Indian Journal of Plant Sciences ISSN: 2319–3824(Online)
An Open Access, Online International Journal Available at http://www.cibtech.org/jps.htm
2015 Vol. 4 (4) October-December, pp. 139-145/Sanjai
Research Article

EFFECT OF MYRRH (COMMIPHORA MYRRHA) PHYTOCHEMICALS FORTIFIED LEAF EXTRACT ON THE COCOON AND ECONOMIC TRAITS OF SILKWORM BOMBYX MORI LINN.

***Sanjai Kumar Gupta**
Department of Zoology, Silkworm/Entomology Laboratory, N.S.P.S. Government Post Graduate College, Magarhan, Mirzapur-231306 U.P ***(INDIA)***
**Author for Correspondence: drsanjaigupta1976@gmail.com*

ABSTRACT
Myrrh (*Commiphora myrrha* Guggul), frequently called shares, is well known in ancient writings for its spiritual and therapeutic benefits, as well as for its potent antibacterial and antiseptic qualities. Myrrh is a key component of Hindu spiritual rituals and is widely used in Ayurveda, Unani, Greek, and Roman medicine because of its therapeutic benefits. Since silk is a premium commodity with significant demand, improving the quality of silk fiber is of utmost importance in sericulture. The impact of adding ethanolic extracts of Myrrh (*Commiphora myrrha*) to mulberry leaves on the growth and economic characteristics of silkworms (Bombyx mori L), notably throughout the fifth instar, is examined in this study. The addition greatly increased larval development, cocoon weight, shell weight, shell ratio, filament length, silk filament weight, denier, and silk quality in comparison to the control group. The 5% ethanol extract produced the most noticeable results when compared to the other concentrations that were tested. The excellent commercial characteristics of silkworms fed mulberry leaves enhanced with phytochemicals point to the potential of Myrrh (Commiphora myrrha) extract as a natural growth promoter in sericulture. Myrrh (*Commiphora myrrha*) supplementation is a promising, environmentally friendly, and affordable way to increase silkworm production and silk quality, which will help the sericulture sector, according to this study. Myrrh phytochemicals fortification is shown by these findings to be effective at greatly increasing cocoon output, emphasizing its capacity to raise the sericulture sector's efficiency and productivity. In addition, these results indicate that fortifying mulberry leaves with myrrh phytochemicals may be a viable and successful strategy to increase silk output and raise the standard of living for rearers working in the sericulture industry.

Keywords: *Myrrh (Commiphora myrrha) plant extract, silk parameters, cocoon parameters, silk cocoon weight, shell weight, shell ratio, filament length, filament weight, denier of silk worm (Bombyx mori Linn).*

INTRODUCTION
Myrrh (Commiphora myrrha Guggul) is a potent, aromatic resin with medicinal and antimicrobial effects comparable to neem, making it very helpful for treating skin infections, wounds, and oral health issues. Similar to Neem, it works as an astringent, antiseptic, and anti-inflammatory, and it is frequently used in tinctures to cure skin infections, gum disease, and mouth ulcers. By improving the output of silk, a direct contribution is made to the financial improvement of reelers involved in sericulture. A promising way to increase the quality and quantity of silk production in silkworms is to add phytochemicals to mulberry leaves. The general health and development of silkworms can be greatly enhanced by supplementing mulberry leaves with extra nutrients like vitamins, proteins, and minerals. As a result, this experiment uses commercially available samples of Myrrh leaf extract to analyze the effectiveness of mulberry feed enhanced with phytochemicals on the development and cocoon quality of Bombyx mori L. The goal of the study is to boost the nutritional value of mulberry leaves by fortifying them with myrrh leaf extract in order to improve the biological traits and silk output of silkworms. The mulberry leaves that were fed to

