EVALUATION AND CONVERSION OF TEMPLE WASTE FLOWERS INTO INCENSE STICKS IN TUMAKURU DISTRICT OF KARNATAKA, INDIA

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Original scientific paper
Received: October 23rd, 2021
Accepted: November 24th, 2021
HAE-2178
https://doi.org/10.33765/thate.13.1.2

ABSTRACT

In any waste management process, the 3 R's, i.e., Recycling, Reuse and Recover play a very important role. The present work focuses on collection, handling, and usage of waste flowers. A large volume of flower waste generated daily at Tumakuru is improperly disposed of in open places or in dust bins and finally reaches landfill along with the other municipal solid wastes. As a part of India's Swachh Bharat programme, this paper gives an idea of reducing the flower waste quantity and converting them into incense sticks. The various types of flowers were analysed and compared based on the results obtained from physicochemical properties. SEM and EDS were used to determine the surface morphology and chemical compositions of crushed flowers, respectively. From the SEM study, it can be seen that filament type, cave type and stripelike textures were observed on the surfaces of crushed flowers, and the EDS analysis has shown that the rose flower powder has a rich amount of carbon (66.98 %) and yellow chrysanthemum flower contains less carbon (37.68 %) compared to other crushed flowers. Also, this paper demonstrates the practical aspects in making incense sticks from flower waste. It was suggested that dumping process must be managed with flexibility, following strict implementation of the applicable legislation, and awareness programs are needed to collect and reuse flower waste from different sources.

Keywords: *municipal solid wastes, flower waste, scanning electron microscopy, recycling, waste management, incense sticks*

INTRODUCTION

In any waste management process, the 3 R's, i.e., Recycling, Reuse and Recover play a very important role. Environmental degradation, climate change, waste disposal and management, and sustainable development are all significant concerns for human society. Many temples can be found in India, and they attract a large number of devotees. Flower garlands, vegetables, coconut, sweets, and other edibles are offered to the God by the pilgrims. The edibles are normally taken out to be distributed as *prasada* to the devotees and consumed by priests, temple administrators, and other temple workers. Non-consumable materials, such as flower garlands, are thrown away after being offered to God.

Municipal solid waste (MSW) usually consists of more degradable materials (> 70 %) that may be responsible for the emission of greenhouse gases in the nature [1]. The nation faces big issue of waste management with rapid urbanisation. More than 377 million urban citizens in India live in 7,935 cities and towns, producing 62 million tonnes (Mt) of MSW per year. Just 43 Mt of waste is collected, 11.9 Mt is treated, and 31 Mt is disposed of at landfills [2]. Of the 62 Mt waste produced, 5.6 Mt is plastic waste, 0.17 Mt is hospital/biomedical waste, 7.90 Mt is hazardous waste, and 1.5 Mt is e-waste. Overall, 75 - 80 % of municipal waste is collected and only 22 - 28 % of this waste is treated and processed [3]. More than 90 % of Indian MSW is disposed of on land in an unscientific and inappropriate way [4].

India is home to many diverse cultures and religions. Distinguished by different ideologies, traditions and rituals, the country has a place to worship in every corner although there are numerous religions in India. Temples are considered as the symbol of prayers and worship. There are countless temples situated in every part of the country, producing temple waste/holy waste. Flower waste or floral waste is also considered as one of the MSW. So, its management also plays a key role. It was estimated that around 800 million tonnes of flowers are offered across the temples, mosques, gurudwaras and in other worshiping centres in India [5].

When compared to kitchen waste degradation, floral waste degradation is a very slow process [6]. As a result, a proper and environmentally friendly floral waste treatment process is needed. To prevent the negative consequences of discarding the flower offerings, they can be used to create useful products. Herbal incense sticks may be made from flowers gathered from temples. Incense sticks are made from flowers like genda, and rose water is made from roses. Aside from incense sticks and rose water, the flowers can also be used in herbal items like herbal colours, natural dyes and activated charcoal etc.

At all places of worship, religious events, festive occasions, and weddings, everybody uses *agarbatti* (incense sticks). This in itself demonstrates how important *agarbatti* is. Because of the improvement in quality and the expansion of product varieties, the demand for *agarbatti* is growing both in the domestic and export markets. India is the world's largest producer of *agarbatti*.

