



## **A Promising Herbal topical formulation ‘PPP’ for treating Bedsores.**

**Thomas M. Walter<sup>3\*</sup>, R. Sweety Nirmala<sup>4</sup>, S. Merish<sup>1</sup>, M. Tamizhamuthu<sup>2</sup>**

<sup>1-2</sup> *Final Professional BSMS Students, Govt. Siddha Medical College, Palayamkottai, Tamilnadu. [merish@doctor.com](mailto:merish@doctor.com)*

<sup>3</sup> *Lecturer, Pharmacology department, Govt. Siddha Medical College, Palayamkottai, Tamilnadu. [thomaswalter@doctor.com](mailto:thomaswalter@doctor.com)*

<sup>4</sup> *CEO, Bethesda Siddha Research Center, Tirunelveli, Tamilnadu.*

*[bethesdacam@gmail.com](mailto:bethesdacam@gmail.com)*

*\*For correspondence: [dr.thomaswalter@gmail.com](mailto:dr.thomaswalter@gmail.com)*

### **ABSTRACT**

The active role of siddha medicine in combating chronic diseases is being widely recognized nowadays. In that way, immobile patients who have bedsores carry a high incidence of morbidity and even mortality. A decubitus ulcer, also called a pressure sore or bed sore, is an open wound on the skin. Pressure sores often occur on the skin covering bony areas. The most common places for a pressure sore to appear include hips, back, ankles, and buttocks. A considerable number of nearly 1300 new cases of decubitus ulcers are occurring on a daily basis globally. This has resulted in deaths amounting up to 34,320 during 2000-2002 in US alone. While going through the classic Siddha literatures, the authors of this paper found out a very promising remedy *Padukkai Pun Podi* (PPP) and decided to carryout Anti-microbial sensitivity testing to prove its efficacy in treating decubitus ulcers. Disc diffusion method was followed with Mueller Hinton Agar as the culture media. The organisms tested were *Pseudomonas auroginosa*, *Staphylococcus aureus*, *Streptococcus mutans*, *Klebsiella pneumonia*, *E.coli*, The test results show that the drug PPP is sensitive against *Streptococcus mutans* and *E.coli*. The clinical significance of the Anti-microbial study results are discussed in detail.

**Keywords:** *Decubitus ulcer, Bedsore, Pressure ulcer, Padukkai Pun Podi, Herbal dusting powder.*

## **1. INTRODUCTION**

The plant kingdom harbors an inexhaustible source of active ingredients invaluable in the treatment of many intractable challenging and chronic diseases. Infectious diseases are the leading cause of death world-wide. Various studies have identified compounds from herbal plants that are effective antibiotics (Basile et al., 2000)[1]. Many infectious diseases have been known to be treated with herbal remedies throughout the history of mankind. The herbal remedies of traditional healing systems around the world can be utilized as an important source for the discovery of new antibiotics (Okpekon et al., 2004); some traditional remedies have already produced compounds that are effective against clinically important strains of bacteria (Kone et al, 2004)[8]. Here the Authors comes across the drug called ‘*Padukkai pun podi*’, which is clinically effective for the Padukkai pun (*Decubitus ulcer*) referenced from age old text[2].

A Decubitus ulcer, also called a pressure sore or bed sore, is an open wound on the skin. Pressure sores often occur on the skin covering bony areas. The most common places for a pressure sore to appear include hips, back, ankles, and buttocks. National Pressure Ulcer Advisory Panel defines a pressure ulcer as an area of unrelieved pressure over a defined area, usually over a bony prominence, resulting in ischemia, cell death, and tissue necrosis.

The World Health Organization (WHO) uses the incidence and prevalence of pressure ulcers as an indicator of the quality of patient care services and the use of efficient prevention measures and its treatments has become very important[4].

### ***1.1. Aetiology***

Pressure ulcers are caused by unrelieved pressure, applied with great force over a short period (or with less force over a longer period), that disrupts blood supply to the capillary network, impeding blood flow and depriving tissues of oxygen and nutrients.

This external pressure must be greater than arterial capillary pressure to lead to inflow impairment and resultant local ischemia and tissue damage[5].

## ***1.2. Pressure Ulcer Stages defined by NPUAP-EPUAP***

### ***1.2.1. Stage I: Non-blanchable erythema***

Intact skin with non-blanchable redness of a localized area usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area. The area may be painful, firm, soft, warmer or cooler as compared to adjacent tissue. Category I may be difficult to detect in individuals with dark skin tones. May indicate “at risk” persons.

### ***1.2.2. Stage II: Partial thickness***

Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough. May also present as an intact or open/ruptured serum-filled or sero-sanguinous filled blister. Presents as a shiny or dry shallow ulcer without slough or bruising. This category should not be used to describe skin tears, tape burns, incontinence associated dermatitis, maceration or excoriation. Bruising indicates deep tissue injury.