the monophagous silkworm larvae were fortified with a variety of myrrh phytochemicals, including leaf extract samples. Numerous methods, such as nutritional supplements and bioactive chemicals, have been researched in an effort to improve the biological and financial characteristics of silkworms. The silkworm (Bombyx mori L), a heavily tamed and economically important insect **(Krishnaswami, 1986)**, is the main manufacturer of silk. Approximately 98% of the world's natural silk is made in China, India, and Uzbekistan. Mulberry leaves, which are the sole food source for silkworm larvae, are rich in essential nutrients like carbohydrates, proteins, lipids, vitamins, and minerals. These nutrients are essential for the development, growth, and reproduction of silkworms. Researchers have consistently attempted to identify the factors that may be regulated in order to aid the rearers of silkworms since man has benefited greatly from the silk produced by them **(Nair JS et al. 2004; Mahmoud SM 2015)**. Mulberry silkworms Many pathogens, including bacteria, viruses, fungi, and protozoa, can negatively impact the silk production of Bombyx mori Linn, resulting in up to 75% of cocoons being damaged **(Das 1950)**. Certain plant extracts improve disease resistance, growth, and nutrient absorption **(Nikolova, 2012)**. In sericulture, myrrh (Commiphora myrrha) extract can be used to boost silkworm development, raise silk production, and enhance the marketable properties of silk **(Prasad, et al. 2012)**. Myrrh (Commiphora myrrha), sometimes known as Guggul, is a medicinal plant well known for its wide range of pharmacological characteristics, including its potent fragrance as a perfume as well as its antioxidant, antimicrobial, and growth-promoting properties **(Prakash & Gupta, 2005)**. Its bioactive components, which include flavonoids, phenolic compounds, and eugenol, have been shown to aid in the development and defense of a variety of organisms **(Singh *et. al.,* 2010)**. In the context of sericulture, including plant-based bioenhancers like Guggul phytochemicals extract in silkworm diets may have a beneficial impact on their development, survival, and silk output. Myrrh (Commiphora myrrha) has been shown in studies to have a potential role in enhancing sericulture production by improving the larval health and cocoon yield of silkworms **(Rudroju SS *et. al.,* 2015)**. To determine its potential as a natural growth enhancer in sericulture, this research examines the impact of Myrrh (Commiphora myrrha) extract on the growth, developmental characteristics, and economic features of Bombyx mori Linn. The research examined the effects of feeding fifth-instar larvae phytochemicals-fortified leaf extract of mulberry leaves treated with a 5% ethanolic extract of Myrrh (Commiphora myrrha) leaves on a number of parameters, including cocoon weight, pupal weight, shell weight, shell ratio, and silk quality. The mulberry silkworm, Bombyx mori Linn, is a tamed, commercially valuable species that serves as the foundation of the silk farming sector. Improving the silk yield and profitability depends on boosting the growth and productivity of silkworms.

MATERIALS AND METHODS

In the mulberry garden laboratory media of government college, the experiment was carried out on the mulberry silkworm (Bombyx mori Linn), a pure Mysore × NB4D2 multivoltine DFLs disease-free egg layings that were maintained in plywood trays (23x20x5cm) under the ideal rearing condition **(Krishnaswami *et al.,* 1973 and Jolly MS 1964)** at the silkworm grainage Baharaich, Directorate of Sericulture Uttar Pradesh. Following standard sericulture methods **(Krishnaswami, 1986)**, the silkworms were raised on mulberry leaves (Morus alba) in a regulated environment. Extract from the myrrh Commiphora myrrha (Guggul) plant is well known for its antioxidant and adaptogenic qualities. Silkworms are more able to cope with stress when exposed to harsh environments, thanks to Guggul extract. Consequently, there is continuous silk manufacture and greater cocoon output. Myrrh (Commiphora myrrha), an herb plant gathered from my college, close to the nursery stores. The plant leaves were first washed with tap water, then rinsed with distilled water. The extracts were made by combining distilled water with a weight-by-volume ratio (1:10) to them after they had been crushed in an electric mixer. Following 24–48 hours in a dark environment, 50–600°C heat plates were used for 5–10 minutes. The filtrate was used as the stock solution after the crushed material solution had been filtered through a double-layered muslin cloth. 0.5 ml of the stock solution was pipetted and diluted with 5 ml of distilled water to get a 5% concentration. For use on mulberry leaves and for feeding silkworms, the stock