Incense sticks are an integral part of prayer in any Indian household; without them, the puja (ritual) is incomplete. Incense burning, on the other hand, creates air pollution, which can be harmful to one's health, particularly if the room isn't well ventilated; the smoke produced creates toxic gas and particulate matter, which can be a major source of indoor pollutants [7]. In fact, the smoke from incense sticks may be as harmful as cigarette smoke [8]. The chemicals found in the incense being burned determine the form of contaminants emitted into the air. However, according to Jetter et. al. [9], the concentrations of carbon monoxide (CO), nitric oxide (NO), and sulphur dioxide (SO_2) gases contained in incense smoke could be high enough to damage human health. It is important to reduce the amount of air pollution emitted in the smoke by selecting incense made from natural, plant-based ingredients without the addition of harmful chemicals. Incense that is smokeless or low-smoke is preferable over high-smoke incense. It is necessary to avoid using a charcoal briquette to burn resin incense. Additional air pollutants, such as carbon monoxide, can be produced by the smoke from burning charcoal [10].

Many researchers have used waste flowers for various purposes (Table 1) to avoid mismanagement, and as a result, it was found that it can be controlled to a large extent. However, there are very few published studies on the conversion of used flowers into incense sticks by way of the analysis of various kinds of flowers and raw materials for making incense sticks using scanning electron microscopy (SEM) and energy-dispersive X-ray spectroscopy (EDS); furthermore, there are no studies on favourable limits of physicochemical parameters for making incense sticks either. Therefore, this is one of the first attempt to show the technical points in making incense sticks from used flowers.

Problems due to mismanagement of flower waste

Since temple offerings are considered sacred, their disposal in landfills is not recommended. Most temples throw waste into local water bodies, such as rivers, ponds and lakes. Presently, in the various regions of India, flowers are discarded into the water bodies in the least eco-friendly manner. About 8 Mt of flower waste are dumped in the Indian rivers each year [11]. The amount of pollution caused by the flowers is immense. Due to the fact that most of the flower waste is thrown directly into water bodies, organic matter present in the flowers decomposes and results in algal blooms and eutrophication in lakes, which can further deplete oxygen levels in the water bodies and cause marine life to die. These decayed flowers may also cause pollution problems on land. This type of activities finally results in the alteration of the ecosystem. There are several temples in the country, particularly those in the Ganga basin, which dump daily waste directly into the river without segregating it into biodegradable and non-biodegradable components. Although industrial runoff in Ganga is not only responsible for the pollution status, floral waste hardly gets all the blame. Floral waste accounts for 16 % of the total pollution of the river [5].

MATERIALS AND METHODS

Study area

The Tumkur or Tumakuru district is located in the southern portion of the Karnataka state, on the eastern belt. According to the Census of India 2011 (Karnataka), it covers a total area of 10597 km^2. In terms of area, it is the third largest district in the state. Tumkur district is the fourth most populous in the state, with a total population of 2678980 people. The district extends 174 km north to south, and 125 km east to west.

Table 1. Utilisation of waste flowers given in literature

	Materials used	Process	References
1.	Flower waste and vegetable waste	Vermicomposting	[12, 13]
2.	Flower waste and cattle dung	Vermicomposting and bio methanation	[14, 15]
3.	Rose petals	Extraction of essential oil	[16, 17]
4.	Saffron petals, marigold flowers	Extraction of dye	[18, 19]
5.	Vegetable waste and waste flower	Generation of biogas	[20]
6.	Marigold, rose, sunflower	Generation of biogas	[21]
7.	Flower waste	Generation of biogas	[22]
8.	Flower waste	Making of incense sticks	[23, 24]
9.	Flower waste	Making of herbal Holi colours	[25]
10.	Flower waste	Activated carbon	[26]
11.	Waste flowers	Production of handmade paper	[27]
12.	Waste flowers	Biosorption	[28]
13.	Red rose	Biosorption	[29]
14.	Flower mahua	Sugar syrup preparation	[30, 31]

Location and size

The district is located between latitudes 12°44' to 14°20' north and longitudes 76° 20' to 77° 31' east. The district's highest and lowest points are at 1000 and 600 m above mean sea level, respectively.

Climate and rainfall pattern

The district's climate is usually pleasant. However, the climate is relatively hot in very few regions. During the summer season, the maximum temperature can reach 40 °C or 41 °C. During the winter season, average minimum temperatures range from 9 to 10 °C. According to KSNDMC Karnataka, Tumakuru district recorded 782 mm of rainfall in 2019, which is 12 % more than its normal value of 697 mm.

Geology and soil

Tumkur district is geologically located on the archaeon complex. The crystalline schists, granitic gneisses, and newer granites reflect the rock formations. The district's soil is usually hard and sparsely fertile. Red soil, black soil, and sandy soil are the most common types of soil found in the district.

