

## SHORT COMMUNICATION

### THE EFFECT OF *OCIMUM SANCTUM* AND *LEDUM PALUSTRE* ON SERUM URIC ACID LEVEL IN PATIENTS SUFFERING FROM GOUTY ARTHRITIS AND HYPERURICAEMIA

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**ABSTRACT.** The effect of *Ocimum sanctum* Linn on uric acid levels in 200 humans was observed in this study. Three times oral administration of *Ocimum sanctum* Linn (test medicine) to the 100 patients (60 males and 40 females), and *Ledum palustre* Linn (reference remedy) to 100 patients was given. For analysis of uric acid in blood samples the enzymatic method was selected due to its accuracy and reproducibility. The value of reduction in serum uric acid by *Ocimum sanctum* Linn (OSL) in males was  $2.6 \pm 0.3$  and reduction in serum uric acid (SUA) by *Ledum palustre* Linn (LPL) in males was  $4.3 \pm 0.3$ . On the other hand, the value of reduction in SUA by OSL in females was  $2.5 \pm 0.3$  and reduction in serum uric acid by LPL in females was  $4.6 \pm 0.4$ . It can be concluded that LPL has better results in the reducing SUA levels than OSL in both males and females.

**KEY WORDS:** *Ledum palustre*, *Ocimum sanctum*, Serum uric acid levels

## INTRODUCTION

The decreased excretion of uric acid through the kidneys and large intestine or over secretion of uric acid due to alcohol, crash diet, meat, etc would lead to excessive uric acid in the blood, eventually leading to Gout [1]. It is a metabolic disorder characterized by abnormally high levels of uric acid in the blood. The pain and swelling due to gout can be sudden and may appear and disappear over periods of several days [2, 3].

Numbers of remedies are available for the treatment of gout which are giving the relative while other providing absolute cure. OSL contains many beneficial chemical constituents that have anti-microbial and anti-inflammatory activity. The leaves have been found to cause reduction in fasting blood sugar and postprandial glucose level in the patients of noninsulin-dependent diabetes mellitus [4-7]. Its leaves juice is effective in the management of flu, cough and ring worm [8, 9]. It has also effect on sperm count and reproductive hormones [10]. The presence of eugenol in it has been shown to possess significant antioxidant property and to inhibit lipid peroxidation [11-12].

The principal components, ledol, palustrol and myrtenal, in leaf of LPL are of much medicinal importance. Octacosanol and oleuropeic acid have also been isolated and identified in petroleum and chloroform extracts of the plant [13]. It is a very effective herbal remedy for rheumatism [14]. It may be prescribed in both acute and chronic rheumatism. It has positive effects on insect bites, especially mosquito, spider, tick, wasp, bee and scorpion bites. It may be helpful in cases of long lasting discoloration after injuries [15, 16].

In Pakistan, no study is available on clinical trials showing the effect of OSL and LPL on uric acid levels. For this reason main objectives of this study were: to observe effects of OSL

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and LPL on serum uric; and to observe the comparison in the effectiveness of these remedies in male and female patients in local population.

## EXPERIMENTAL

*Chemicals and plants tinctures.* Phosphate buffer, N-ethyl N-(2-hydroxy-3-sulfopropyl)-3-methylaniline (EHSPT), ferrocyanure, amino-4-antipyrine, uricase and peroxidase (Merck KGaA, Germany), uric acid mono (AMP Medizintechnik – Austria), Microlab 300 (Merck Marker, Germany). The mother tinctures of *Ocimum sanctum* Linn and *Ledum palustre* Linn were purchased from BM private limited (ISO Certified 9001:2000, 14001:1996) Ferozpur Road Lahore.

*Method of analysis of uric acid in human blood.* A simple and sensitive colorimetric procedure for uric acid assay in serum or urine was adopted [17], utilizing a 3,5-dichloro-2-hydroxybenzene sulfonic acid/4-aminophenazone chromogenic system in the presence of peroxidase and uricase. The reaction was completed in less than 15 min at room temperature. The red dye formed was measured at 520 nm. The standard curve for the method was linear for uric acid concentrations up to 1500  $\mu\text{mol/L}$ . Average analytical recovery of uric acid in human sera and urine exceeded 99%. Within-run and between-run precision studies showed coefficient of variation (CV) of less than 1.2 and 2.2%, respectively.