solution was kept in a refrigerator, and a fresh dilution was made **(Gobena W et al, 2015; Etaberi K et al. 2004)**. The control group of silkworms was given mulberry leaves from the plant Kanva, while the treatment group was given mulberry leaves from the plant sprayed with a 5% concentration of Myrrh Commiphora myrrha (Guggul) phytochemicals fortified leaf extract. There were three replicates for each treatment, and each group had 90 silkworms. Cultivating silk worms: In silkworm grainage Beharaich, Directorate of Sericulture Uttar Pradesh, India, the research made use of third-instar larvae of the **Pure Mysore × NB4D2** multivoltine double hybrid silkworm rearing station of the (Bombyx mori L) race. The Department of Zoology at Government College in Uttar Pradesh, India, is where the collected larvae were cultivated. Fresh, healthy mulberry leaves from the Kanva variety were utilized in the current study. The experiment maintained optimal temperature and relative humidity at 26±1°C and 80±5% Rh, respectively. The timings for bed cleaning, spacing, and feeding were maintained in accordance with **(Krishnaswami's 1973)** guidelines. Method of application: The use of plant extracts was made mandatory and put into practice only after the third instar. The schedule for applying is as follows: III instar (first day first feed), IV instar (first and third day first feed), and V instar (every day first feed). Silkworms were raised in the following conditions: Temperature: 26 ± 1°C, Relative humidity 80±5% RH, and Photoperiod 12±1 hours of light and dark cycles. It's time to eat: The right concentration of Myrrh (Commiphora myrrha) leaf extract was applied to the mulberry leaves after they had been washed and air-dried. The treated leaves were given to the silkworms four times a day (8:00 AM, 5:00 PM,). The mulberry leaves given to the control group silkworms were untreated. The larval stage maintained the same feeding regimen. Data gathering: The traits of the larval, cocoon, and post-cocoon stages were documented as follows: Weight of the larvae in grams: A digital scale was used to weigh 25 larvae chosen at random from each treatment replication at the conclusion of the fifth instar larvae. The length, weight, and denier of the filament; the cocoon weight; the shell weight; and the shell ratio using a digital scale, 25 randomly chosen cocoons from each replication were weighed. Ratio of cocoon shell in percent: The ratio of shell weight to cocoon weight, which is stated as a percentage, is known as the cocoon shell ratio, and it is determined as follows:

$$\textbf{CSR (\%)= SW (gm)/CW (gm) × 100}$$

Where CSR is the cocoon shell ratio, SW is the shell weight in grams, and CW is the cocoon weight in grams.

Silk filament weight (gm): 20 cocoons of reeled silk were oven dried at 85°C to determine the average weight. Denier: Denier was computed using the following formula:

$$\textbf{Denier= SWF/SFL×9000}$$

Where SFW is the silk filament weight (g), SFS is the silk filament length (m), and 9000 is a constant value.

Average filament length (m): 20 cocoons from each replication were collected and reeled on a single realer (eprouvette). The number of revolutions was recorded and converted to meters using the following formula:

$$\textbf{L=R× 1.125}$$

Where L is the filament length (in meters) per cocoon and R is the number of revolutions recorded by the eprouvette. The circumference of Eprouvette was 1.125 the average filament lengths of the three cocoons from each replication were determined. **Statistical analysis:** The data were analysed using statistical and provided as means ± SD values by using Microsoft excel.

