

# Antibacterial Activity Of Sericin From Sporlac Treated Silkworm Cocoon Against Some Human Pathogens

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**Abstract:** Modern scientific studies have revealed the therapeutic functions of insect extractions include antibacterial, anti-inflammatory, antitumor activities, immune regulations and reducing blood sugar. Mulberry silkworm, *Bombyx mori* L. is to be one of the commercial insects that have high medicinal value and are usually used to reduce blood pressure, diabetes, nerve disorders and heart problems. Nutrition plays an important role in improving the growth and development of silkworm *Bombyx mori* L. like other organisms (Legay, 1958). In the present study, the antibacterial activity of sericin from sporlac, treated silkworm against five human bacterial pathogens such as *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Streptococcus pyogenes* and *Klebsiella pneumoniae* were investigated. Among all the bacterial pathogens tested, maximum activity ( $17.3 \pm 0.6$  mm zone of inhibition) was found against *S.pyogenes* at the concentration of 5% and the minimum activity ( $14.2 \pm 0.2$  mm zone of inhibition) was found against *E.coli*.

**Keywords:** *Bombyx mori* L, antibacterial, Nutrition, sericin, sporlac.

## I. INTRODUCTION

Medicinal insects and their secretions have been used to cure diseases for more than 2000 years in traditional medicine. Recently modern scientific studies have revealed the therapeutic functions of insect extractions include antibacterial, anti-inflammatory, antitumor activities, immune regulations and reducing blood sugar. Numerous substances and compounds extracted from insects have been studied and tested as important resources for the discovery of new drugs (Feng *et al.*, 2009). Mulberry silkworm, *Bombyx mori* L. is to be one of the commercial insects that have high medicinal value and are usually used to reduce blood pressure, diabetes, nerve disorders and heart problems.

Nutrition plays an important role in improving the growth and development of silkworm *Bombyx mori* L. like other organisms (Legay, 1958). Amway protein increases the economic character and energy budget of silkworm *B.mori* (Rani *et al.*, 2011). The probiotic potential of *Lactobacillus plantarum* and endogenous actinomycete has an important role on mulberry silkworm (Subramanian *et al.*, 2009). In this study the effect of sporlac on the antibacterial activity of

sericin (silkworm cocoon) against human pathogens were analysed.

## II. MATERIALS AND METHODS

Disease free layings (DFLs) of PM x CSR2 multivoltine race was purchased from Government sericulture farm and reared in the laboratory by improved method of silkworm rearing (Krishnaswami, 1978). For the present experiment, probiotics selected for supplementation was sporlac. The sporlac were prepared in different concentrations such as 1%, 3% and 5 % and sprayed uniformly on mulberry leaves followed by air drying. Then the leaves were fed at one of the feeding schedules from the first day of third instar larvae. After fifth instar, the silkworm larvae start to spin the cocoon. After 5-6 days the cocoons were collected for the isolation of sericin.

The antibacterial activity was carried out by using standard filter paper disc diffusion method. Sterilized discs were soaked with sericin of different concentrations of sporlac treated silkworms and the soaked discs were then aseptically

dried. The muller hinton agar medium was dispensed in to presterilized petridishses to yield a uniform depth (4mm). The various stock cultures of pathogen such as *E.coli*, *P.aeruginosa*, *S. aureus*, *S.pyogenes* and *K.pneumonia* were swabbed over the agar surface. The plates were allowed to dry for 20 minutes. Dried antibacterial disc were carefully dispended at uniform distances over the agar surface and were pressed for correct implantation. Then all plates were incubated at 37°C for 24 hours. After incubation, the zones of inhibition were measured in diameter (mm).

### III. RESULTS AND DISCUSSION

In the present study, the antibacterial activity of sericin from sporlac, treated silkworm against five human bacterial pathogens such as *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, *Streptococcus pyogenes* and *Klebsiella pneumoniae* were investigated.

Among all the bacterial pathogens tested, maximum activity (17.3±0.6mm zone of inhibition) was found against *S.pyogenes* at the concentration of 5% and the minimum activity (14.2±0.2mm zone of inhibition) was found against *E.coli* (Table.1).

Organisms	Zone of inhibition in diameter(mm)/concentration of sporlac treated silk worm			
	Untreated	1%	3%	5%
<i>Escherichia coli</i>	8.7 ± 0.2	11.3 ± 0.2	12.3 ± 0.2	14.2 ± 0.2
<i>Pseudomonas aeruginosa</i>	9.6 ± 0.2	12.7±0.2	14.5±0.3	16.7±0.2
<i>Staphylococcus aureus</i>	8.4 ± 0.09	11.2 ± 0.3	13±0.4	15.8 ± 0.2
<i>Streptococcus pyogenes</i>	9.8 ± 0.1	13 ± 0.4	15.6 ± 0.2	17.3 ± 0.6
<i>Klebsiella pneumoniae</i>	9.5 ± 0.04	11.3 ± 0.2	12.8 ± 0.2	15.3 ± 0.2

Each value represents the mean ± SD of 3 replications

Table 1: Antibacterial activity of sericin obtained from silkworm cocoon treated with different concentration of sporlac against human pathogens

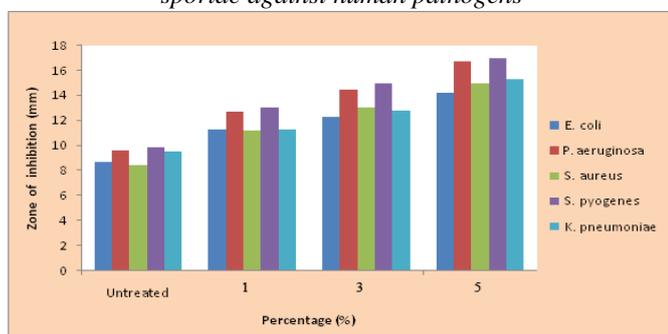


Figure 1: Antibacterial activity of sericin obtained from silkworm cocoon treated with different concentration of sporlac against human pathogens

In this study, sericin from sporlac treated silkworm showed concentration dependent activity against all the

pathogens tested (Figure.1). In the present study the antibacterial activity of sericin from sporlac, treated silkworm against five human bacterial pathogens such as *E. coli*, *P.aeruginosa*, *S. aureus*, *S. pyogenes* and *K. pneumonia* was investigated by disc diffusion method. Pandiarajan *et al.* (2011) has investigated the antibacterial activity of cocoon shell extract and proved that the cocoon shell extract inhibited the growth of micro organisms such as *E.coli*, *B. cereus*, *P. aeruginosa*, *S. aureus* and *K. pneumoniae*. Jassim and Al-Saree (2010) isolated and identified some pathogenic bacteria like *S.aureus*, *P.aeruginosa*, *E.coli* and tested the antimicrobial activity of sericin against these pathogens and concluded that the protein sericin has good antimicrobial properties. The antibacterial activity of erisericin in the representative gram negative (*E.coli*) and gram positive (*S.aureus*) bacteria models were observed by Senakoon *et al.* (2009).

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