### ***1.2.3. Stage III: Full thickness skin loss***

Subcutaneous fat may be visible but bone, tendon or muscle are not exposed. Slough may be present but does not obscure the depth of tissue loss. May include undermining and tunneling. The depth of a Category/Stage III pressure ulcer varies by anatomical location. The bridge of the nose, ear, occipital and malleolus do not have (adipose) subcutaneous tissue and Stage III ulcers can be shallow. In contrast, areas of significant adiposity can develop extremely deep Stage III pressure ulcers. Bone/tendon is not visible or directly palpable.

### ***1.2.4. Stage IV: Full thickness tissue loss***

Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present. Often includes undermining and tunneling. The depth of a Category/Stage IV pressure ulcer varies by anatomical location. The bridge of the nose, ear, occiput and malleolus do not have (adipose) subcutaneous tissue and these ulcers can be shallow. Category/Stage IV ulcers can extend into muscle and/or supporting structures

(e.g., fascia, tendon or joint capsule) making osteomyelitis or osteitis likely to occur. Exposed bone/muscle is visible or directly palpable.

The National Pressure Ulcer Advisory Panel (NPUAP) estimates that approximately 60,000 people in the US die annually due to complications generated by pressure ulcers and associated expenses are estimated at between \$2,000 and \$25,000 per individual per year[9][10].

## **2. MATERIALS AND METHODS**

The formula for this preparation ‘*Padukkai pun podi*’ was selected from the text ‘*Gunapadam Mooligai Vaguppu* (Materia medica – Vegetable section)[3]. On the basis of the formula, a Standard Operative Procedure (S.O.P) was prepared. The raw drugs were collected from Tirunelveli district, and authenticated by the Staffs of Gunapadam Department. After that the raw drugs were subject to proper purification to remove all the impurities. The purified ingredients are well grinded till getting the paste form[7]. Then allow to dry it in sunshade for two day and this sample was subjected to Anti-bacterial studies.

### ***2.1. Antimicrobial Activity***

#### ***2.1.1. Agar- Well Diffusion Method***

#### ***2.1.2. Principle***

The antimicrobials present in the plant extract are allowed to diffuse out into the medium and interact in a plate freshly seeded with the test organisms. The resulting zones of inhibition will be uniformly circular as there will be a confluent lawn of growth. The diameter of zone of inhibition can be measured in centimeters[6].

#### ***2.1.3. Preparation of Extract***

The plant parts were dried in shade, finely powdered and subjected to defatting using 80% Petroleum ether and the filtrate was dried and subjected to soxhilation. Briefly 50grams of plant material was filled on extractor of a soxhlet apparatus and subjected to soxhilation of 5-7 cycles at 75oC. The extract was further condensed using rotatory evaporator and used for further studies.

## **2.2. Reagents**

### **2.2.1. Muller Hinton Agar Medium (1 L)**

The medium was prepared by dissolving 33.9 g of the commercially available Muller Hinton Agar Medium (HiMedia) in 1000ml of distilled water. The dissolved medium was autoclaved at 15 lbs pressure at 121°C for 15 minutes. The autoclaved medium was mixed well and poured onto 100mm petriplates (25-30ml/plate) while still molten.

### **2.2.2. Nutrient broth (1L)**

One litre of nutrient broth was prepared by dissolving 13 g of commercially available nutrient medium (HiMedia) in 1000ml distilled water and boiled to dissolve the medium completely. The medium was dispensed as desired and sterilized by autoclaving at 15 lbs pressure (121°C) for 15 minutes.

### **2.2.3. Gentamycin** (standard antibacterial agent, concentration: 40mg / ml)

## **2.3. Procedure**

Petriplates containing 20ml Muller Hinton medium were seeded with 24hr culture of bacterial strains such as *E coli*, *Pseudomonas aeruginosa*, *Bacillus subtilis*, *Staphylococcus aureus* and *Klebsiella pneumoniae*. Wells of approximately 10mm was bored using a well cutter and 25 µl, 50 µl and 100 µl of sample was added to the well. The plates were then incubated at 37°C for 24 hours. The antibacterial activity was assayed by measuring the diameter of the inhibition zone formed around the well (NCCLS, 1993). Gentamycin was used as a positive control.