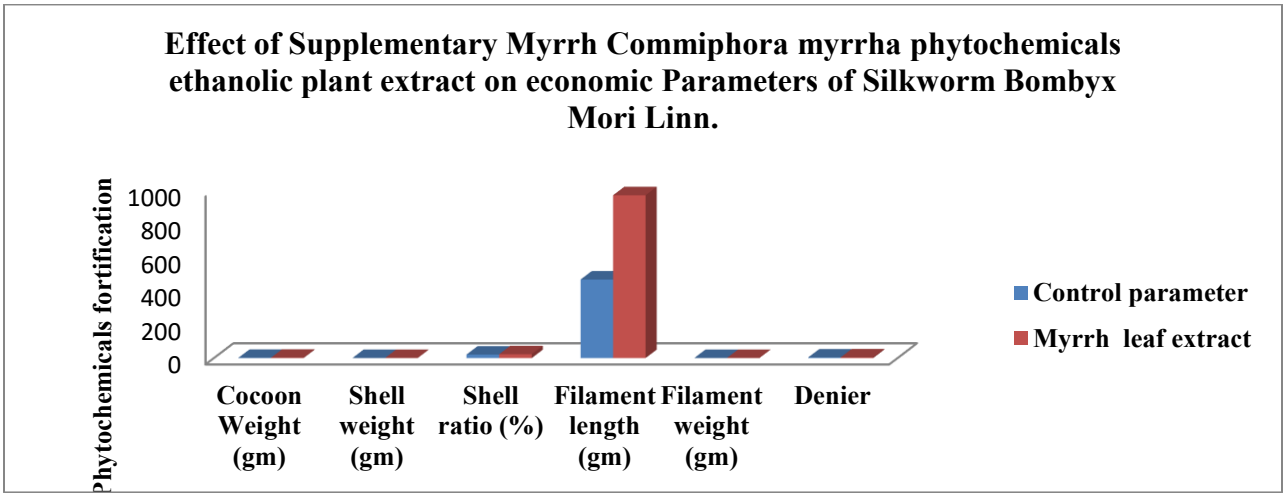
Indian Journal of Plant Sciences ISSN: 2319–3824(Online)
An Open Access, Online International Journal Available at http://www.cibtech.org/jps.htm
2015 Vol. 4 (4) October-December, pp. 139-145/Sanjai
Research Article

RESULTS AND DISCUSSION

The phytochemicals-fortified ethanol extracts of mulberry leaves and Guggul had an impact on the silkworm's economic characteristics, as shown in (Table; Fig). The changes are examined in relation to the financial aspects of sericulture, such as larval linearity, cocoon weight, shell weight, shell ratio, filament length, filament weight, and denier. Mulberry leaves and myrrh (Commiphora myrrha): The impact of Myrrh (Commiphora myrrha) extract on the traits of silk worm larvae and cocoons is shown in the table. The economic character of the silken cocoon increased significantly in the control group (0.337gm) (3.514M), with a greater increase seen in the 5% Commiphora myrrha extract (0.422 gm) (3.785 M) from cocoon shell weight and Denier of silken cocoon. According to the research, the average cocoon weight rose from 1.235g in the control group to 1.951g in the phytochemicals leaf extract group, while the shell ratio increased from 20.73% to 22.82% of the cocoon parameters when Commiphora myrrha plant extracts were used. This indicates that the extract Myrrh (Commiphora myrrha) has the ability to modify the length of a cocoon filament length (467.28m) since the filament length of a cocoon is impacted by phytochemicals fortified leaf extract as control parameters are increased as (968.85M). The length of silk fibers differs depending on the breed and the environment in which they are grown. In the current study, adding phytochemicals fortified leaf plant extracts resulted in a notable increase in filament length when compared to controls. The myrrha phytochemicals treatment results in a significantly longer mean filament length than the control groups when the average filament length is at its highest.

Table: 1- Effect of Supplementary Myrrh Commiphora myrrha phytochemicals ethanolic plant extract on economic Parameters of Silkworm *Bombyx mori* Linn.