*Selection of subjects and ethical approval.* Randomized single blind experimental design was applied to the study. Physical signs and symptoms such as age, sex, previous medication and family history were recorded for each patient participated in the study. 200 patients (120 males + 80 females) suffering from arthritis, hyperuricemia and gouty arthritis were selected for the observations, clinical effects and treatment with mother tincture of OSL and LPL. The patients showing any major illness, renal failure, severe hypertension, diabetes mellitus, glomerulonephritis and allergic reactions were excluded from the study. The ethics of this study were approved by the Pharmacy Research Ethics Committee, The Islamia University of Bahawalpur, Pakistan (Ref No. 24-2012/PREC dated January 23, 2012).

*Drug administration and blood sampling.* The medicines were administered to each patient in the required doses (10 drops TDS for both drugs). Blood samples of all the patients were taken before starting the treatment as zero reading followed by blood sampling after every 15<sup>th</sup> day for 3 months. Single blood sample at each sampling time point was collected from forearm vein into heparinized glass tube. The collected samples were tested for uric acid levels in serum by enzymatic method [17] (uricase method) with using Microlab 300.

*Statistical analysis.* The data was analyzed by using MS-Excel and SPSS [18]. For statistical analysis the t-test was applied on results of the male and female patient's data who were treated with OSL and LPL.

## RESULTS AND DISCUSSION

The medicinal plants are extensively used by the traditional medical practitioners for curing various diseases. The major benefits of medicinal plants in curing various ailments include their safety, effectiveness, inexpensiveness and availability. They are rich in essential oils of therapeutic importance and their secondary metabolites are also potential sources of drugs. Homeopathically, many medicine plants may be selected to treat gouty arthritis and hyperuricaemia and the correct remedy will depend on the patient's presentation of the disease.

The effects of OSL and LPL on serum uric acid concentration of males and females over three-month period are presented in Figure 1-4.

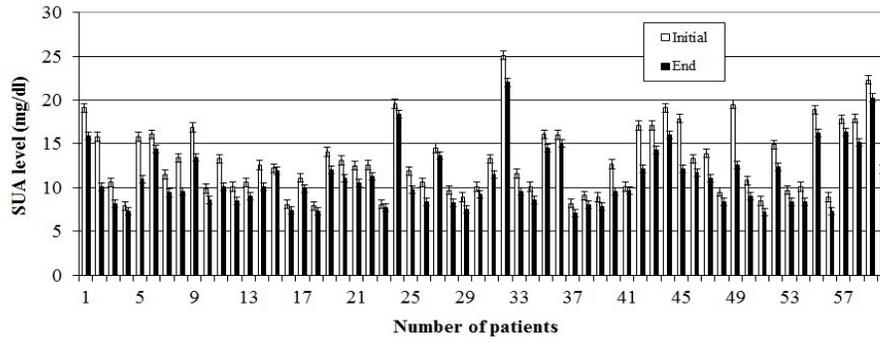


Figure 1. Effect of *Ledum palustre* on males SUA level before and after treatment.

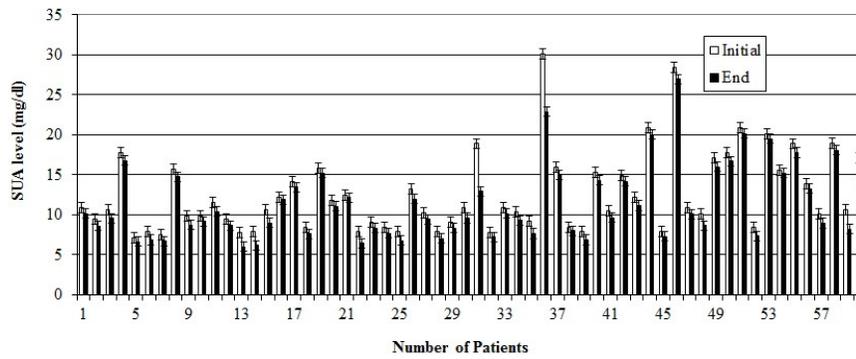


Figure 2. Effect of *Ocimum sanctum* on males SUA level before and after treatment.

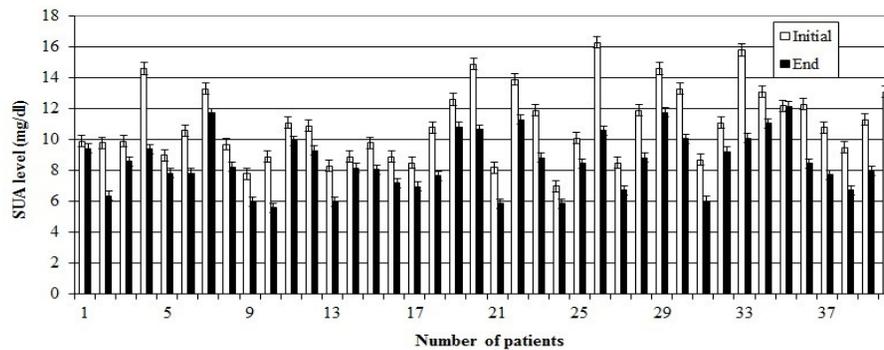


Figure 3. Effect of *Ledum palustre* on females SUA level before and after treatment.

