J. Mountain Res. P-ISSN: 0974-3030, E-ISSN: 2582-5011 DOI:https://doi.org/10.51220/jmr.v17i2.20
Vol. 17(2), (2022), 185-188

Uses of *Schizandra Elongata* and *Viscum Articulatum* for Bone Healing

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Received: 28.06.2022; Revised: 08.12.2022; Accepted: 10.12.2022

Abstract: *Schizandra elongata* Hook. f. & Thomson and *Viscum articulatum* Burm were the medicinal plants of the Sikkim Himalaya having tremendous medicinal potentials. In this experiment, the pulverized stem part of former and the whole plant of latter were mixed in 4: 1 ratio. The mixture was added in 1000 ml distilled water which is then reduced to the volume of ½ of its original volume. The extract was sealed in a conical flask and stored at -20 degree for future use. The experiment was conducted on dog weighing 7 Kg. having broken femur. The nutraceutical was administered to the dog orally for the quick recovery. The oral administration of the extract of 10 ml per dose twice in a day for forty five days was administered.The result supports that the combination of *Schizandra elongata* Hook. f. & Thomson and *Viscum articulatum* Burm. f is the effective medication for the bone healing in animal.Thus, the new report of animal's bone healing using *Schizandra elongata* Hook. f. & Thomson and *Viscum articulatum* Burm. f. is presented alongwith the elemental composition of Viscum *Articulatum* Burm. f.

Keywords: Ethonomedicine • *Schizandra elongata* • Sikkim Biodiversity • Sikkim Himalaya • *Viscum articulatum*

Introduction

Several plant materials are used for the bone healing. There are several reports of the bone healing plants which are in use as ethnomedicine (Upadhya *et al*., 2012; Balasooriya and Karunarathna, 2016; Singh, 2017; Pradhan, 2020). Likewise, *Schizandra elongata* Hook. f. & Thomson found as bone healing plant having potential to increase the mineral density of bone. The use of the *Viscum articulatum* Burm. f as the bone healing medicinal plant, is already reported in earlier publications (Patel and Singh, 2017; Zhang, 2021). Another study reported that the use of Schizandra chinensis (Turcz.) K. Koch increases bone's mineral density with the serum osteocalcin level. In addition, its extract reduced the increased growth plate of the epiphyseal plate in femur. Even pores within bone marrow cells decreases filling the lateral and medial epicondyle along with increase of serum estradiol concentration (Kim *et al.*, 2014). Thus, the paper deals to present the bone healing potencies of *Viscum articulatum* Burm. f *and Schizandra elongata* Hook. f. & Thomson, which are found growing in the Sikkim Himalaya.

Materials and Methods

The plant materials *Schizandra elongata* Hook. f. & Thomson and *Viscum articulatum* Burm. f was collected from the sub-temperate and temperate forests. The stem of *Schizandra elongata* Hook. f. & Thomson (200 gm) were cut into small pieces of less than 0.5 cm and pulverized the whole plants of *Viscum articulatum* Burm. f (50 gm, dried sample). The mixture of cut

stems of *Schizandra elongata* and *Viscum articulatum* powder was added in 1000ml volume of distilled water, subsequently the volume of the extract reduced into ½ of its original volume keeping at the constant temperature at 100° C. The extract was decant leaving the residues. The extract was sealed in a conical flask and stored at -20 degree for future use.

Animal: The experiment was conducted on Dog weighing 7 Kg. having broken femur. The nutraceutical was administered to the dog orally for the quick recovery.

Dosage: Oral administration of the extract of 10 ml per dose twice in a day for forty-five days was administered.

Additional dosages: For the pain relief, the following medicines were administered for three days, namely, Meloxicam (1500 ppm) 1 ml orally, Pramodol (50mg) 1 tablet per day, Magcil syrup 0.8 ml orally. All these were prescribed dosages as per the recommendation of the authorized Veterinarian of SARAH, Gangtok.

The X-ray of the femur bone of hind limbs of the canine was taken. The broken femur bone placed in position by the supports of plates so that the movement of the bone is restricted. The dog kept in well ventilated kennel for forty-five days maintaining hygiene with one attendant to restrict its movement.