Sr. No.	Phytochemicals fortification groups	Cocoon Weight (gm)	Shell Weight (gm)	Shell Ratio (%)	Filament length (m)	Filament weight (gm)	Denier (M)
1-	Control parameter of mulberry tree leaves	1.235 ±0.13	0.337 ±0.032	20.73 ±3.46	467.28 ±31.49	0.22 ±0.022	3.514 ±0.65
2-	Phytochemicals treatments Myrrh (Commiphora myrrha) leaf extract	1.951 ±0.232	0.422 ±0.028	22.82 ±3.498	968.85 ±92.456	0.43 ±0.054	3.785 ±0.34



By increasing the cocoon weight, shell weight, shell ratio, filament length, filament weight, and denier of the fifth instar, an ethanolic extract of the phytochemicals of the Myrrh Commiphora myrrha plant

promotes development. Phytochemicals extract improves cocoon shell weight, particularly in imported hybrids, which proves its beneficial effect on the economic growth and development of silkworms. These findings suggest that phytochemicals derived from plant extracts are a practical and ecologically sound alternative to manufactured additives for increasing silkworm output. Local hybrid positive reactions provided evidence of the potential for optimizing silkworm rearing in certain agricultural settings **(Narzary Prety *et al.,* 2013)**. The findings of the current investigation are consistent with those of (Hajam *et. al.,* 2014), where 5% Myrrh (Commiphora myrrha) phytochemicals concentrations markedly increased the average filament length, measuring 1221 m compared to 1071 m in the control group. One research discovered that the longest silk filament, at 873 meters, was produced by adding 20% Parthenium leaf extract to the diet. This finding **(Rudroju et al. 2015; Abdel Rahman SH *et. al.,* 2015)** revealed that Trichosanthes cucumerina seed extract produced the greatest cocoon weight, shell weight, silk ratio, and filament length **(Saad *et al.,* 2015)**. In contrast 3.1% black cumin seed extracts resulted in considerably heavier cocoon shell weights, while larvae fed on mulberry leaves with 3.2% basil leaf extracts had the highest cocoon weights. Furthermore, every tested quantity of black cumin seed extract produced more silk in the cocoons. The shell ratio was similar in **(Chavan KK et al. 2013 and Chand Sujata 2013 and Berg SB *et al.,* 2015)** (Vitamin C 0.25% + soya flour 0.25% + vitamin B-complex 0.5% + methionine 0.5%), where T_5 had the highest mean cocoon shell ratio at 24.59%. **(Sujatha *et al.,* 2015)** Compared to the control, there was a notable increase in economic features as the 3% (T3) Myrrh (Commiphora myrrha) enhanced. Leaf treatment with extracts of T. terrestris, B. diffusa, and P. niruri resulted in a significant correlation between the growth of silkworms and the production of silk. Because the plant extracts contained an active bio ingredient that aids in nutrient digestion, the silkworms were able to develop **(Murugan K *et. al.,* 1998 and 1999)** The larval characteristics and nutrition of Sida acute plant extracts in methanol were all affected by supplementation on silk. Bombyx mori's growth and development are encouraged by adequate nutrition. The addition of 5% plant extract results in higher silk and larval production. The silkworm ultimately saw an increase in the length of the silk, the weight of the larvae, and the length of the experimental group. To improve the growth and cocoon features of silkworms, the Bombyx mori the Sida acuta plant extract was tested against Vth instar larvae of silkworms by **(Umadevi M *et. al.,* 2013 and Vidyadevi, 2015)**. Numerous researches have demonstrated that different concentrations of plant extract and their natural composition, such as vitamins, hormones, ascorbic acid, folic acid, thiamine, Alloe tonic, etc. , enhance the characteristics of the larvae and cocoons **(Manimuthu M *et. al.,* 2010; Etaberi K, 2004 and Jaiprakash rao, 1999)**. Numerous attempts have been made to enhance the amount and quality of silk production, including fertilizing the leaves with nutrients, spraying them with antibiotics, vitamins, hormones, plant products, and extracts. Phytochemicals can have an impact on insect survival and functionality **(Narzary *et al.,* 2013; Jiang Li 2015 and Khaliknazarov U *et. al.,* 2012)**, and plants have the highest concentration of organic molecules on the planet. These results emphasize the possibility of using Myrrh (Commiphora myrrha) as a sustainable growth promoter in sericulture.

