodia. Internally it is prescribed for vesicle calculi. Externally it is used in edema, rheumatism and tumor of the uterus.

The juice of the leaves of Mymosa with tender coconut water is used to be given to kids who suffers from bronchial asthma and was also used to be given in conditions such as for dibates, skin diseases, allergy etc. (Neshamani, 2000)
Ganguly et al. (2005) conducted a study on the effect of Mimosa Pudicca root extract on vaginal estrous and serum hormones for screening of antifertility activity in albino mice. Several plants are traditionally used as birth control agents by the rural people in India. Mimosa Pudicca is one of the folk medicinal plants commonly used as antifertility agent in some places in India. The present work was carried out to evaluate the claimed antifertility effect of the plant by carrying out pharmacological studies with the root extract of the plant.

Air-dried roots of Mimosa Pudicca were extracted using methanol. Dried methanol extract of the root was administered orally to Swiss albino mice for 21 consecutive days. Estrous cycle, reproductive hormones (prolactin, estradiol and progesterone) and number of litters produced were studied in both control and extract-administered groups by using standard methods. Phytochemical studies of the methanolic root extract were carried out using qualitative and thin-layer chromatography methods.

The results do shows that, Mimosa Pudicca root extract, when administered orally at a dose of 300 mg/kg body weight/day, prolonged the length of the estrous cycle with significant increase in the duration of the diestrous phase and reduced the number of litters in albino mice. The number of litters was increased in the post treatment period. The analysis of the principal hormones (prolactin, estradiol and progesterone) involved in the regulation of the estrous cycle showed that the root extract altered gonadotropin release and estradiol secretion. Hence the conclusion drown do
indicates that, the root extract of *Mimosa Pudicca* has antifertility effect and it prolongs the estrous cycle and disturbs the secretion of gonadotropin hormones in albino mice. The decreased level in the proestrus and estrus stages in the extract-administered group when compared with those of control animals indicates, the disturbance of estrous cycle and ovulation through suppression of FSH.

*Valsala* et. al. (2002) conducted a study on the effect of *Mimosa Pudicca* root powder on oestrous cycle and ovulation in cycling female albino rat, *Rattus norvegicus*. *Mimosa Pudicca* root powder (150 mg/kg body weight) when administered intragastrically, altered the oestrous cycle pattern in female *Rattus norvegicus*. Nucleated and cornified cells were absent in all rats. The smear was characterized by leucocytes only, as in dioestrus, which persisted for 2 weeks. There was a significant reduction in the number of normal ova in rats treated with the root powder when compared with the control rats and a significant increase in the number of degenerated ova.

*Campbell*, (1979) conducted a study on Potassium and Calcium in the motor organ of the sensitive plant *Mimosa Pudicca* localization by Ion microscopy. The ion microscope was used to study potassium and calcium distributions in the main motor organ of *Mimosa Pudicca*. The cortex of the motor organ has two cell types differing in location, structure and ion distribution. Histochemical features portrayed in ion micrographs were plainly correlated with structures seen in the light and electron microscopes.
Prasad et. al. (1975) studied the regeneration of peripheral nerve in young growing albino rats. The sciatic nerve of each animal was crushed with the help of artery forceps. They were divided in three groups containing equal number of animals and were treated either with total extract of Lajjawanti or hydrocortisone. The process of regeneration was studied histologically, electro physiologically and the number of axons was also counted at each interval. The results of this experiment showed that the regeneration of the nerve was enhanced by 30-40% on Lajjawanti treated animals.
REVIEWs RELATED WITH OTHER HERBAL MEDICINES

Relevant literature regarding the area of present exploration has been obtained from experts in the field of Ayurvedic-medical profession, related books, journals, sports magazines, newspapers etc and is briefly categorized below.

Plants provide us with most of the nutrients essential for life. Other than essential nutrients, plant food contain naturally occurring substances, referred respectively as phytochemicals. Herbals, which are derived from leaves, bark, berries, roots, gums, seeds, stems or flowers of plants, also contain numerous phytochemicals thought to have nutritive or medicinal value.

Kochhar and Nagi, (2005) conducted a study on the effect of supplementation of traditional medicinal plants on Blood Glucose in Non–Insulin-dependent diabetics. The effect of supplementation of a powdered mixture of three traditional medicinal plants—bittergourd, jamun seeds, and fenugreek seed (raw and cooked form) on blood glucose was studied in 60 non–insulin-dependent male diabetics. The patients were divided into two groups of 30 each of which patients of group I were given the raw powdered mixture in the form of capsules; the patients of group II were given this mixture in the form of salty biscuits. Daily supplementation of 1 g of this powered mixture for a 1.5-month period and then a further increase to 2 g for another 1.5 months significantly reduced the fasting as well as the postprandial glucose level of the diabetic patients. A significant decrease in
oral hypoglycemic drug intake and decline in percentage of the subjects who were on hypoglycemic drugs were found after the 3-month feeding trial. It was concluded that 2 g of a powdered mixture of traditional medicinal plants either raw or cooked form can be successfully used for lowering blood glucose in diabetics

Liang et. al, (2005) conducted a study for a period of eight week supplementation of *Panax ginseng* extract (6g/day) for enhanced performance on treadmill running time, based on serum levels of antioxidant enzymes and was attributed to decreased oxidative stress. However, this one-group study involved a control pre-test followed by a post-test after the eight-week supplementation period and no placebo was utilized.

Neychev and Mitev, (2005) conducted a study on the effect of *Tribulus terrestris* on athletes. Extract of 20 mg/kg body weight, daily for four weeks was found to have no effect on serum testosterone or androstenedione. Also, in a double-blind, placebo-controlled study, *Tribulus terrestris* supplementation exerted was found to have no effect on body weight, body composition, maximal strength or muscular endurance in resistance-trained males during training.

