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Study of different composition for preparation of incense stick using marigold flower waste

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Abstract

Offering flowers to God is very popular in India, every day around 0.5 M people go to temples and offer flowers. As per estimates, 800 MT of flowers are offered at various mosques, gurdwaras and temples in the country. After satisfying their purpose flowers are discarded in water bodies, which is the major reason for water pollution. The main purpose of the research is the utilization of waste flower. In this study finding the best composition for incense stick making where good amount of flower powder used. Incense stick character stick surface, smell quality, burning duration, test weight, and stick diameter among all the combination the treatment T₁₁ (Charcoal 10%+ Sawdust 10%+ Jigat powder 20%+ Flower powder 60%) showed better result.

Keywords: Incense stick, temple waste, waste flower and flower powder

Introduction

India is a nation with lots of different religions where, worshiping is the way of living and people offer various offerings to the deities, out of which floral offerings are found in huge quantity. As a result, the amount of flower waste in temple waste is exceptionally high. After satisfying their purpose, flowers and other waste end up in the garbage or are dumped into rivers, seas, or oceans, which causes a variety of environmental issues. Common flowers offered in various religious places are marigold, rose, jasmine, chrysanthemum, hibiscus, *etc.* At present total production of flowers in our country is 2785000 metric ton. Growing at a compound annual growth rate (CAGR) of floriculture market of 20.1% during 2019-2024 (Sharma, 2021)^[1]. Therefore, India's production of floral waste will increase in the future. The large-scale consumption of flowers during religious festival carried out throughout the country. Every day around 0.5 M people go to temples and offer flowers. As per estimates, 800 MT of flowers are offered at various mosques, Gurudwaras, and temples in the country. More than 8 MT of flowers are dumped in the water body every year, along with toxic insecticides and pesticides used in their cultivation. There are so many places of worship in India that generate 20 T of flower waste every day (Sharma, 2021)^[1]. Much of it ends up in landfills, where it does not decompose as it would naturally because it is mixed with other non- biodegradable waste and disposal of flowers in rivers, oceans, *etc.* which leads to water pollution as well as affects the living organisms present in the water. Human and environment are closely interwoven in order to maintain the equilibrium of the nature. Natural resources exploration, in term of industrialization is carried out to fulfil the human needs. In other side, the rapid growth of population has an impact on the increase of pollution level that lead to environment deterioration (Soedjono *et al.*, 2018)^[2]. One of the problems indicating to the degradation of the environment is the generation of untreated waste. Waste is generated from any activities and due to insufficient waste management facilities, it is ended up to the landfill (Yadav *et al.*, 2015)^[3]. To evade ill effects caused by disposal of floral related offerings, they can be used to make some valuables. Incense sticks are made from flowers like marigolds (*Tagetes spp.*) and roses are used to make rose water. In addition to rosewater and incense sticks, the flowers can be used in herbal products like herbal colours, natural dyes, *etc.* We can also recycle this floral waste to reuse it for various purposes, like in case of Ajmer, where floral waste management has yielded good Pay Off is that of Ajmer Sharif Dargah of Khwaja Moinuddin Chishti where nearly 15 to 18 Quintals of flowers, offered each day were used to be dumped in a well (Adhikary *et al.*, 2020)^[4].

Incense stick and Dhoop lighting is a common practice in most Indian households. Incense is used widely in many religious practices to deepen attention and uplift one's own spirit when practicing meditation. When an incense stick is lit, it releases a distinct aroma that permeates the surroundings. According to studies, the incense's essential oils are said to help clear nasal blockages and enhance air quality, simulating the beneficial effects of aromatherapy. As a result, it is kept in particular and frequently used in alternative healing facilities. Incense sticks have some health advantages as well. The incense's organic scents can lift your spirits. It is believed that the incense sticks' aromas have natural calming and soothing healing properties.

Materials and Methods

Collection of flowers and making flower powder

The flowers collected from different temples of Raipur (C.G.), remove unnecessary things from it, select only flower petals for making flower powder. Dry the flower petals properly in the sun and then grind it in grinder.



Fig 1: Flower powder making process

Other ingredients

Charcoal

The wood becoming black on burning is crushed to the required mesh and used as a filler for incense stick. Dry wood is cut into pieces and put in kiln like structure and fired from below and the entire layer is covered by mud. After formation of charcoal, it sent to the crushing units.

Sawdust

Sawdust are tiny particles of wood that are formed from sawing or sanding wood. It was collected from the factory producing wooden furniture and then cleaned and finely sieved for equal particle size. Fine saw dust particles were used.

Jigat powder

Jigat is a binding material it is essential element for the making of incense stick. It can be separated by peeling of barks of tree species like *Litsea chinensis*. Jigat is a vernacular word signifying "sticky" that is used in the Karnataka province of India. Currently, 50 percent of the demand for Jigat is accomplished by importing the material from Malaysia and Thailand.

DEP oil

Diethyl phthalate (DEP) oil is colourless substance that insoluble in water. Used as fragrance evaporation retardant

makes fragrances long lasting by slowing evaporation.



