

## Antimicrobial Activity of Shilajit

Aliya Hayat<sup>1\*</sup>, Fatima Sher Ali<sup>1</sup>

<sup>1</sup>Department of Microbiology, Jinnah University for Women, Karachi – 74600.

### ABSTRACT

Shilajit is a pale-brown to blackish-brown exudation of variable consistency, exuding from layers of rocks in the mountainous ranges of this world, especially Himalayan and Hindu Kush ranges of Indian subcontinent. The aim of study was to determine the antimicrobial activity of shilajit against different microorganisms. The diluted sample (80%) was used to find the activity which was assessed by agar well diffusion method. The microbial inhibition was more effective. Among all species, *Candida albicans* was found to be highly susceptible while *Acinetobacter* was highly resistant. Other bacterial species were also susceptible to this material. Shilajit not only helps to overcome physiological activities of human, but can also protect the body by inhibiting the pathogenic organism of respiratory and gastrointestinal tract. This indicates that shilajit contain antimicrobial compounds to control pathogens.

**Keywords:** Shilajit, agar well diffusion, susceptible

### INTRODUCTION

Shilajit is also known as salajit, shilajatu, mumie or mummiyo (Cornejo *et al.*, 2011) means "winner of rock" (Mukherjee, 1992) or "sweat of the rock" (Tirtha, 1998). It has a unique composition as a phytocomplex. It is very rich in fulvic acid, elagic acid, some fatty acids, resins, latex, gums, albumins, triterpenes, sterols, aromatic carboxylic acids, 3,4-benzocumarins, amino acids, polyphenols and phenolic lipids (Chopra *et al.*, 1958). There are four different varieties of shilajit which have been described in Charka Samhita, namely Savrana, Rajat, Tamra and Lauha shilajit (Agarwal *et al.*, 2007). It is a compact mass of vegetable organic matter composed of a dark-red gummy matrix interspersed with vegetable fibers, sand and earthy matter (Chopra *et al.*, 1958). Traditionally, Shilajit was believed to be a general restorative tonic, meaning it helps fight a range of illness and is also taken to maintain good health. Variety of benefits was reported that is against common colds, ulcers, cancers and act as antiviral agent. It has great affinity for human viruses.

\*Corresponding author: aliyaap@yahoo.com

Literature about the antimicrobial activity of shilajit is lacking. Therefore, present study was conducted to identify the antimicrobial potential of shilajit (black shilajit/lauha shilajit) against Gram positive, Gram negative and yeast species. It was found that this black rock has distinct antifungal activity than any other bacteria.

### MATERIALS AND METHODS

Shilajit sample was purchased from a local market of Gilgit, Pakistan. The processed sample was diluted in sterile distilled water to make 80% solution. The sample was filtered through Whatman filter paper and filtrate was stored under refrigeration condition until use.

Twenty five pure cultures of bacterial and fungal species were collected from culture bank of Department of Microbiology, Jinnah University for Women. Among them 13 were Gram negative, 8 were Gram + and 4 were *Candida* species. Microbial susceptibility was determined by agar well diffusion method (Betoni *et al.*, 2006) using 5mm borer. It was

carried out for *E. coli*, *Pseudomonas florescense*, *Klebsiella oxytoca*, *Citrobacter*, *Salmonella typhi*, *Salmonella para typhi A*, *Acinetobacter*, *Shigella dysenteriae*, *Staphylococcus aureus*, *Staphylococcus saprophyticus*, *Streptococcus pneumoniae*, *Bacillus subtilis* and *Candida albicans*. Overnight cultures (37°C) in Brain Heart Infusion (BHI) were adjusted to 0.5 MacFarland's standard and inoculated on MHA.

## RESULTS AND DISCUSSION

Table I. Zone of inhibition of different isolates.

	No of isolates	Zone of Inhibition (mm)
<b>Gram positive</b>		
<i>S. aureus</i>	02	17
<i>S.saprophyticus</i>	01	15
<i>S.pneumoniae</i>	01	20
<i>B.subtilis</i>	01	20
<b>Gram negative</b>		
<i>Salmonella paratyphi A</i>	01	17
<i>Shigella dysenteriae</i>	01	17
<i>E.coli</i>	01	16
<i>Klebsiella oxytoca</i>	01	15
<i>P.florescense</i>	02	15
<i>Salmonella typhi</i>	01	14
<i>Citrobacter</i>	01	13
<i>Acinetobacter</i>	01	R
<b>Yeast</b>		
<i>Candida albicans</i>	02	50