Worshiping centres

The Tumakuru district is famous for Sree Siddaganga Math, one of the oldest Gurukulas and a worshipping centre. According to Hindu religious and Charitable Endowments Department, the district has 8 A grade, 10 B grade and 2443 C grade temples and its classification is depending on temple income per year. A grade temple has an annual income of more than 2500000, a B grade temple has an annual income of 1000000 to 2500000, and a C grade temple has an annual income of less than 1000000. List of A Grade temples are given the Table 2.

Table 2. List of A Grade temples in Tumakuru district

	Temple name	Place
1.	Sri Siddhalingeshwara temple	Yediyuru, Kunigal Taluk
2.	Sri Lakshminarasimha swamy temple	Devarayana Durga, Tumakuru Taluk
3.	Sri Huliyuramma temple	Haleuru, Kunigal Taluk
4.	Sri Dandina Maramma temple	Madhugiri town
5.	Sri Lakshminarasimha Swamy Temple	Rajatadripura, Tiptur Taluk
6.	Sri Subrahmanya Swamy temple	Nagalamadike, Pavagada Taluk
7.	Sri Channabasaveshwara Swamy temple	Gubbi
8.	Sri Siddarameshwara temple	Yalanadu, Chikkanayakanahally Taluk

Some other popular temples include Goravanahalli Mahalakshmi temple, Sri Channakeshava temple at Turuvekere, Seebi Narasimha Swamy temple, Sri Shani Mahatma temple at Pavagada, Chowdeshwari temple at Dasarighatta, Siddeshwara swamy temple at Siddarabetta, Shetty hally Anjaneya temple and Sai Baba temple at Tumakuru city. Flowers such as roses, white chrysanthemums (WC), yellow chrysanthemums (YC), marigold (MG), tuberose (TR) and tulsi/basil are commonly used in temples. Every day, worshippers offer these flowers in temples, which subsequently usually reach landfills along with other wastes. India is a country of festivals, and several activities are commemorated during the year, resulting in the generation of solid waste. This type of waste is often overlooked and deserves special attention. Many people refuse to throw flowers and other things used for prayers in the trash because of their religious values, placing them instead in plastic bags and throwing them directly into bodies of water. Flowers are still held under sacred trees, so there is no appropriate method of disposal.

The present study focuses on utilization and conversion of the large volume of waste flowers into sustainable products by applying science techniques and analysis the physico-chemical characteristics of the flower samples.

According to door-to-door survey at the temples of Tumakuru city, it has been observed that the storage of all forms of temple waste at the point of generation was not maintained properly and there was no adequate waste segregation, and the waste was contained in poorly maintained dustbins. Waste was sometimes thrown in community bins or dumped on surrounding streets, footpaths, open fields, drains, water sources, bare ground, and so on. This resulted in contamination of land and water, clogging of drains, and a variety of health risks for residents.

Utilization of temple waste flowers

For the present study, waste flowers such as rose, WC, YC, MG, TR and Tulsi were collected from the temples in Tumakuru city, and the following methodology was adopted for the preliminary process:

1. The first step is to collect flowers from different sources in and around Tumakuru,
2. Segregation of flowers is carried out on separate papers, plastics, and other unwanted materials. The petals were separated from the collected flowers and the remaining green parts of the flowers can be sent to composting.
3. Separated petals were washed with distilled water and sun dried. The dried petals of rose, WC, YC, MG, TR and Tulsi were crushed into powder with the help of a machine and used as a starting material, i.e., rose powder (RP), white chrysanthemums powder (WCP), yellow chrysanthemums powder (YCP), marigold powder (MGP), tuberose powder (TRP) and tulsi powder (TP), respectively. The complete processing of the waste flowers (collection, drying and powdering) is shown in the Figure 1.

a)

b)

c)

Figure 1. Preliminary process: collection (a), drying (b) and making powder from waste flowers (c)

Analysis of crushed flower samples (CFS)

Mass percentage of moisture content, ash content and volatile content, fixed carbon, bulk density (g/cm^3), porosity percentage and specific gravity of all CFS were determined according to standard procedures [26]. The surface morphology and elemental compositions of RP, WCP, YCP, MGP, TRP and TP have been characterized using SEM and EDS. SEM-EDS is operated at 10 kV and

15 kV. Images were taken at magnification 1000 - 5000x, with a working distance of 11 - 11.5 mm. Carbon tape was used to attach the powder samples to a holder. A thin layer of gold was also applied to the samples to provide an electrically conductive surface.

