International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 11 Issue 5 ǁ May 2023 ǁ PP. 476-481

A study on cotton fabric finished with microencapsulation finish using basil oil for meditech development

Dr. Sonu Rani [*] and Dr. Alka Goel [**]

[*] *G.B.P.U.A.&T.,Pantnagar, Assistant Professor, Clothing and Textiles department, Home Science College, India*

[**] *G.B.P.U.A.T., Pantnagar, Professor and Dean, Home Science College, G.B.P.U.A.T., Pantnagar, India*

e-mail:*sonu.sonulibra@gmail.com*

ABSTRACT

Traditionally, a Hindu household is considered incomplete if it doesn't have a tulsi plant in the courtyard. Tulsi or Holy basil,a plant of Lamiaceae family is medicinal aromatic herb. Medicinal plants are considered safe, economical and are easy available. The plants of genus Ocimum are full of phenolic compounds and renowned for their therapeutic importance. Ocimum basilicum popularly known as "Sweet basil" is used in both Unani and Ayurvedic medicine. Other species of tulsi includes Ocimum canum, Ocimum scharicum, Ocimum sanctum, Ocimum kilmand. Tulsi is referred to as an "Elixir of Life" for its healing powers.The chemical composition of tulsi is eugenol which contains many phyto-chemicals which consist of antioxidant, adaptogenic, anti inflammatory, antibacterial and immune-enhancing properties. The oil of the plant has been found to be useful for the alleviation of mental fatigue, cold, spasm, rhinitis.

Major causes of textile degradation are moist climate and perspiration which can cause growth of harmful microorganisms. Consumers are searching for remedies to reduce the odour and microbial problem which is reduced by incorporating antimicrobial finish. Microencapsulation can be applied to medical textiles to include antimicrobial properties. Under microencapsulation process, tiny particles or droplets are surrounded by a coating to give small capsules, which can impart functional properties.

Under the present study, it was planned to develop masks (as meditech products) using microencapsulation finish. Sample size selected for the study was 100. Selection of respondents were done randomly from Udham Singh Nagar district of Uttrakhand. Pretest and post test questionnaires were developed to analyze the effect of aromas on the ultimate consumer. Each respondent was given one mask to be worn for 15 days of trial and asked to fill pretest questionnaire and after 15 days post test questionnaire were collected regarding the effect of aromas of Ocimum basilicum present in the mask.

It was concluded from the study that masks treated with Ocimum basilicum was safe, comfortable, helpful in reducing stress of people caused by pandemic. Respondents noticed health benefits after using mask for 15 days. It was found that the original characteristic of treated cotton fabric was not changed and it is found that after 15 days fragrance of the mask relatively decreases.

Key words: *Microencapsulation, Medical textiles, Antimicrobial finish*

Date of Submission: 05-05-2023 Date of acceptance: 17-05-2023

I. Introduction

Traditionally, a Hindu household is considered incomplete if it doesn't have a tulsi plant in the courtyard [1]. Tulsi or Holy basil, a plant of Lamiaceae family is revered culinary and medicinal aromatic herb. "Tulsi" another name, "Vishnupriya" expresses the one that delight Lord Vishnu [2]**.**Medicinal plants are considered safe besides being economical, effective and are easy available. The plants of genus *Ocimum* are full of phenolic compounds and renowned for their therapeutic importance. *Ocimum basilicum* popularly known as "Sweet basil" is used in both Unani and Ayurvedic medicine. Other species of tulsi includes *Ocimum canum, Ocimum scharicum, Ocimum sanctum, Ocimum kilmand.*

Tulsi is referred to as an "Elixir of Life" for its healing powers and available in India in plentiful.The chemical composition of tulsi is eugenol. This chemical formula contains many phyto-chemicals referred as compounds which consist of antioxidant, adaptogenic, anti inflammatory, antibacterial and immune-enhancing properties. One who consumes Tulsi in any form his body gets prepared to fight against the diseases.The oil of the plant has been found to be useful for the alleviation of mental fatigue, cold, spasm, rhinitis.Tulsi is widely used for treatment of bronchitis, rheumatism and pyrexia, epilepsy, asthma, hiccups, cough, skin and haematological diseases, parasitic infection, headache, wounds and inflammation [2]**.**