CONCLUSION

One of the most significant species in the sericulture industry is the mulberry silkworm, Bombyx mori. It is in high demand in the agricultural sector because it naturally produces white and yellow silk. The key components of silkworm increasing are healthy seeds, healthy host plants, and favorable agricultural, climatic, and environmental circumstances. A single, healthy mulberry host plant is essential for raising silkworms successfully. Due to severe infestation of host plants, the current study determined that many insect pests are the main issue for mulberry silkworm farming. Defoliators are the destructive pest of the mulberry plant among all the insect pests. For this reason, it is essential to use scientific methods to manage insect pests in order to safeguard the food plants used by mulberry silkworms. The study found that adding 5% Myrrh (Commiphora myrrha ethanolic) phytochemicals to a plant extract greatly enhanced the economic and charitable characteristics of silkworms. When employed in a multivoltine

hybrid, this plant extract had a positive impact on the traits of cocoon and larval development, demonstrating significant positive effects on financial factors. The addition of myrrh (Commiphora myrrha) phytochemicals to mulberry leaves that had been enhanced with plant ethanolic extract had a beneficial impact on silkworm development and financial characteristics. Compared to the control group, the treatment group exhibited considerable improvements in economic features, cocoon weight, shell ratio, filament length, and filament weight and denier of silk filament. Myrrh (Commiphora myrrha, Guggul) has the potential to be a natural growth booster in sericulture, as shown by these results. Furthermore, the use of these phytochemicals plant extracts indirectly improves the biological and technological features of the plant, making it useful in sericulture for increasing the quality and quantity of cocoon crops.

REFERENCES

Abdel Rahman SH and YA (2015). Effects of some Extracts on Growth Characters of Mulberry Silkworm Bombyx mori L." *Assiut J Agric Sci* **46** 58-71.

Barge SB and AB Pardeshi (2015). Influence of dietary supplementation with of Sida acuta plat extract on the mulberry silkworm, B. mori L. *International Journal of Zoology Studies* **3**(2) 199-202.

Chand Sujata Sasmita Chand and Bauri Raula (2013) Usage of silkworm materials in various ground of Supplementation on Growth and Reproduction of Silkworm Bombyx mori L Biological Trace *Element Research* **193** 271 - 281.

Chavan KK *et. al.,* (2013). Effect of leaves mulberry leaves enrichment with nutritional supplements on plant extract on the economic parameters of silkworm, Bombyx mori L *Journal of Entomology and Zoology Studies* **3(2),** 62–64.

Das GMR (1950). Diseases of silkworm monograph on cottage industries. No1, Govt. India *Press, economic parameters of FC1 x FC2 Silkworm Bombyx mori L.* 123-127.

Etaberi K, Kaliwal B (2004). Matindoost L. Supplementation of mulberry leaves in sericulture, theoretical and applied aspects. *Int. J Indust Entomol* **9** 14-28.

Gobena W Sori and RN Bhaskar (2015). Fortification of mulberry leaves with medicinal botanical plant extracts effect on silkworm, Bombyx mori L. (PM× CSR2) (Lepidoptera: Bombycidae) larval growth and cocoon traits. 199-206.

Hajam, O. Ahmad, *et al.* (2014). Influence of plant extract fortified mulberry leaf on some reeling parameters of silkworm, *Bombyx mori* L 187-191.

Jayaprakash rao (1999). Effect of few Botanicals and iodine compounds on the economic traits of eri silk worm M. Sc (Sericulture) Thesis, University of Agriculture Science, *Dharwada*. 199-201.

Jiang Li Peng L Cao Yu-Yao Thakur K Hu F Tang S & Wei Zhao (2015). Effect of Dietary Selenium Supplementation on Growth and Reproduction of Silkworm Bombyx mori L *Biological Trace Element Research.* **193** 271- 281.

Khaliknazarov U Akbarov D Tursunov A Gafforov S & Abdunabiev D (2012). Existing problems of drying cocoon and making chrysalis feeble, and their solutions. *IOP Conference Series: Earth and Environmental Science* **939**(1).