Shilajit is an oriental medicine, from steep rocks of different formations found throughout the whole world (Phillips, 1997). It is said to be very effective against chronic bronchitis and asthma, digestive troubles, nervous disease, leprosy, parasitic diseases of skin etc (Mittal *et al.*, 2009). It is also believed to slow down the process of aging (Sharma *et al.*, 1978). Most research papers described its physiological properties and activity in humans and animals. Antiviral and antifungal activities of shilajit have been reported. Studies showed that it has effective

anti-inflammatory (Acharya *et al.*, 1988) and immunomodulatory (Ghosal S, 1990) effects. It was also found that this compound has the property of reducing viral load (Ghosal S, 1990).

In this study it was found that shilajit gave intermediate zone of inhibition with gram positive and negative bacteria. Only *Acinetobacter spp.* was resistant to its action. Among gram positive (+) organism; *Streptococcus pneumonia* and *B.subtilis* showed greater zone of inhibition (20mm). While *S.aureus* showed a zone of (17mm) and *S. saprophyticus* showed a zone of (15mm). Among gram negative (-) organism, *Shigella dysenteriae* and *Salmonella paratyphi A* showed greater zone of (17mm) in diameter. *E.coli* showed a zone of (16mm), *P.florescense* and *Klebsiella oxytoca* showed a zone of (16mm), *Salmonella typhi* showed a zone of (14mm) and *Citrobacter* showed a zone of (13mm).

Greater zone of inhibition (50mm) was found in *Candida albicans* as compare to bacteria. The literature reported mostly antifungal activity of shilajit. Inhibitory effects of shilajit were reported by Shalini & Rachana Srivastava, (2009) against phytopathogenic fungi.

## CONCLUSION

It is concluded that this rock material not only helps to overcome physiological activities of human but simultaneously protects the body by inhibiting various pathogenic organisms of respiratory and gastrointestinal tract.

## REFERENCES

- Acharya SB, Fortan MH, Goel RK, Tripathi SK and Das PK. (1988). Pharmacological Actions of Shilajit. Indian Journal of Experimental Biology, 26: 775-777.
- Agarwal SP, Khanna R, Karmarkar, Anwer MK, Khar RK. (2007). Shilajit: A Review. Phytother Res., 21(5):401-405.

Alberto Cornejo, José M. Jiménez, Leonardo Caballero, Francisco Melo, Ricardo B. Maccioni (2011) Fulvic Acid Inhibits Aggregation and Promotes Disassembly of Tau Fibrils Associated with Alzheimer's Disease *Journal of Alzheimer's Disease* 27:143–153. DOI 10.3233/JAD-2011-110623.

Betoni, JEC, Mantovani RPP, Barbosa LN, Di Stasi LC, Fernandes Junior A. (2006). Synergism between plant extract and antimicrobial drugs used on *Staphylococcus aureus* diseases. *Mem. Inst. Oswaldo Cruz.*, 101: 387-390.

Chopra, RN, Chopra I C, Handa K L & Kapur L D. (1958). *Chopra's Indigenous Drug of India*. 2nd ED. B.K. Dhur of Academic Publishers, Calcutta India.

Mittal P, Kaushik D, Gupta V, Bansal P, Khokra S. (2009). Therapeutic Potential of "Shilajit Rasayana" A Review, *International Journal of Pharmaceutical and Clinical Research*; 1(2): 47-49.

Mukherjee, Biswapati. (1992). Traditional medicine, proceeding of an International Seminar. pp. 398-

319. Hotel Taj Bengal, Calcutta India. Oxford & IBH Publishing, New Delhi.

Paul P. (1997). Unearthing the evidence. *Chemistry in Britain*, pp.32-34.

Ghosal S. (1990). Chemistry of shilajit, an immunomodulatory Ayurvedic rasayan., *Pur and Applied Chemistry*, 62(7):1285-1288.

Sharma RK, Dash B, Sambita TC. (2000). Chowkhamba Sanskrit Series Office, Varanasi-1., Vol III Chap 1:3 pg 50-54. Varanasi, India.

Srivastava SR. (2009). Antifungal activity screening and HPLC analysis of crude extract from *Tectona grandis*, Shilajit, *Valeriana wallachi*, *Electrical Journal of Environment, Agricultural and food Chemistry*, 8(4): 218-229.

Tritha, Swami Sada Shiva. (1998). *The Ayurvedic Encyclopedia*. Ayurveda Holistic Centre Press. Bayville, NY.