Major causes of medical textile degradation are moist climate and perspiration which can cause growth of harmful microorganisms. Meditech textiles are directly in contact with skin therefore meditech textiles should be effective to protect the humans. Consumers are searching for remedies to reduce the odour and microbial problem and this is reduced by antimicrobial finish. Antimicrobial refers to a broad range of technologies that can provide varying degree of protection against microorganisms. Fabric and clothing used in area where there might be danger of infection from pathogen can benefit from antimicrobial finishing.Antimicrobial finish is an important property required in Meditech textiles.Impregnation, starching, fiber mass treatment, microencapsulation etc. are processes for incorporating antimicrobial finish in medical textiles. In microencapsulation process, microcapsules containing an antimicrobial agent adhere to the textile using a binding agent. Under microencapsulation process, tiny particles or droplets are surrounded by a coating to give small capsules, which can impart functional properties. The microencapsulated textiles become active only when the microcapsules broken while putting on the garment made from using microencapsulated textiles [3]. Microencapsulation of antimicrobial agents is gaining popularity in medical textiles all over the world [4]**.**The objective of the present study was to develop masks (meditech textile) using microencapsulation of *Ocimum basilicum* oil and evaluate psychological comfort for the user.

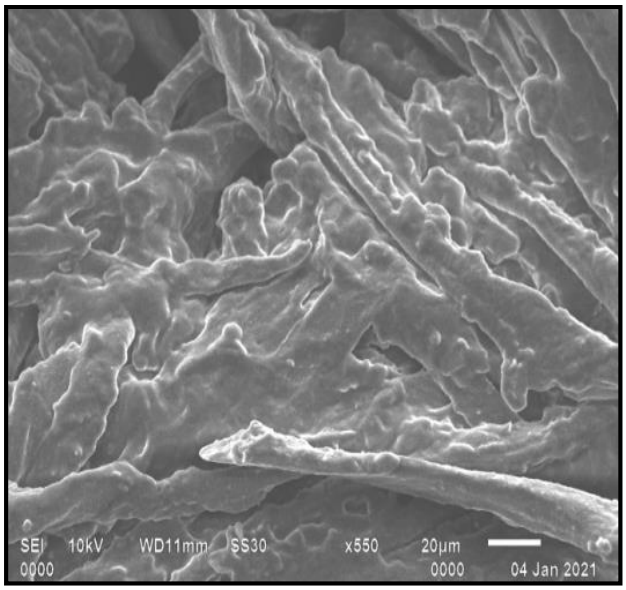

Plate-1 SEM image of treated cotton fabric

Plate-2 Masks prepared as Meditech product

II. Methodology

The present study aimed at microencapsulation of cotton fabric using *Ocimumbasilicum*. Cotton was procured from local market and tulsi(*Ocimumbasilicum*) oil purchased from ICAR- Central Institute of Medicinal and Aromatic Plants, Nagla. Before the application of microencapsulation finish, cotton fabric wasscoured using method given byShenai,V.A. [5]**.** Scouring of cotton was done using Sodium carbonate 2g/l, detergent 5g/l for 30 minutes at 50-60ºC. Material liquor ratio kept for scouring process was 1:30.Under the present study, *Ocimumbasilicum*was selected as core material according to their easy availability and effective against cold. Microcapsules prepared using Acacia gum andtulsi oil in 1:2 ratio at 40^{O}C at acidic pH [6]**.**Digivision microscope was used toconfirmpresence of microcapsules. The microencapsulation finish applied using padding mangle at standard pressure of 80%. After the finish, treated fabric was kept in oven for 5 minutes at 80-85 ^{O}C. Scanning electron microscopy (SEM JSM-6610LV apparatus) was used to ensure the presence of microcapsules in treated fabric (Plate-1). Masks(Meditech product) were developed from treated fabric (Plate-2).In the present study sample size was 100.Selection of respondents wasdone randomly from Udham Singh Nagar district of Uttrakhand which were consisted of professors from G.B.P.U.A.&T.,Pantnagar, teachers from primary school, Junior high school and Inter college and doctors, engineers, senior research fellows, managers, non-teaching staffs, shopkeepers, auto-rickshaw drivers, students of schools, colleges, universities and housewives. These respondents were categorized into four categories i.e. teaching, non – teaching, housewives and students. Pretest and post test questionnaires were developed as given by [7]**)** to analyze the effect of aromas on the ultimate consumer.The content validity of scales developed was checked by a panel of 5 judges i.e. Professors from G. B. Pant university.This study was conducted in December2020-January 2021.Ethical permission was taken from University Committee for Human Ethical Research (UCHER) prior to conduct of test. All participants were informed about objectives of the study before starting the trial. All