Additionally, the plant tissues digested and examined with inductively coupled plasma emission spectroscopy (Mills and Jones 1996). The tissues (300 mg) were digested and examined in inductively coupled plasma emission spectroscopy.

Result and Discussion

The plant material, *Viscum articulatum* Burm. f was procured from the temperate forest of Tendong having GPS coordinates 27^{O} 21' N 88^{O} 37' E, and the plant material, *Schizandra elongata*, was collected from the Rai Goan, Sokaythang, Gangtok having GPS cooridinates 27^{O} 34' N 88^{O} 60' E. It was observed that the extract of *Schizandra elongata* Hook. f. & Thomson and *Viscum articulatum* Burm. f was highly effective in healing the bone of dog quickly. This was observed when the oral administration of the extract of 10 ml per dose twice in a day for forty-five days was administered.

Noteworthy point is that the animal (canine) which was unable to move due to completely broken femur bone started to walk within two month and eighteen days. It reveals that the plants extract contains the potential to heal the broken bones of animal. During the study, the broken femur bone of the canine was re-examined on 30^{th} day using X-ray film which depicted that the bone heals perfectly. However, the affected portion of canine was restricted to move as a precautionary measure so that no further damage of hind leg's tissues. It is exciting to note that the canine could run as normal as other dogs after 78^{th} day. This result supports that the combination of *Schizandra elongata* Hook. f. & Thomson and *Viscum articulatum* Burm. f is the effective medication for the bone healing in animal. The aerial plant *Viscum articulatum* Burm. was chemically analyzed as a case study and presented (Table 1).

Table 1: Tabulated concentration of *Viscum articulatum* Burm. (derived from pulverized powdered weighing 300 mg).

Elements	Tune mode	Conc.	Units	RSD (%)	Rep
Li	No Gas	158.465	ng/L	1.75	3
Be	No Gas	16.207	ng/L	5.89	3
Na	He	60364.466	ng/L	21.68	3
Mg	He	2844523.576	ng/L	12.09	3
Al	No Gas	165635.364	ng/L	0.71	3
K	He	277703385.484	ng/L	11.84	3
Ca^{43}	He	628653.498	ng/L	12.99	3
Ca^{44}	He	1206720.315	ng/L	12.68	3
V	He	152.673	ng/L	15.32	3
Cr	He	175.367	ng/L	24.02	3
Mn	He	179688.912	ng/L	13.34	3
Fe^{56}	He	117299.513	ng/L	13.70	3
Fe^{57}	He	118006.832	ng/L	14.25	3
Co	He	62.910	ng/L	15.71	3
Ni	He	3390.925	ng/L	14.60	3
Cu^{63}	He	15141.498	ng/L	14.12	3
Cu^{65}	He	15213.007	ng/L	13.91	3
Zn	He	15979.449	ng/L	13.32	3
Ga	No Gas	2373.469	ng/L	1.51	3
As	He	20.743	ng/L	22.15	3
Rb	No Gas	108960.364	ng/L	0.32	3
Sr	No Gas	24601.224	ng/L	0.44	3
Ag	No Gas	8.840	ng/L	5.03	3
Cd	No Gas	23.043	ng/L	9.15	3
Cs	No Gas	1051.522	ng/L	0.76	3
Ba	No Gas	29005.823	ng/L	0.71	3
Ti	No Gas	99.253	ng/L	0.89	3
Pb^{206}	No Gas	297.556	ng/L	3.86	3
Pb^{207}	No Gas	310.520	ng/L	1.93	3
Pb^{208}	No Gas	304.369	ng/L	1.11	3
U	No Gas	5.813	ng/L	2.84	3

The result depicted that the plant, *Viscum articulatum* Burm., is the incredible sources of nutrients having natural sources of elements. Such reason may add values for the quick response of the plants for bone healing.

This is a new report of animal's bone healing using *Schizandra elongata* Hook. f. & Thomson and *Viscum articulatum* Burm. f., however, it warrants further research for details efficacies.

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