Kuriyan and Rajendran, (2005) conducted a study on the effect of supplementation of Coccinia Cordifolia extract on newly detected diabetic patients. *Coccinia indica* (synonym *Coccinia cordifolia*) a herb growing abundantly in India, has been used in the traditional treatment of diabetes mellitus. However, carefully controlled studies of its efficacy are lacking.
This study aimed to evaluate the effectiveness of *Coccinia* on blood glucose levels of incident type 2 diabetic patients requiring only dietary or lifestyle modifications. The study was a double blind, placebo control, randomized study trial. Sixty incident type 2 diabetics (aged 35 – 60 years) patients from St. Johns Medical College Hospital, Bangalore, India were selected a subjects. The subjects were randomly assigned into the placebo or experimental group and they were provided with 1 gm of an alcoholic extract of the herb for 90 days. Anthropometric, biochemical, dietary and physical activity assessment were carried out at baseline and were repeated on the 45th day and the 90th day of the study. All the subjects were provided with standard dietary and physical activity advice for the control of their blood sugarlevel.

There was a significant decrease in the fasting, post prandial blood glucose and glycosylated hemoglobin of the experimental group when compared to the placebo group. The fasting and post prandial blood glucose levels of the experimental group on the 90th day significantly decreased by 16% and 18% respectively. Besides, no significant changes were observed in the serum lipid levels.

Bock et. al. (2004) found that an acute dose (200milligrams) of *Rhodiola rosea* improved time to exhaustion by 3% on a cycle ergometer. But, on the other hand, there was no significant effect was found following four weeks of supplementation with 200 milligrams daily. Apart from that, there was no effect on maximal strength, various measures of reaction time or
movement time. Besides, using combinations of such herbals have also been shown to have no ergogenic effect.

Herbold et. al. (2004) reported that 17 percent of female collegiate athletes used herbal/botanical supplements. Herbal dietary supplements are marketed to physically active individuals for a variety of reasons, including energy increases, inducing weight loss, promoting muscle growth or inducing other physiological or metabolic responses that may enhance exercise performance. Some sports drinks and sports bars contain herbals as well. Research supports beneficial medicinal effects of specific herbs for specific health problems, as documented in Herbal Medicine: Expanded Commission E Monographs (Blumenthal et. al. (2000)) and WHO Monographs on selected Medicinal Plants (WHO 1999). Unfortunately, however, with a few exceptions research investigating the ergogenic effects of herbal supplements are limited.

Parcell and Smith, (2004) conducted a study on the effect of supplementation with *Cordyceps Sinensis* (CordyMax Cs-4) to examine the effects on ventilatory threshold and endurance performance in endurance-trained cyclists. Twenty-two male cyclists participated in 5 weeks of supplementation with CordyMax Cs-4 tablets (3 g/d). Training intensity was maintained by weekly documentation and reporting throughout the 5-week period. Subjects completed a VO\textsuperscript{2} (peak) test and work-based time trial prior to and following the supplementation period. It is concluded that 5 weeks of
CordyMax Cs-4 supplementation has no effect on aerobic capacity or endurance exercise performance in endurance-trained male cyclists.

Pittler and Ernst, (2004) reviewed the research on numerous dietary supplements marketed for weight loss, including various herbals and found that none (with the possible exception of *ephedra*) have shown evidence beyond a reasonable doubt that they are effective for reducing body weight.

Willoughby, (2004) reported that 1200 milligrams/day of *Cystoseira canariensis* supplementation during 12 weeks of resistance training had no effect on serum myostatin levels nor did it have any effect on muscle mass, muscle strength or body fat.

Curtis Prior, (1999) conducted a study on the Chinese Ginkgo tree the world's most ancient extract, originated two hundred million years ago and the source for *Ginkgo biloba* leaf extract. *Ginkgo biloba* is believed to exert its mode of action when its active ingredients, the flavonoids and terpenoids, work in concert. One of the tissue level effect is stimulated release of endothelium-derived relaxing factor, which may enhance muscle tissue blood flow through improved microcirculation.

Allen et. al. (1998) conducted a well-controlled study and reported that no significant effect of either Panax ginseng or a standardized ginseng extract on cardiovascular, metabolic or psychologic responses to either submaximal, maximal or supramaximal exercise performance capacity. The
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results do indicate that, ginseng in its various forms does not enhance exercise or sport performance.

Winslow and Kroll, (1998) conducted a study on the earliest evidence of human use of plants for healing dates back to the Neanderthal period and today, various modern medicines may be classified as herbals. Now, herbals are regulated as medicine in some countries like India and Germany, but as dietary supplements in others. Currently in the United States most herbals are regulated by the Dietary Supplement Health and Education Act (DSHEA), more like food ingredients than drugs. However, given the pharmacological effect of various herbals, some health professionals are emphasizing the need for regularizing standard herbal therapy.

Lim, (1997) evaluated the effect of a breakfast meal containing 10 gm of dried hot red pepper on energy substrate use in male runners during rest and exercise (cycling at about 60 percent VO$_2$max). For the red pepper trial, plasma epinephrine and non epinephrine concentrations were significantly elevated after 30 min, but not at 60 and 150 min of rest. The hot pepper meal significantly elevated the respiratory quotient (RQ) and blood lactate levels at rest and during exercise, but there was no effect on oxygen consumption or energy expenditure during rest or exercise. These results suggest that, contrary to the theory of glycogen sparing, hot red pepper ingestion stimulates carbohydrate oxidation at rest and during exercise. Besides, it was also found that hot red pepper ingestion before exercise could decrease endurance.
performance in athletes due to associated muscle and/or liver glycogen depletion.