RESULTS AND DISCUSSION

Physical characteristics of CFS

All the collected flowers were subjected to various physical tests to learn about their suitability in making valuable products and to determine their quality. Results are shown in the Table 3.

Table 3. Physical parameters of CFS

	Parameter	RP	WCP	YCP	MGP	TRP	TP
1.	Moisture content, %	7.31	10.70	8.84	8.03	7.86	7.81
2.	Ash content, %	4.18	8.36	7.48	7.65	10.24	13.57
3.	Volatile matter, %	83	78.80	80.61	82.55	81.46	76.31
4.	Fixed carbon, %	5.51	2.14	3.07	1.77	0.44	2.31
5.	Bulk density, g/cm^3	0.21	0.18	0.19	0.25	0.18	0.39
6.	Porosity, %	40	65.38	59.57	66.27	61.7	51.25
7.	Specific gravity	0.35	0.52	0.47	0.75	0.47	0.80

The moisture content was computed as the ratio of loss in weight on drying and initial sample weight. Moisture content ranged from 7.31 to 10.70 %, whereas the lowest value is found in RP (7.31 %) and the highest is in WCP (10.70 %). Ash content is calculated as the ratio of ash weight and oven-dry weight of the sample. It is an inorganic residue that remains after combustion at a specific high temperature. Ash content ranged from 4.18 to 13.57 % and the highest value is found in TP (13.57 %), whereas the lowest value is in RP (4.18 %). The volatile matter is the gaseous phase formed during the thermal degradation of the sample. Volatile matter ranged from 76.31 to 83 % and the highest value is found in RP (83 %), and the lowest value in TP (76.31 %). Fixed carbon (FC) is the amount of carbon present in the sample. FC was calculated according to the following formula: FC = 100 − % (moisture content + volatile content + ash content). It ranged from 0.44 % to 5.51 %, with the highest value found in RP (5.51 %) and the lowest value in TRP (0.44 %). Bulk density is the mass of material per unit volume in its natural state. Values ranged from 0.18 to 0.39 g/cm^3. The highest value has TP (0.39 g/cm^3) and the lowest value is found in WCP and TRP (0.18 g/cm^3). Porosity is the ratio of volume of voids and total volume of sample. Its value varies from 40 to 66.27 %. The highest value is found in MGP (66.27 %) and the lowest value in RP (40 %). Specific gravity is defined as the ratio of material's density and the density of water at specific temperature. Its values ranged from 0.35 to 0.80. The highest specific gravity is found in TP (0.80) and the lowest value in RP (0.35).

SEM and EDS analysis

SEM produces images of a sample surface by scanning the surface with a focused beam of electrons. In the SEM imaging process, the electron gun generates high-energy electrons which are focused into a fine beam, which is scanned across the surface of the specimen. Elastic and inelastic interactions of the beam electrons with the atoms of the specimen produce a wide variety of radiation products, like backscattered electrons, secondary electrons, absorbed electrons, characteristic and continuum X-rays, etc. A sample of this radiation is collected by a detector and the collected signal is amplified and displayed on the computer. SEM-EDS in this study operated at 10 and 15 kV. SEM images were taken at magnification from 1000 to 5000x, with a working distance of 11 - 11.5 mm. It is the main technique for the analysis of morphological features, like size, shape, surface composition etc. In the past, SEM and EDS analyses for CFS were seldom performed, but in this study these analyses are more precise and focused on the chemical compositions and microstructures of the samples. Figures 2 - 7 show the surface morphology of the CFS. The filament type, cave type and stripe-like textures were observed in the SEM images of CFS and particle sizes range from 3.35 µm to 20.84 µm, 1.49 µm to 21.69 µm, 9.19 µm to 35.18 µm, 1.24 µm to 29.59 µm, 1.77 µm to 15.83 µm and 10.1 µm to 66.13 µm for RP, WCP, YCP, MGP, TRP and TP samples, respectively. Similar kind of morphology was observed in the crushed marigold flower in the study of Waghmode et al. [27].