### 3. RESULTS AND DISCUSSION

#### 3.1. Organism: *Streptococcus mutans*

Sample	Concentration (µg)	Zone of inhibition (cm)
Gentamycin		3.6
MORUS		
100	25	Nil
500	50	Nil
1000	100	1.2

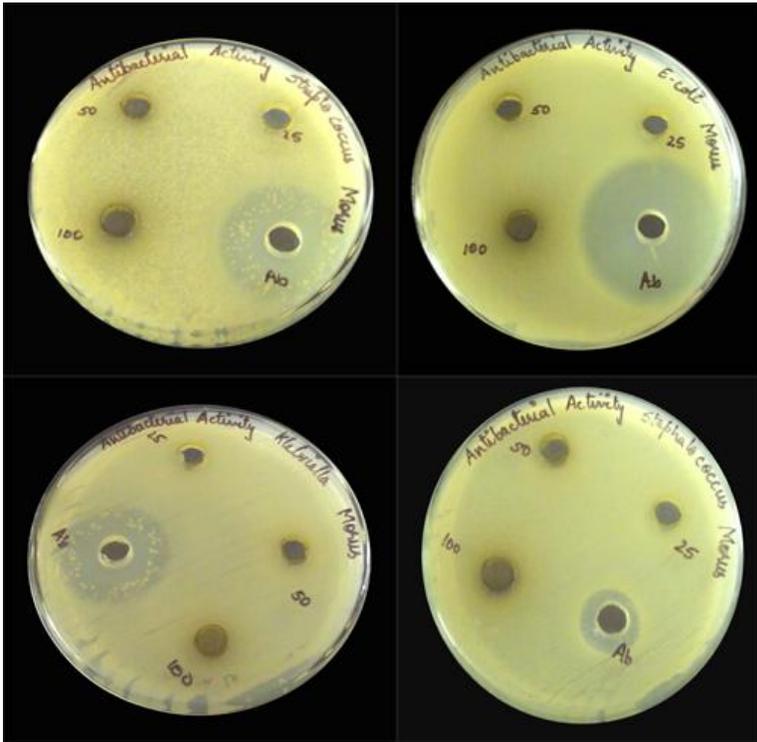
#### 3.2. Organism: *E coli*

Sample	Concentration (µg)	Zone of inhibition (cm)
Gentamycin		3.5
MORUS		
100	25	Nil
500	50	Nil
1000	100	1.1

#### 3.3. Other Organisms tested

Organism	Zone of inhibition (cm)
<i>Pseudomonas auroginosa</i>	Nil
<i>Staphylococcus aureus</i>	
<i>Klebsiella pneumonia</i>	

**Figure 3 .Zone of Inhibition of PPP**



Gentamycin at a concentration of 40 mg/ml was used as the Standard Anti-bacterial agent. The test drug, *Padukkai pun podi* was sensitive to *Streptococcus mutans* and *E.Coli* in higher concentrations i.e., 100 µg. The drug is sensitive against micro-organisms and gives preventive and curative effects against the infection caused by these micro-organisms in decubitus ulcer.

#### **4. CONCLUSION**

The antibiotic drugs are the greatest contribution of 20th century to the therapeutics. Their importance is magnified in developing countries where infective diseases are predominant. Plant-based antimicrobials have enormous therapeutic potential, and they are sufficiently proved by the clinical applications. Some of the drugs gave triplets of unexpected results in clinical applications. But while viewing through the scientific way, may be not significant.

#### **5. CONFLICT OF INTEREST**

The authors declare that they have no conflicts of interest.

## 6. REFERENCE

1. Nadkarani KM (2000). Indian Materia Medica, 3<sup>rd</sup> Edition, Vol: I, Published by Popular Prakash, Mumbai, India.
2. Kuppusamy Muthaliar KN, Uthamarayan KS (2009). Classical text '*Siddha Vaithya Thirattu*', 3rd edition, published by Directorate of Indian Medicine and Homeopathy, Chennai, India.
3. Murugesu Muthaliar (1988). Siddha Materia Medica (Vegetable section), Vol. I, Fourth edition, Publisher, Tamilnadu Siddha Medical Council, Chennai.
4. Bluestein D, Javaheri A (2008). Pressure ulcers: prevention, evaluation, and management. *American Family Physician*, 78(10), 1186-1194.
5. Whittington K, Patrick M, Roberts JL (2000). A national study of pressure ulcer prevalence and incidence in acute care hospitals. *Journal of Wound Ostomy & Continence Nursing*; 27(4), 209-215.
6. National Committee for Clinical Laboratory Standards. (1993). Performance Standards for Antimicrobial Disk Susceptibility Tests—5<sup>th</sup> Edition: Approved Standard M2-A5. NCCLS, Villanova, PA.
7. Sambasivam Pillai TV(1991), Dictionary Based on Indian Medical science, 2<sup>nd</sup> edition, Vol. 2, published by Directorate of Indian Medicine and Homeopathy, Chennai, India.
8. Gurib-Fakim A (2006). Medicinal plants: Tradition of yesterday and drugs of tomorrow, Review article. *Molecular Aspects of Medicine*, 27(1), 93.
9. JoAnn Maklebust, Mary Sieggreen(2010), Pressure Ulcers: Guidelines for Prevention and Management 3<sup>rd</sup> Edition.
10. Karen S. Clay (2008). Evidence-Based Pressure Ulcer Prevention, HCPro Publishers.