respondents were asked to sign the consent form in which they were asked to declare that they did not taking any type of regular medicine related to cold and also they do not suffer from any severe type of allergy. Each respondent was given one mask to be worn for 15 days trial.Views of respondents were obtained through questionnaire. Responses obtained were in three categories: Strongly agree, agree and disagree.Respondents were asked to fill pretest questionnaire on the first day of trial and after 15 days filled posttest questionnaire were collected regarding the effect of aromas of *Ocimum basilicum*.

III. Results and discussion

Findings of the study are as follows:1.It was found in the study that 17 % teachers, 19 % non-teaching,15 % students and 5 % housewife strongly agree while 13 % teachers,13 % non-teaching, 9 % students and 4 % housewife agree that they found mask was comfortable for them. Only 1 % teachers, 2 % non teaching and 1 % student disagree that mask was comfortable for them. Maximum number of respondents i.e. 56 % respondents strongly agree and 40 % respondents agree that mask was comfortable for them while 4 % respondents disagree that they found mask was comfortable for them. Maximum respondents agreed that the treated mask was comfortable for them (Fig.1).

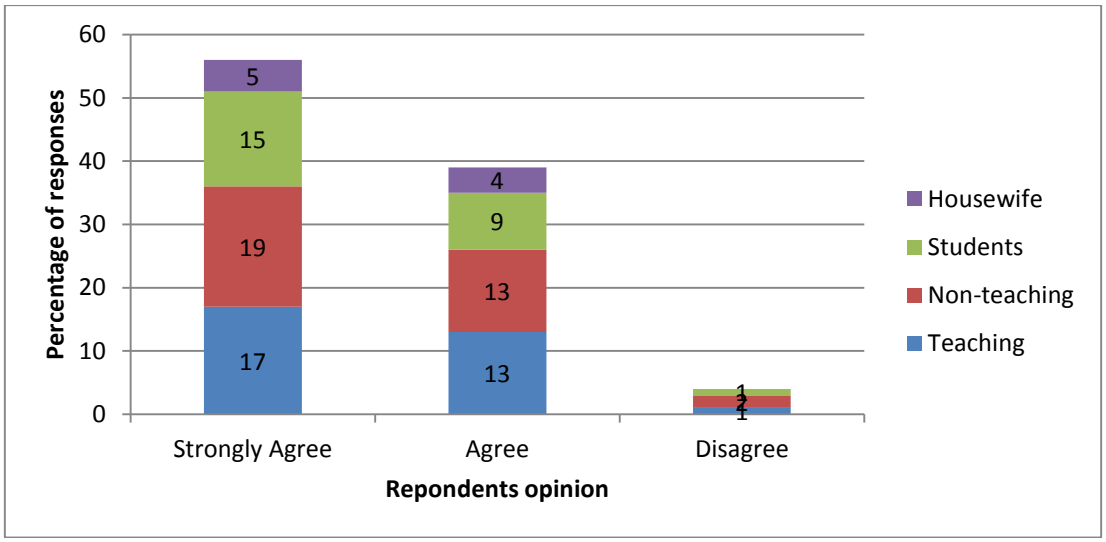

Fig.1 . Percentage of respondents found the mask was comfortable for them

2.It was clear that 11 % teachers,10 % non-teaching,11 % students and 3 % housewife strongly agreewhile 15 % teachers, 19 % non-teaching, 8 % students and 6 % housewives agree that the mask treated with *Ocimumbasilicum* reduced stress of peoples caused by pandemic. Only 6 % teachers, 4 % non teaching and 7 % student disagree that the treated mask reduced stress of peoples caused by pandemic. Most of the respondents i.e. 35 % respondents strongly agree and 48 % respondents agree that treated mask reduced stress of peoples caused by pandemic while 17 % respondents disagree that treated mask reduced stress of peoples. Maximum respondents agree thatmasks treated with *Ocimumbasilicum* reduced stress of peoples caused by pandemic (Fig.2).

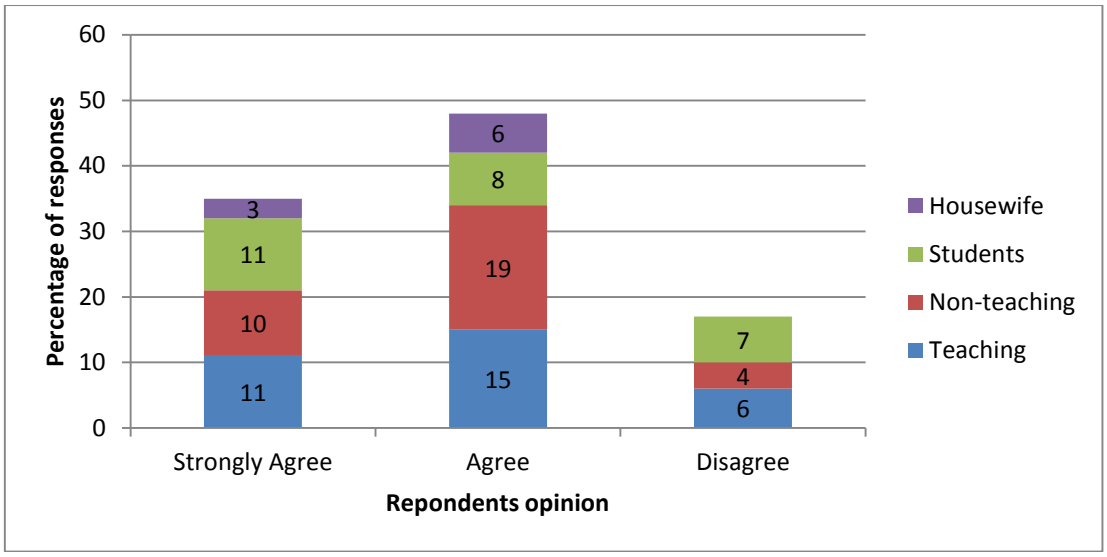

Fig.2. Percentage of respondents who think mask treated with *Ocimumbasilicum* reduced stress of peoples caused by pandemic

3. It was found that 5 % teachers, 4 % non-teaching, 8 % students and 1 % housewife strongly agree while13 % teachers,15 % non-teaching, 8 % students and 3 % housewife agree that the finish applied in the mask had changed original character of the fabric used.