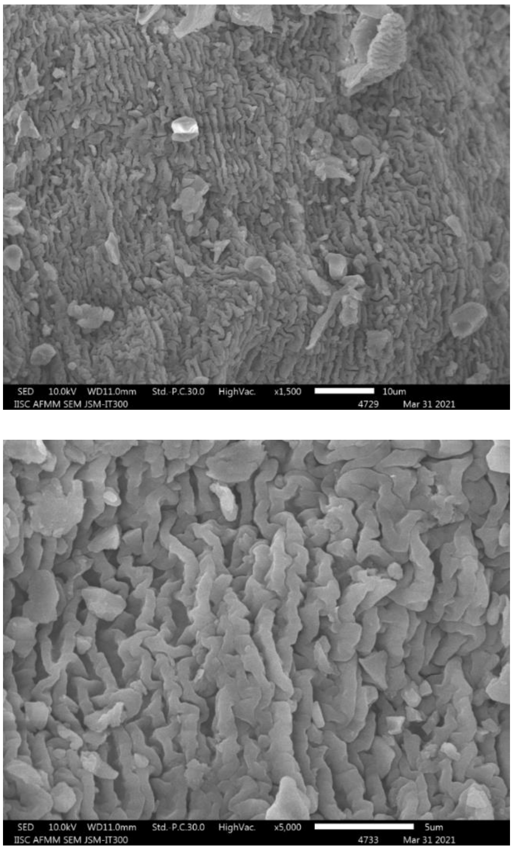

Figure 2. SEM images of RP observed at 1500x (top) and 5000x (bottom) magnification

The Table 4 shows the chemical composition of the CFS. From the EDS analysis it can be seen that RP has the highest carbon content (66.98 %) and YCP has the lowest carbon content (37.68 %) compared to other CFS. High carbon percentage contributes to good burning characteristics. In the EDS spectrum, the highest peak represents the highest percentage of element and lower peak represents lower percentage of the respective elements, whereas the X-axis and the Y-axis represent energy and intensity, respectively.

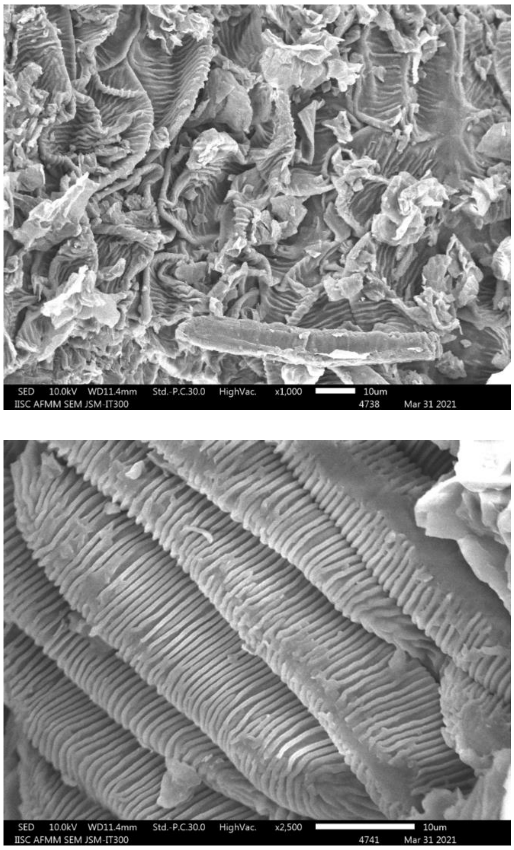

Figure 3. SEM images of WCP observed at 1000x (top) and 2500x (bottom) magnification

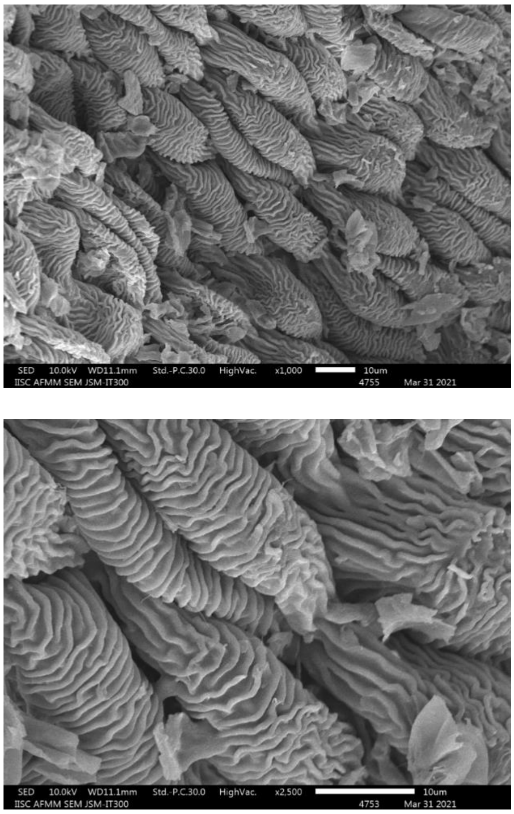

Figure 4. SEM images of YCP observed at 1000x (top) and 2500x (bottom) magnification