Fig 2: Ingredient's



Fig 3: Rolling of paste on stick

Fragrance

Fragrance provides good aroma in incense stick that are selling point of incense stick. Fragrance creates soulful atmosphere and mindfulness.



Fig 4: Shade drying of incense stick

Bamboo stick

Bamboo sticks are round, long (20 cm – 26 cm) and very thin pieces of plant with hard hollow jointed stem. Good finished bamboo sticks are available with incense stick dealers. Care

must be taken not to store it in wet and humid condition as fungus may develop and reduce the strength of the stick.

Formulation of incense stick

Incense sticks are prepared by mixing different ingredients (charcoal, jigat powder, sawdust and flower powder) with sufficient quantity of water to make dough. The paste or dough is wrapped on a bamboo stick by rolling. After shaping the incense stick it is dried in the shade for 6-7 days, so that the moisture completely comes out of the incense stick. Normally the ends left blank or naked are 3 cm for 20 cm bamboo stick.

Adding fragrance in incense stick

Incense stick fragrance is a major component which influence both its quality and functional aspects and helps the consumer to differentiate between brands. It helps the incense stick makers to create special identity in the market. It is a challenging job for incense stick maker to get distinct fragrance to be used on an incense stick. The quality and purpose of use should be kept in mind while choosing fragrance for incense stick which will be useful for marketing the product. To add fragrance in incense stick, sandalwood perfume and DEP oil are mixed in 1:4 ratio. After that, the dried incense sticks are dipped in this mixture for 10-15 seconds and kept in the shade for 2-3 days to dry.



Fig 5 & 6: Adding fragrance in incense stick

Table 1: Treatment details

Treatment	Combination of treatments
T ₁	Charcoal 80% + Jigat powder 20% (Control)
T ₂	Charcoal 60% + Jigat powder 15% + Flower powder 25%
T ₃	Charcoal 40% + Jigat powder 20% + Flower powder 40%
T ₄	Charcoal 50% + Jigat powder 20% + Flower powder 30%
T ₅	Charcoal 50% + Sawdust 10% + Jigat powder 15% + Flower powder 25%
T ₆	Charcoal 40% + Sawdust 5% + Jigat powder 25% + Flower powder 30%
T ₇	Charcoal 35% + Sawdust 5% + Jigat powder 25% + Flower powder 35%
T ₈	Charcoal 30% + Sawdust 10% + Jigat powder 20% + Flower powder 40%
T ₉	Charcoal 25% + Sawdust 20% + Jigat powder 25% + Flower powder 30%
T ₁₀	Charcoal 20% + Sawdust 15% + Jigat powder 20% + Flower powder 45%
T ₁₁	Charcoal 10% + Sawdust 10% + Jigat powder 20% + Flower powder 60%
T ₁₂	Jigat powder 30% + Flower powder 70%

The experimental data were analysed by one way ANOVA and CRD was followed for analysing the data of the present study. The data were analysed for main and interaction effect

at probability level of 5%.

Quality characteristics of incense stick

Physical parameters viz., test weight, diameter and burning duration test were carried out at ambient room condition. Being made by hand, the incense sticks were not of the same diameter at all places, so by taking the diameter of three different places with the help of vernier calliper, the mean was taken as the diameter of the incense sticks. For test weight, five samples of incense sticks from each treatment were randomly selected. Weighed all the incense sticks separately and calculated their mean. For burning duration test five sample of incense stick from each treatment were randomly selected. Duration is recorded with the help of stopwatch. Sensory evaluation of incense stick was assessed by the panel of four professors and ten students of the Department of Floriculture and Landscape Architecture for the colour, appearance and smell quality were attributes for this study. Samples from each treatment were coded and presented to the panel for evaluation. The ratings assigned by the panel were numerical scores ranging from one to five points as outlined by Amerine *et al.* (1965)^[5].

Results and Discussion

Stick diameter (mm)

The minimum diameter 2.99 mm was observed in treatment T₁₁. However, it was significantly smaller than other treatments. The maximum diameter 4.22 mm was observed in treatment T₅. The smaller diameter of incense stick in treatment T₁₁ is due to less amount of charcoal and sawdust which does not stick to the hands while rolling the incense stick, so that it is easy to roll the incense stick thinly.

Table 2: Quality parameter of different treatment

Treatment	Stick diameter (mm)	Test Weight (g)	Burning duration (minute)
T ₁	4.06	2.43	82.97
T ₂	4.18	2.37	78.07
T ₃	3.92	2.24	78.20
T ₄	3.61	2.09	88.17
T ₅	4.22	1.94	84.08
T ₆	3.49	1.88	88.90
T ₇	3.38	1.76	94.01
T ₈	3.83	1.73	92.86
T ₉	3.48	1.68	98.18
T ₁₀	3.23	1.74	101.21
T ₁₁	2.99	1.65	103.03
T ₁₂	3.15	1.94	2.19
CD at 5%	0.18	0.04	3.79
SE m±	0.06	0.12	1.28

Test weight of incense stick (g)

The minimum test weight 1.65 g was observed in treatment T₁₁. However, it was significantly smaller than other treatments. The maximum test weight is 2.43 g was observed in treatment T₁. The minimum test weight of incense stick in treatment T₁₁ is due to the diameter of incense stick of that treatment is smaller that means less amount of premix has been used in that treatment.