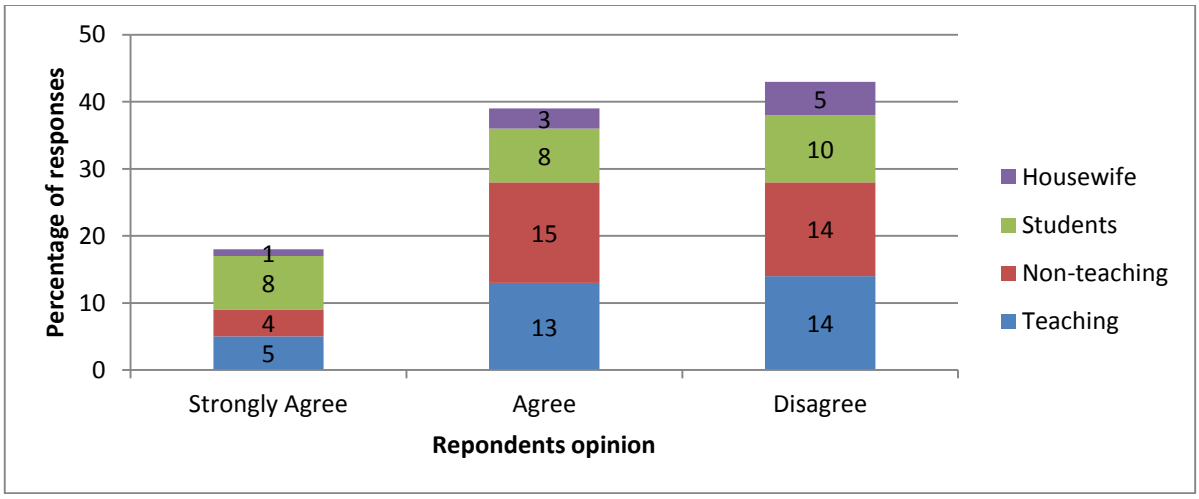

Fig.3. Percentage of respondents who consideredthe finish applied in the mask had changed original character of the fabric used

Only 14 % teachers, 14 % non teaching 10 % students and 5 % housewife disagree that the finish applied in the mask had changed original character of the fabric used. Maximum number of respondents i.e. 43 % respondents disagree that the finish applied in the mask had changed original character of the fabric used(Fig.3). Hence, it can be concluded from the present study that respondents disagree that the finish applied in the mask had changed original character of the fabric used.

4. It was found in the present study that 7 % teachers, 13 % non-teaching, 5 % students and 2 % housewife strongly agree while 21 % teachers, 20 % non-teaching, 15 % students and 7 % housewife agree that they noticed health benefits from this mask after 15 days of use. Only 4 % teachers, 1 % non teaching and 5 % student disagree that they noticed health benefits from this mask after 15 days of use. Most of the respondents i.e. 27 % respondents strongly agree and 63 % respondents agree that they noticed health benefits from this mask after 15 days of use whereas 10 % respondents disagree that they noticed health benefits from this mask after 15 days of use. Maximum respondents agreed that they noticed health benefits from this mask after 15 days of use(Fig. 4).

