

UGC-MAJOR RESEARCH PROJECT

F. No. 42-696/2013 (SR), Date 25 March 2013

Title of Project

**Phytochemical Investigation and Fracture Healing Activity
Studies of Some Medicinal Plants of Chhattisgarh State for
the Treatment of Bone Fracture Healing**

Dr. Vinod D. Rangari

Principle investigator

UGC-MRP Project

Institute of Pharmaceutical Sciences
Guru Ghasidas Vishwavidyalaya, Bilaspur

**S.L.T. INSTITUTE OF PHARMACEUTICAL SCIENCES
GURU GHASIDAS VISHWAVIDYALAYA (A CENTRAL UNIVERSITY)
BILASPUR (C.G.)**

UNIVERSITY GRANTS COMMISSION
BAHADUR SHAH ZAFAR MARG
NEW DELHI – 110 002

PROFORMA FOR SUBMISSION OF INFORMATION AT THE TIME OF SENDING THE
FINAL REPORT OF THE WORK DONE ON THE PROJECT

1. Title of the Project: **Phytochemical Investigation and Fracture Healing Activity Studies of Some Medicinal Plants of Chhattisgarh State for the Treatment of Bone Fracture Healing.**
2. NAME AND ADDRESS OF THE PRINCIPAL INVESTIGATOR: **Prof. Vinod D. Rangari, Professor and Head, S.L.T. Institute of Pharmaceutical Sciences, Guru Ghasidas University, Bilaspur.**
3. NAME AND ADDRESS OF THE INSTITUTION: **S.L.T. Institute of Pharmaceutical Sciences, Guru Ghasidas University, Bilaspur (C.G.).**
4. UGC APPROVAL LETTER NO. AND DATE: **F. No. 42-696/2013 (SR), dated 25 March, 2013**
5. DATE OF IMPLEMENTATION: **25 March, 2013**
6. TENURE OF THE PROJECT: **Three years extended by on year**
7. TOTAL GRANT ALLOCATED: **Rs. 12,85,800/-**
8. TOTAL GRANT RECEIVED: **Rs. 11,59,800/-**
9. FINAL EXPENDITURE: **Rs. 10,24,072/-**
10. TITLE OF THE PROJECT: **Phytochemical Investigation and Fracture Healing Activity Studies of Some Medicinal Plants of Chhattisgarh State for the Treatment of Bone Fracture Healing.**
11. OBJECTIVES OF THE PROJECT:
Identification, collection, phytochemical investigation and fracture healing activity studies of some medicinal plants of Chhattisgarh state for the treatment of bone fracture healing.
12. WHETHER OBJECTIVES WERE ACHIEVED
Extensive medicinal plant survey of the tribal area, ethnomedical survey has been extensively carried out. The plant selected were identified from the office of Botanical Survey of India, Allhabad. Selected plants were subjected to extraction and the extracts and their fractions were studied for phytochemical constituents and fracture healing activity. The objectives of the project were achieved.
13. ACHIEVEMENTS FROM THE PROJECT:
One medicinal plant has been thoroughly investigated for the fracture healing activity. It has shown a very good activity and has shown the great potential drug for the treatment of fractures.

14. SUMMARY OF THE FINDINGS (IN 500 WORDS)

An exhaustive literature review has been done on bone fracture healing which includes important topics such as mechanism of bone fracture healing and phases of bone healing, 70 medicinal plants were reviewed for their current status of herbal medicine and its role in the treatment as a fracture healing agents. 41 selected medicinal plants were identified from the office of the botanical Survey of India, Allahabad. Review clearly indicated that many medicinal plants with specific ethnomedical history awaits the attention of the researchers. The following medicinal plants with the potential of the fracture healing activity were selected, identified for their scientific names and after their collection they were subjected to phytochemical and pharmacological studies.

The medicinal plants selected for study were namely *Vitis vitifolia*- VVR (Root)- VVR (Root), *Haldina cordifolia* Roxb.- HCB (Bark), *Dillenia indica*- DIS & DIL (stems and leaves) and *Vitis quadrangularis*- CQS (Stem) as the standard for comparison.

Extraction of the above selected medicinal plants has been done using accelerated solvent extraction (with pet. ether), hot soxhlet extraction with petroleum ether, ethanol etc and cold maceration with hydro-alcoholic mixtures of the solvent.

Simultaneously, various other activities such as antioxidant activity, Hydrogen peroxide scavenging activity, flavonoid content study were performed. The extracts and the fractions were subjected to the column and flash chromatographic fractionation and the fractions were further analysed by LC-MS study.