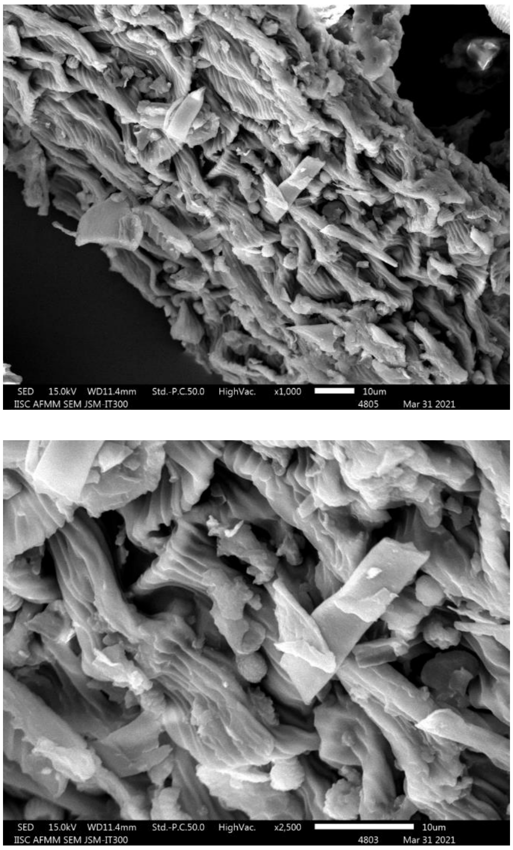

Figure 5. SEM images of MGP observed at 1000x (top) and 2500x (bottom) magnification

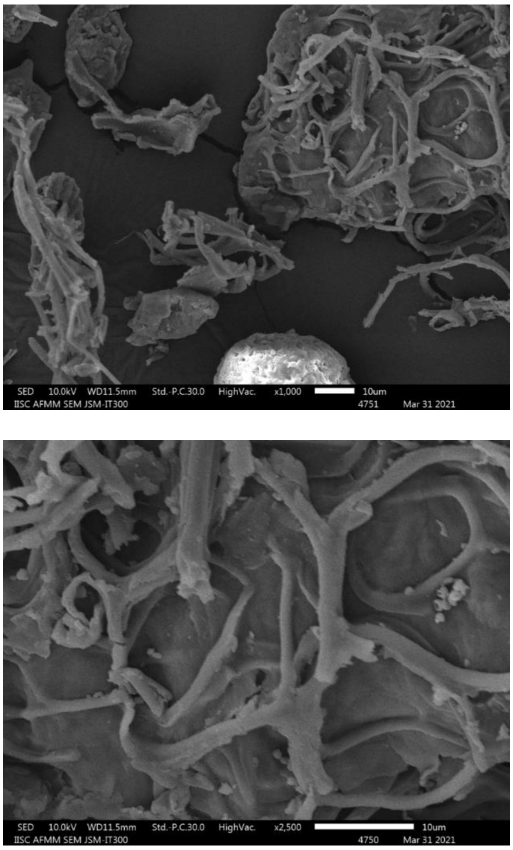

Figure 6. SEM images of TRP observed at 1000x (top) and 2500x (bottom) magnification

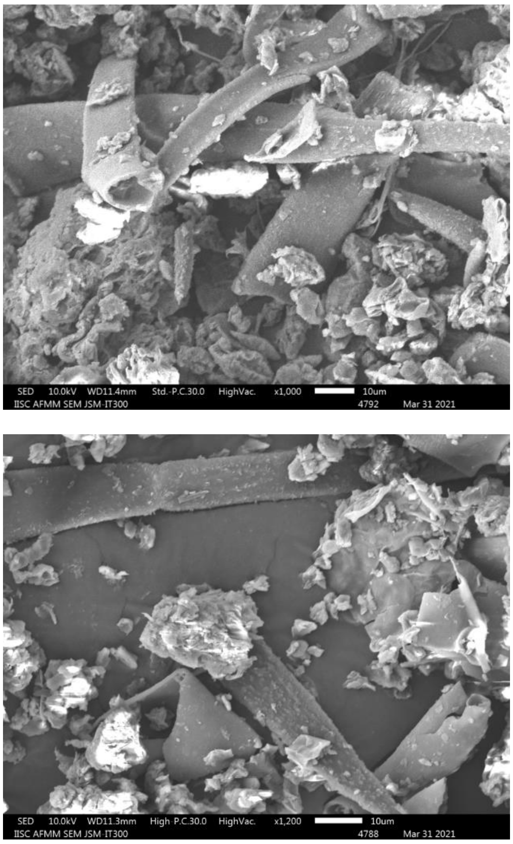

Figure 7. SEM images of TP observed at 1000x (top) and 1200x (bottom) magnification