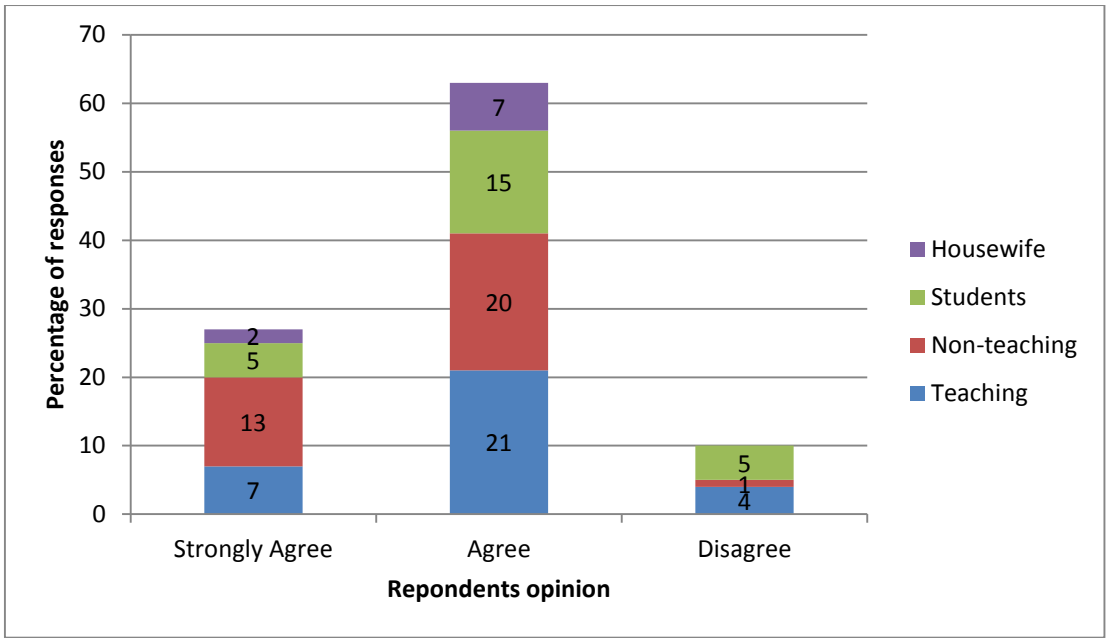

Fig. 4. Percentage of respondents who noticed health benefits from the mask after 15 days of use

5.It was found that 14 % teachers, 9 % non-teaching, 8 % students and 1 % housewife strongly agree while 14 % teachers, 14 % non-teaching, 15 % students and 6 % housewife agree that after 15 days fragrance of the mask relatively decreases; due to release of fragrance. Due to most of microcapsules get burst over after the period of use i.e.15 days. Only 4 % teachers, 10 % non-teaching, 2 % students and 2 % housewife disagree that after 15 days fragrance of the mask relatively decreases. Most of the respondents i.e. 33 % respondents strongly agreed and 49 % respondents agreed that after 15 days fragrance of the mask relatively decreases. Most of the respondents agreed that after 15 days fragrance of the mask relatively decreases (Fig. 5).

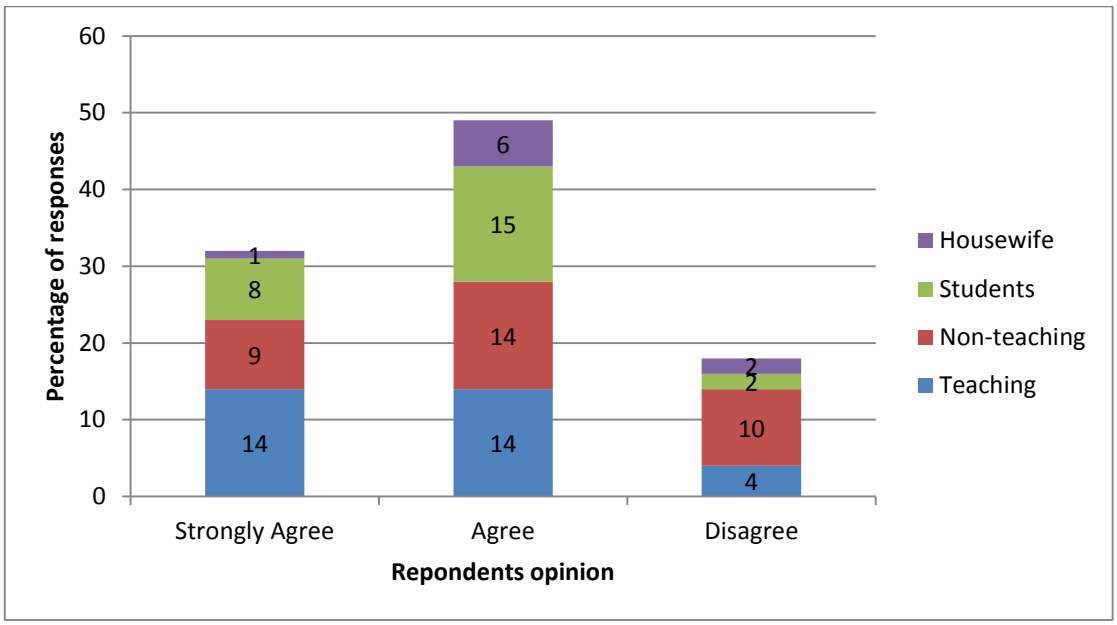

Fig. 5. Percentage of respondents who think that after 15 days fragrance of the mask relatively decreases

6. It was clear from the study that 16 % teachers, 18 % non-teaching, 17 % students and 5 % housewife strongly agree while 15 % teachers,16 % non-teaching, 7 % students and 4 % housewife agree that mask was safe for them as it has no side effects. Only 1% teacher and 1% student disagree that mask was safe for them as it has no side. Most of the respondents i.e. 56 % respondents strongly agree and 42 % respondents agree that the mask was safe for them as it has no side effects while 2% respondents disagree that the mask was safe for them. Most of the respondents agreed that masks treated with *Ocimumbasilicum*was safe for them as it had no side effects(Fig. 6).