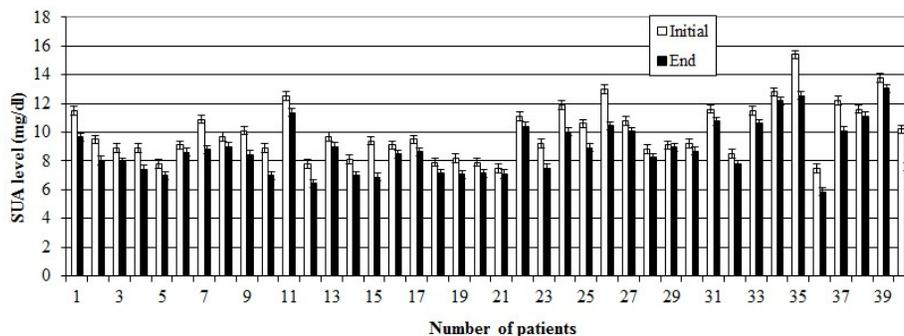


Figure 4. Effect of *Ocimum sanctum* on females SUA level before and after treatment.

*Serum uric acid level in male patients.* In male patients the  $p$ -value (EVA) was found to be 0.003 and the range of (95%) CID was 2.9 to 0.6. From  $p < 0.05$  we can conclude that both OSL and LPL have significant lowering effect on SUA level. The mean value of SUA lowering was 2.6 and 4.3 mg/dL for OSL and LPL, respectively (Table 1). These results clearly demonstrate that LPL is better choice for reducing uric acid level in gout patients. However, greater value of standard deviation (5.2) for LPL shows slightly greater fluctuations in reducing SUA compared to OSL.

Table 1. Mean uric acid level (mg/dl) in patients before and after treatment.

| Plants | Gender  | Sample size | Mean uric acid level (mg/dL) (Mean $\pm$ SD) |                |
|--------|---------|-------------|--|----------------|
|        |         |             | Initial                                      | After 3 months |
| OSL    | Males   | 60          | 12.6 $\pm$ 4.1                               | 10 $\pm$ 2.7   |
| LPL    | Males   | 60          | 13.2 $\pm$ 3.5                               | 8.9 $\pm$ 3.9  |
| OSL    | Females | 40          | 10.0 $\pm$ 0.5                               | 7.5 $\pm$ 0.9  |
| LPL    | Females | 40          | 11.0 $\pm$ 2.2                               | 6.4 $\pm$ 1.3  |

*Serum uric acid level in female patients.* After applying t-test to SUA levels to female data, the  $p$ -value (EVA) was found to be 0.001 and the range of (95%) CID was 3.4 to 0.9. As  $p < 0.05$ , therefore we can conclude both medicinal plants have significantly lowered the level of uric acid. In females the mean SUA reduction followed by three months course was 2.5 and 4.6 mg/dL for OSL and LPL, respectively (Table 1). Therefore, it can be concluded that both drugs have huge effects on lowering SUA in gouty arthritis and hyperuricaemia [19-22]. OSL may be preferred in patients where SUA elevation is modest whereas LPL will be more productive choice in severe elevation of serum uric acid level. However standard deviation for LPL was found to be 2.5 that is greater than 1 for OSL. This showed that there might be fluctuations in the effects of LPL.

The presence of phenolics and tannins in LPL is responsible for its efficacy in the treatment of gout. Whereas eugenol (1-hydroxy-2-methoxy-4-allylbenzene), the active constituent present in OSL has been found to be responsible for its therapeutic potentials. The linolenic acid and fixed oil in OSL exhibit significant anti-inflammatory activity against prostaglandin-E<sub>2</sub>, leukotriene and arachidonic acid induced oedema due to their ability to inhibit both the cyclooxygenase and lipoxygenase pathways of arachidonic acid metabolism [23].

### CONCLUSION

There is significant difference in the effect of *Ledum palustre* Linn and *Ocimum sanctum* Linn treatments for the reduction of serum uric acid level but *Ledum palustre* Linn has better efficacy than *Ocimum sanctum* Linn in both males and females. *Ocimum sanctum* Linn may be preferred in clinical situations where serum uric acid elevation is mild to moderate. Otherwise *Ledum palustre* Linn being more efficacious should be preferred in elevated serum uric acid level.

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