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SYNTHESIS AND ANTIMICROBIAL ACTIVITY OF SCENTED CANDLES FROM *NERIUM OLEANDER* AND *MALUS SYLVESTRIS*

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ABSTRACT

A candle is an ignitable wick embedded in wax or another flammable solid substance such as tallow, that provides light and in some cases a fragrance. A candle can also provide heat or a method of keeping time. The good quality of beeswax depends greatly on the production methods. There are two wax extraction methods: melting and chemical extraction. Our aim is to prepare scented candles by using extraction of *Nerium oleander* and *Malus sylvestris* which contains anti-bacterial properties.

keywords: Bees wax, *Nerium oleander*, *Malus sylvestris*, Anti-bacterial activity

INTRODUCTION

An ignitable wick covered in wax or another solid fuel that can catch fire, like tallow, makes up a candle. It provides light and sporadically, fragrance. A person who makes candles is referred to as a "chandler" **[1]**. 20% of the global beeswax market is through candle making. Beeswax candles are less common and more expensive than paraffin-wax candles. Wax is a component needed by bees for their combs. The main base materials needed to make wax are substances containing carbohydrates, such as sugars in honey, fructose, glucose and sucrose **[2]**. Colors on ancient wall murals and iconography are

created using beeswax, which hasn't altered in over 2000 years **[3]**. Although while beeswax is no longer as pricey as it once was, it is remaining the costliest of all-natural waxes **[4]**. Since beeswax candles were so costly, only a few people in mediaeval Europe could afford to light them at home **[5]**. Alternatives that were far less expensive, including colza oil and rapeseed oil, were introduced later in the 18th century **[6]**. This method keeps the wick and hence the flame at the same height by having it coil around while it burns. These wicks are characterized as "self-consuming" or "self-trimming" wicks because so much extra wick burns **[7]**. Price's Candles, a London-based company, was the world's largest candle maker by the late 19th century **[8]**. Before the invention of electric lighting, candles and oil lamps were widely used as sources of illumination. Up to the twentieth century, northern Europe used candles more often. In the developed world today, candles are mostly used for their aesthetic value and scent, particularly to create a soft, pleasant or romantic atmosphere, as emergency lighting during power outages and for religious or ceremonial purposes **[9]**. It is unknown where and when candle clocks were first used. They are originally referenced in a poem written in Chinese by You Jiangu (AD 520) **[10]**.

MATERIALS AND METHODS: Tallow (beef or mutton fat) or beeswax were the primary materials used to make candles during the bulk of recorded history **[11]**. Even if the kind of wax also affects the burn rate, beeswax and coconut wax burn for a longer period of time than paraffin or soy wax **[12]**. The majority of people frequently see a candle's shape, color or aroma as being its most important feature. But the wick also has a crucial role to perform. The wick of a candle, which is a piece of rope or thread, supports the flame **[13]**. *Nerium oleander* and *Malus sylvestris* were extracted for the scent, depending on the kind of wax, wick and scent used in the candle's formulation, the right kind and quantity of colorant must be chosen.

Extraction: Take a fresh *Nerium oleander* and *Malus sylvestris* in the round bottom flask and then add the Methanol in RBF. Then tightly seal the round bottom flask and after the 48 hours extraction of *Nerium oleander* and *Malus sylvestris* is ready.

Preparation of Bees wax: 25 gm of stearic acid was mixed with 23.63gm of Cetyl Alcohol, 2.5gm of Paraffin and 2.5gm of Pure wax. 3ml of Mineral Oil and 2.5gm of gelatin were mixed with the mixture and 2.5ml of conc. H_2SO_4 was added for esterification. Whole mixture was heated by double boiling

method with continues stirring. Mixture was cooled down at room temperature to solidify.

Preparation of Scented candles: 40gm of prepared bees wax was melted in a container to make homogeneous mixture. At 80°C temperature, fragrance of *Nerium oleander* and *Malus sylvestris* were added. Wick was dipped in a mixture. The mixture was molded at room temperature.

RESULT & DISCUSSION:

Saponification process: How much potassium hydroxide (KOH mg/g) is necessary to saponify 1g of beeswax? It is one of the beeswax quality markers. In beeswax, for instance the higher the saponification value and better the quality are the more components that can be saponified; on the other hand, the lower the saponification value and worse, the quality are the more contaminants. Saponification value = $(yRBF - xRBF) \times$ $Moleclar\ weight\ of\ KOH$ = 88.1 mg/g KOH

Determination of Acid Value: 1gm of beeswax has a free fatty acid content that uses milligrams of potassium hydroxide (KOH mg/g). It is one of the beeswax quality markers. In general, medium beeswax has an acid value 4-9 KOH mg/g and western beeswax has an acid value is 15-23 KOH mg/g. Beeswax that has been artificially contaminated will have an acid value that is either high or low. Beeswax, for instance, has a low acid value when combined with paraffin tallows, steric acid etc. while having a high acid value when combined with rosin etc. The process of neutralized titration is used to calculate the acid value of beeswax. Acid value = $xml\ of\ 0.1N\ KOH \times Equivalent\ weight\ of\ KOH$ = 7.212 mg/g.

Anti-bacterial Activity: In biological testing for bacteria, the non-steroidal antimicrobial agent activity of a typical antibiotic formulation and the inhibition of bacterial growth it causes are contrasted with the results of a component that is not concentrated. The bacterial assay can be carried out on a disc plate using a variety of methods **[14]**. In the investigation, the following bacteria were used: *Escherichia coli* (gram^{-Ve}), *Staphylococcus aureus* and *Bacillus* (both gram^{+Ve}).

Table 1: Calculated values of beeswax

Sr. No	Evaluating parameters	Values
1.	Melting point	37°C
2.	Boiling point	370°C
3.	Colour	White
4.	Odour	Pleasant
5.	Saponification value	88.1 KOH mg/g
6.	Acid value	7.212 KOH mg/g

Table 2: Anti-bacterial Activity of Beeswax

Sr. No.	Name of the bacteria	Zone Of the inhibition	Standard(Ampicillin)
1.	*Bacillus*	13mm	7mm
2.	*Escherichia coli*	13mm	9mm
3.	*Staphylococcus aurous*	15mm	7mm

CONCLUSION:

Prepared sample gives pleasant smell due to *Nerium oleander* and *Malus sylvestris*. It gives good anti-bacterial properties against gm^{+ve} and gm^{-ve} bacteria. As we increase the concentration of product against microbes the zone of inhibition is also increased. So, more the concentration it is more potent. The potential for the commercialization is enormous. Additionally, the study looked at natural components, formulation techniques, evaluation. Looking towards these scented candles which are great commercial scope in future.

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