Bone fracture healing activity was performed by using the Drill-hole injury model in femur bone of rats. The administration of the extracts coded as HCB-A200, DIS-W, VVR-W250 and VVR-G250 groups at different dose level to fractured animals show a significant modification of bone calcium compared to fractured rats. However, the VVR-W500, VVR-A200 and VVR-G500 extracts induced a significant increase in bone calcium concentrations as compared to the normal control. Treatment of fractured animal with the HCB-A100, CQS-W, CQS-A, VVR-A100, VVR-T250 and VVR-T500 did not significantly alter the serum phosphorus concentration as compared to the fractured control. However, VVR-W500, VVR-A200 and VVR-GH500 extract group led

to a marked increase in phosphorus concentration as compared to the normal control. Animals presenting bone injury showed a non-significant increase in serum alkaline phosphatase activity as compared to the normal control. Treatment of fractured rats with VVR-W500, VVR-A200 and VVR-G500, led to a significant in AP activity as compared to the fracture control.

These results suggest that, the groups of VVR-W500, VVR-A200 and VVR-G500 possess osteoblastic effects responsible for enhancing bone repair process.

Administration of the extract of HCB-A200, DIS-W, VVR-W250 and VVR-G250 groups a significant increase the value of hematological parameters as compared to the normal control and fractured control respectively. The plant extract of HCB-A200, DIS-W, VVR-W250 and VVR-GH250 was led to a increase all hematological parameters with respect to the fractured control.

One medicinal plant namely *Vitis vitifolia*- VVR (Root) has been thoroughly investigated for the fracture healing activity. It has shown a very good activity and has shown the great potential drug for the treatment of fractures.

The project has been completed successfully with fruitful results. Among the several plants investigated, roots of *Vitis vitifolia* has been shown to be very effective in healing the fractures.

The medicinal plant explored for the bone fracture healing activity can be used as a potential drug for the treatment of bone fractures in human. The filing of the patent application is in progress.

15. CONTRIBUTION TO THE SOCIETY:

The medicinal plant explored for the bone fracture healing activity can be used as a potential drug for the treatment of bone fractures in human. The filing of the patent application is in progress.

16. WHETHER ANY PH.D. ENROLLED / PRODUCED OUT OF THE PROJECT: Ph.D. student Registered.

17. NO. OF PUBLICATIONS OUT OF THE PROJECT:

Papers not communicated due to the planning for the patent filing.

(PRINCIPAL INVESTIGATOR)

Principal Investigator
UGC-MRP Project
Institute of Pharm Sciences
Guru Ghasidas Vishwavidyalaya
Bilaspur (Chhattisgarh)

(REGISTRAR/PRINCIPAL)
गुरु गहासीदास विश्वविद्यालय, बिलासपुर (छ.ग.)
Guru Ghasidas Vishwavidyalaya,
Bilaspur (C.G.)

Final Report Assessment / Evaluation Certificate
(Two Members Expert Committee Not Belonging to the Institute of
Principal Investigator)
 (to be submitted with the final report)

It is certified that the final report of Major Research Project entitled "Phytochemical Investigation and Fracture healing activity studies of some medicinal plants of Chhattisgarh state for the treatment of Bone fractures" by Prof. Vinod D. Rangari, Department of Pharmaceutical Sciences, Guru Ghasidas Vishwavidyalaya, Bilaspur (CG), has been assessed by the committee consisting the following members for final submission of the report to the UGC, New Delhi under the scheme of Major Research Project.

Comments/Suggestions of the Expert Committee:-

The project has been completed successfully with fruitful results. Several plants have been investigated and evaluated for fracture healing activity. Roots of one of the plant shortlisted and scientifically investigated has been shown to be very effective in healing the fracture. Principal investigator is in a process of filing a patent.

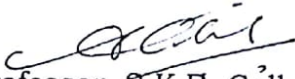
Name & Signatures of Experts with Date:-

Name of Expert

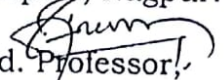
University/College name

Signature with Date

1. Prof. A.T. Patil



 Professor, S.K.B. College of Pharmacy
 Kamptee, Nagpur.

2. Dr M. R. Tajne


 Retd. Professor,
 RTM Nagpur University, Nagpur.

It is certified that the final report has been uploaded on UGC-MRP portal on

It is also certified that final report, Executive summary of the report, Research documents, monograph academic papers provided under Major Research Project have been posted on the website of the University/College.


HEAD
 S.L.T. Institute of Pharm. Sciences
 Guru Ghasidas Vishwavidyalaya
 Bilaspur (C.G.)


 (Registrar/Principal)
 Registrar (Acting)
 Guru Ghasidas Vishwavidyalaya
 (A Central University)
 Bilaspur (C.G.) 495 009 India