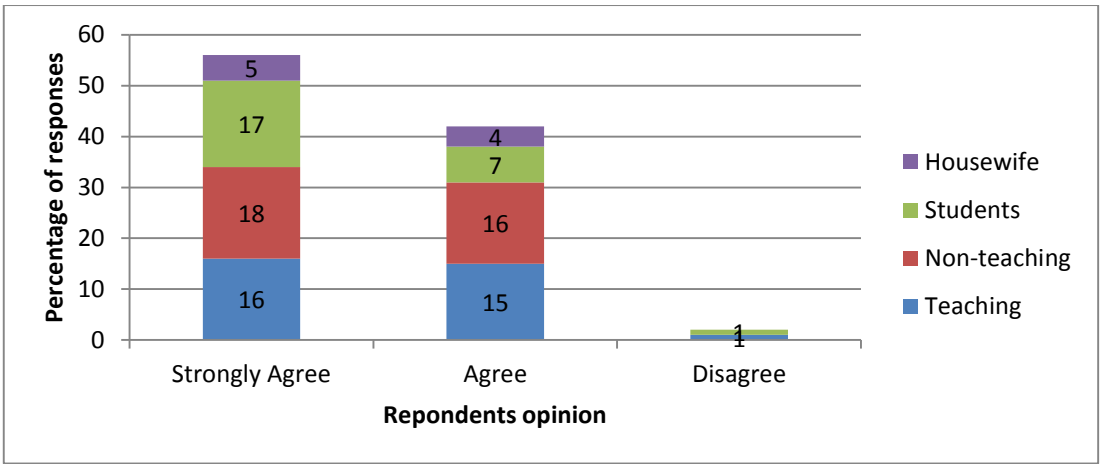

Fig. 6. Percentage of respondents who considered masks treated with *Ocimum basilicum* was safe for them

IV. Conclusion

It was concluded from the present study that masks treated with *Ocimumbasilicum* was safe, comfortable, helpful in reducing stress of people caused by pandemic. Respondents noticed health benefits after using mask for 15 days. It was found that the original characteristic of treated cotton fabric was not changed and it is found that after 15 days fragrance of the mask relatively decreases.

References

[1]. Rajput KR. Medicinal value of Tulsi. Facts for you.Retrieved from www.google.com .last accessed 2017/10/04.
[2]. Jamshidi N and Cohen M M. The clinical efficacy and safety of Tulsi in Humans: A Systematic Review of the Literature. Retrieved from https://www.hindawi.com/journals/ecam/2017/9217567.last accessed 2021/04/19.
[3]. Freney J. and Renaud F. Textiles and Microbes. Retrieved from https://www.researchgate.net/ publication/258733042_Textiles_and_Microbes .last accessed 2021/04/02.
[4]. Hammad U., Nigam H, Tamboli A M and Nainsar M S M. Microencapsulation: process, techniques and applications. Int J. of Res. in Phar. and Biom. Sci., 2(**2**):474-481(2011).
[5]. Shenai V.A. The wool fiber. Technology of textile Processing.1:59-71(1976)
[6]. Thilagavathi G, Bala S K and Krishna Bala. Micorencapsulation of Herbal extracts for microbial resistance in healthcare. Ind. J. of Fib. and Text. Res., 32:351-354(2007).
[7]. Bhatia A and Sharma R K. Measurement Techniques in Home Science. Haryana Agricuitural University Press: 12-13(1984).