Krishanaswamy S Jolly MS and Subbarao S (1964). Studies on the mating capacity of male of the mulberry silkworm and possibility polygamy in sericulture part II *Indian Journal Experimental Biology* **2**(3) 165-166.

Krishanaswamy S Narasimhanna MN Suryanaryan SK and Kumar Raja S (1973). Sericulture manual 2 Silkworm Rearing *FAO Agric Serves Bull Rome* **15(2)** 1-131.

Krishnaswami S (1986). Sericulture Manual II: Silkworm Rearing FAO *Agricultural Services Bulletin.*

Mahmoud SM (2015). Silk agriculture and industry. Noor publishing, GmbH, *Nordersted /Germany* 1–288.

Manimuthu M, Isaiarasu L (2010). Influence of herbal tonic Alloe on the overall performance of the mulberry silkworm Bombyx mori L. *Journal of Biopesticides* **3(3)** 567-572.

Murugan K Jeyabalan D Senthikumar N Senthilnathan S Sivaprakasam N (1998). Growth Promoting effect of plant products on silkworm A Biotechnological Approach *J Sci Ind Res* **57** 740-745.
Murugan K Jeyabalan D Senthilkumar N Krishna SS Sivaprakasam N (1999). Growth-promoting effects of plant compounds on silkworm. *Proceedings of the National Seminar on Tropical Sericulture* 107-108.
Nair JS and Kumar SN (2004). Artificial diet for the silkworm, Bombyx mori, L., retrospection through the decades. *Indian Journal of sericulture* 43(1):1-17.
Narzary Prety & Dutta P Lushan I Nath Inand A Gadge Gadge (2013). Role of Plant Extracts on Growth and Development of Mulberry and Non-Mulberry Silkworms 494-501.
Nikolova Tsvetelina (2012). Growing mulberry silkworm with artificial diet with added extract Tribulus
Prakash P & Gupta N (2005). Therapeutic uses of Myrrh (*Commiphora myrrha*) (Tulsi) with a note on eugenol and its pharmacological actions: A review. *Indian Journal of Physiology and Pharmacology*, **49(2),** 125-131.
Prasad MP Jayalakshmi K Rindhe GG (2012). Antibacterial activity of Ocimum species and their phytochemical and antioxidant potential. *International Journal of Microbiological Research* **4(8)** 302–307.
Rudroju SS Akula S Janga S and Kuntamalla S (2015). Effect of leaf and seed extract of Trichosanthes cucumerina L on antibacterial activity and economic traits of mulberry silkworm, Bombyx mori L. *J. Entomo and Zool. Studies* 5(2) 889-894.
Saad Mahmoud SI Enas MY Elyamani, and Walaa MM Helaly (2015). Controlling of bacterial and fungal diseases that contaminating mulberry silkworm, Bombyx mori by using some plant extracts." Bulletin of the National Research Center 43: 1-9. *Science and research Journal of Natural Fibers* **20(1)** 213-219.
Singh S Malhotra M & Majumdar DK (2010). Antioxidant and anti-inflammatory activities of Myrrh (Commiphora myrrha). *Journal of Ethno pharmacology*. **33(3)** 235-243.
Sujatha Kuntamalla Janga Sathish, and Jirra Anitha (2015). Effect of medicinal botanical (Myrrh (Commiphora myrrha)), Family, Labiateae on commercial parameters of the silkworm, Bombyx mori, L International Journal of Multidisciplinary and Current Research 3: 76-78. terrestris L." *Bulgarian Journal of Agricultural Science* 1041-1046.
Umadevi M Sampath Kumar K P Debjit Bhowmik & S Duraivel (2013). *Journal of Medicinal Plants Studies* 234-238.
Vidya Devi PS and Bai MR (2015). Effect of Myrrh (*Commiphora myrrha*) L. plant extract on the economic parameters of silkworm, *Bombyx mori* L. *Journal of Entomology and Zoology Studies*, **3(2),** 62–64.