Table 4. Chemical composition of CFS (EDS analysis)

Element	RP	WCP	YCP	MGP	TRP	TP
	wt. %					
B	-	1.82	0.01	1.30	1.95	1.27
C	66.98	54.46	37.68	54.35	51.40	52.35
N	-	0.05	0.01	0.40	4.24	0.12
O	19.30	30.78	34.14	26.52	26.57	20.09
Na	-	-	-	-	-	0.99
Mg	-	0.37	0.00	0.20	0.31	0.31
P	-	1.36	0.20	2.64	4.36	2.04
S	-	0.93	0.09	1.57	1.96	1.55
Cl	-	1.26	0.82	1.39	0.65	2.70
Al	0.25	-	-	-	-	-
Si	0.67	-	-	-	-	-
K	5.26	5.49	10.39	8.16	4.03	5.00
Ca	2.12	0.84	0.86	1.33	2.00	11.62
Mn	-	0.34	1.03	0.26	0.33	0.19
Fe	1.07	0.26	1.49	0.28	0.39	0.19
Ni	0.72	0.28	2.34	0.35	0.46	0.26
Cu	1.84	0.59	6.26	0.67	0.68	0.69
Zn	1.79	0.54	4.69	0.58	0.68	0.61
Total	100	100	100	100	100	100

Conversion of flower waste into incense sticks (*agarbatti*)

The raw materials needed to make incense sticks are CFS, jigat powder (JP), wood powder (WP), and bamboo sticks. Moisture content, ash content, volatile content, fixed carbon, bulk density (g/cm^3), porosity percentage and specific gravity of all CFS, WP and JP were determined according to standard procedures and the results are shown in the Tables 3 and 5. The surface morphology and chemical compositions of JP and WP have been determined using SEM and EDS, respectively, and are shown in the Figure 8 and Table 6. From the Table 5 it can be concluded that WP has a higher moisture content, fixed carbon, porosity and specific gravity than JP and JP has a higher values of ash content, volatile matter and bulk density compared to WP.

Table 5. Physical properties of WP and JP

	Parameter	Wood powder (WP)	Jigat powder (JP)
1.	Moisture content, %	5.97	5.22
2.	Ash content, %	4.40	5.17
3.	Volatile matter, %	87.5	88.34
4.	Fixed carbon, %	2.13	1.27
5.	Bulk density, g/cm^3	0.20	0.38
6.	Porosity, %	70.14	34.4
7.	Specific gravity	0.67	0.58

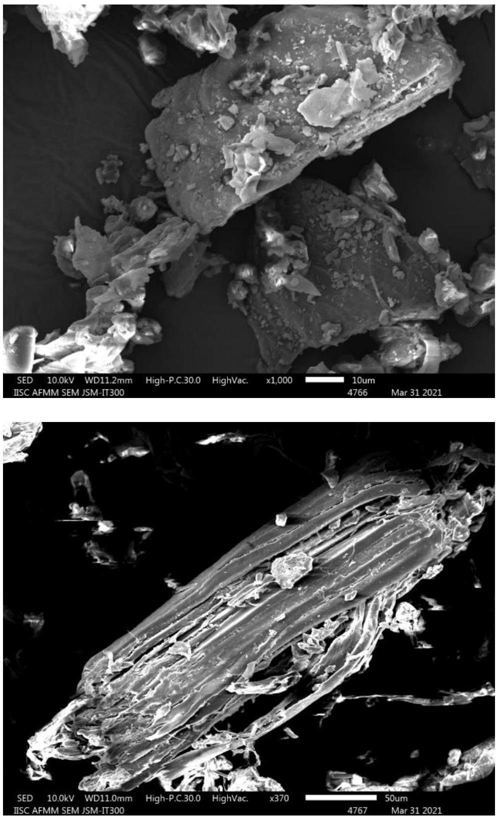

Figure 8. SEM images of JP and WP observed at 1000x (top) and 370x (bottom) magnific.