Burning duration of incense stick (Minutes)

The highest burning duration 103.03 minutes was observed in treatment T₁₁. However, it was significantly higher than other treatments. The minimum duration 2.19 minutes was

observed in treatment T₁₂. The highest burning duration of incense stick in the treatment T₁₁ is due to that treatment premix has moderate amount of burning material *i.e.*, Charcoal and sawdust and high amount of flower powder which can helps the incense stick to burn slowly. The minimum burn duration is in treatment T₁₂ sticks because the premix of that treatment doesn't use burning material due to which the stick does not burn completely.

Table 3: Sensory score of different incense stick for various attributes

Treatment	Stick Surface	Stick colour	Smell quality
T ₁	4.33	4.87	4.50
T ₂	4.50	4.77	4.43
T ₃	4.23	4.67	4.13
T ₄	3.87	4.50	3.87
T ₅	3.77	4.50	3.77
T ₆	3.87	4.30	3.87
T ₇	4.63	4.43	4.50
T ₈	4.73	4.27	4.57
T ₉	4.53	3.77	4.47
T ₁₀	4.73	3.77	4.83
T ₁₁	4.87	3.13	4.93
T ₁₂	3.83	4.67	3.20
CD at 5%	0.56	0.49	0.47
SE m±	0.19	0.16	0.16

Cost for preparation of incense stick

The calculation reveals that the minimum preparation cost for making twenty stick 8.81 rupee was recorded in treatment T₁₁. The maximum preparation cost 9.35 rupee was recorded in treatment T₂. Treatment no T₁₁ has minimum preparation because there is low amount of Jigat powder, charcoal and sawdust is used.

Table 4: Cost of preparation

Treatments	Rupee
T ₁ : Charcoal 80%+ Jigat powder 20%	9.26
T ₂ : Charcoal 60% + Jigat powder 15% + Flower powder 25%	9.35
T ₃ : Charcoal 40% + Jigat powder 20% + Flower powder 40%	9.21
T ₄ : Charcoal 50% + Jigat powder 20% + Flower powder 30%	9.20
T ₅ : Charcoal 50% + Sawdust 10% + Jigat powder 15%+ Flower powder 25%	9.11
T ₆ : Charcoal 40% + Sawdust 5% + Jigat powder 25% + Flower powder 30%	9.19
T ₇ : Charcoal 35% + Sawdust 5% + Jigat powder 25% + Flower powder 35%	9.14
T ₈ : Charcoal 30% + Sawdust 10% + Jigat powder 20% + Flower powder 40%	9.02
T ₉ : Charcoal 25% + Sawdust 20% + Jigat powder 25% + Flower powder 30%	9.10
T ₁₀ : Charcoal 20% + Sawdust 15% + Jigat powder 20% + Flower powder 45%	9.05
T ₁₁ : Charcoal 10% + Sawdust 10% + Jigat powder 20% + Flower powder 60%	8.81
T ₁₂ : Jigat powder 30%+ Flower powder 70%	9.00

Discussion

Incense stick are the important part of every Indian ritual beyond religion and cast. The sticks are used to spread good energy and are thought to encourage concentration, which eventually brings every soul within reach to godliness. The prepared incense sticks were scented with sandalwood perfume. When burned, it produced a pleasant aroma, and even after the stick was completely consumed, the aroma

persisted. Additionally, it produced less ash and it is a herbal product.

Conclusion

The study finds the best composition for incense stick making from marigold waste flower. Our purpose is to utilize the waste flower. Incense stick character like surface, colour, burning duration *etc.* It may be concluded that the one whose diameter is less and whose test weight is less, it will be better than those whose diameter and test weight are high, diameter directly affect the test weight. Treatment T₁₁ is considered the best because it has the longest burning duration 103 minutes and 60% flower powder is used in it. Because the amount of charcoal has been reducing in this treatment so air pollution will also be reduced, compare to the incense stick available in the market, which contain 80-90% charcoal. Treatment T₁₂ in which maximum 70% flower powder is has been used, it is not burning completely because no burning material is added to it.

References

- Sharma RK. Floral Waste management and opportunities. Just agriculture e-magazine; c2021.
- Soedjono ES, Fitriani N, Rahman R, Wijaya IMW. Achieving water sensitive city concept through Musrenbang mechanism in Surabaya City, Indonesia. *GeoMate Journal*. 2018;15(49):92-97.
- Yadav I, Juneja S, Chauhan S. Temple Waste Utilisation and Management: A review, *International Journal of Engineering Technology Science and Research*, ISSN. 2015;2:2394-3386.
- Adhikary K, Vishwavidyalaya M. Management of Temple Floral Waste and Utilization of Value-Added Floral Waste Product: A Review. *International Journal for Environmental Rehabilitation and Conservation*. 2020;11:120-128.
- Amerine MA, Pangborn RM, Roessler EB. Principles of sensory evaluation of food Academic Press. New York/London; c1965. p. 235-241.