Table 6. Chemical composition of Jigat and wood powder (EDS analysis)

Element	Jigat powder	Wood powder
	wt. %	
B	2.51	0.93
C	56.79	54.396
N	0.30	0.018
O	34.06	30.146
Mg	0.44	0.046
P	1.20	0.614
S	0.90	0.608
Cl	0.09	0.834
K	2.00	2.072
Ca	0.49	3.58
Mn	0.24	0.842
Fe	0.18	1.434
Ni	0.17	1.11
Cu	0.26	1.776
Zn	0.37	1.588
Total	100	100

The dried CFS are mixed with the other ingredients, like JP and WP, in appropriate quantity using water, then the mixture is inserted into the *agarbatti* making machine along with the bamboo sticks. The *agarbatti* is collected from the machine and dried. If necessary, perfume can be added. WP and JP are purchased from outsourcing for this study. Mixing ratios of the raw materials were determined applying trial and error methods, keeping in mind that it would not affect its burning and other technical aspects. From various mixing ratios (CFS : WP : JP = 90 : 0 : 10, 80 : 10 : 10, 75 : 15 : 10, 70 : 20 : 10, 60 : 25 : 15), the ratios of 70 : 20 : 10 and 60 : 25 : 15 proved to be optimal in terms of burning, smoke etc. Wood powder is added to increase the burning property of the incense, in some cases WP is not needed. Jigat powder is a natural binding material with strong viscosity and adhesive properties. It is made by crushing the bark of the *litsea glutinosa* tree. A machine that makes incense sticks requires 550 - 650 g of water per 1 kg of other ingredients and approximately 1.5 kg of water per 1 kg of ingredients for hand rolled incense sticks. Figure 9 shows the handmade incense sticks made of flower waste.

For high quality *agarbatti*, according to expert suggestions and trial-and-error experiments, it was recommended that moisture content should be less than 10 %, ash content less than 15 % and bulk density around 0.20 - 0.45 g/cm^3 (CFS & WP) and 0.4 - 0.6 g/cm^3 for JP. EDS of WP and JP shows that JP contains about 56.79 % carbon, WP has 54.40 % of carbon and both contain other trace elements. In the past, no scientific studies have been done dealing with the analysis of various flower samples and incense sticks from flower waste. This study shows how used flowers can be effectively used to make eco-friendly incense sticks. In some parts of India, like Lucknow and Hyderabad, people use flower waste to prepare incense sticks. In Shirdi, Maharashtra, about 2 Mt of flower waste are treated every day to get 80 kg of *agarbatti* and used in the same premises of Shirdi Sansthan in Pooja to Shirdi Saibaba [23]. Generally, incense sticks made up of charcoal have a higher percentage of carbon and sulphur than CFS. These elements are indirectly responsible for the indoor air pollution. Therefore, the use of eco-friendly incense sticks made of flowers can reduce indoor air pollution to some extent.

Figure 9. Handmade incense sticks made of flower waste

CONCLUSION

Temple waste flowers have a major environmental and human health effects. Flowers are an important part of our religion. However, their disposal presents a significant environmental risk. Since flower offerings are considered sacred, they are not thrown in garbage cans when they wither, but in local water sources or rivers, polluting the water and causing ecological damage. The present study shows the use of the large volume of flower waste to make incense sticks, and provides analysis of the various crushed flowers and their suitability. From the SEM study, it can be seen that filament type, cave type and stripe-like textures were observed on the surfaces of crushed flowers. From the EDS analysis, it can be seen that rose flower powder is rich in carbon (66.98 %) and yellow chrysanthemum flower contains less carbon (37.68 %) compared to all crushed flower samples. Also, it was recommended that moisture content should be less than 10 %, ash content less than 15 % and bulk density around 0.20 - 0.45 g/cm^3 (crushed flower samples & wood powder) and 0.4 - 0.6 g/cm^3 for jigat powder. Incense sticks made of charcoal have a higher percentage of carbon and sulphur than crushed flower samples. These elements may be indirectly responsible for the indoor air pollution. It can be concluded that the use eco-friendly incense sticks made of flowers can reduce indoor air pollution to some extent.

To make sure that devotion does not turn into pollution, floral waste can be further turned into dyes, incense sticks, activated charcoal, food products, sugar syrup, compost, biofuels, biogas, bio ethanol, handmade paper, and other value-added products with a wide range of applications. Governments must play a significant role in raising awareness about temples on this topic, and they should develop creative programmes in various districts to collect and reuse floral waste from various sanctuaries, which will help improve the local economy by creating jobs and making marketable by-products. The disposal of temple waste in public areas, such as streets and bare fields, should be prohibited and temple employees should be encouraged to sort recyclable, biodegradable, and non-biodegradable waste and store it in designated bins. If we protect and wisely use the floral offerings in our prayers, we will be able to change our lives, beautify our environment, and build a better tomorrow.

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Acknowledgements

The authors are grateful to Indian Council of Social Science Research (ICSSR) - Impactful Policy Research in Social Science (IMPRESS) for funding this work.