

Unearthing of oils from wild herbs and Fabrication of efficient and economic tiny-scale machinery for its extraction.

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Abstract— With the sole purpose of empowering farmers and economically backward people by providing a mechanism to produce commercially viable value added products entirely from waste and other cheap raw materials is the motive of the project. First, the essential oil component inherent in wild grass was figured out. On identifying its usage, the specific grass is chosen as raw material. The raw materials used are surplus crops that are eventually wasted or crops that grow on their own with no expenditure. The proposed machine model extracts the essential oils from the wild grass which would have otherwise been burnt as waste. The model is suggested is very cheap in cost and easy to use. It can be easily operated and maintained. Keeping in mind the poor farmers, it is installable in a small place. The operating cost is also minimal. Thus, it can be confirmed that the process will satisfy the aim of the project-discovery of oil content in wild grass, fabricating machine for its extraction, thereby helping in the empowerment of poor farmers.

Keywords: Value added products; wild grass; raw materials; machine model; extraction; oil content; fabrication; extraction.

I. INTRODUCTION

In India, study of wild herbs for their oil content has not yet been widely done. I have found out through my study, the availability of valuable oil content in wild herbs. These wild herbs grow on their own during the monsoon rains. They are available in plenty and are usually burnt as waste. My project model helps to distill this oil economically and it is designed in such a way that it can be easily used by poor farmers.

So far in India, essential oil has been distilled only from cultivated crops. The crops are first cultivated in large scale, harvested, transported, segregated and are then finally processed for oil. This is the case for crops like rose, jasmine, vetriver etc. The machineries used are large scale ones. So, the cost of production is high. This scenario along with the ignorance of not knowing the inherent oil in wild grass has been the reason for the exploration of new techniques and ideas in this research field.

The raw material is filled fully in the still apparatus such that there is no gap for the presence of air. Steam or hot air is generated either by means of a boiler [Industrial] or by any

other means like burners and so on. Then, the steam is made to pass through the still's inner core through the openings present in it. The herbage present in the still will be heated up by the incoming steam, which ultimately results in the vapourisation of the oil content present in it. The yield oil is obtained by the passage of the oil along with the steam into the condenser which by means of water circulation makes the oil condense out, which is then collected down in the separator. The oil and the water present is separated out due to the variation in density. Thus the oil is then filtered and purified. It is now ready for its varied usages depending on the type of herbage used up.

II. EXPERIMENTAL

1) Sample collection and analysis

I collected a sample of each type of grass that I found on my way to our college, and sent it to Environmental Monitoring Service, Auroville for testing. They gave the report stating the oil content in each grass¹. It was proved as the Palmarosa oil was found soluble in 70% alcohol solution. I made further study in this field and found out that in an area of 400 sq.m, around 5 tonnes of grass are easily available in ungrazed lands. In the area around our college and also in the route to our college via Kovilpatti - Sankarankoil Road, Pandhalkudi - Aruppukottai Road, Sattur-Idukkankudi extending up to Melmandhai Route, there were several thousands of tonnes available. All these grasses were burnt to waste. They were not even utilized as a cattle crop. I sent a sample of each type of these grasses also to Environmental Monitoring Service, Auroville and found that each one had an inherent oil in it². This inherent oil has not yet been explored.

I visited a company and saw how they distilled oil from the Tulsi plant. This was a huge industrial process. I felt that the industrial method will not be viable for poor farmers and so I planned to do a tiny-scale machine which is cost effective and easy to operate. My proposed method will be capable of distilling the essential oil easily and effectively. Here I have listed some of usage of various types of oil.

I have also personally visited the places of cultivation. After studying the current situation, I have listed below the crops viable (or) that will benefit from my project, their location and their growing season. During the surplus seasons, the crops go as waste as they can't be preserved or marketed

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in a profitable manner. At this point, they can be used to distil oil using my project model which will be worth many times their original value. I am enclosing herewith the details I have collected.

TABLE 1 : USAGE OF DIFFERENT TYPES OF OILS

S. NO	LIST OF HERBAGES	OIL OBTAINED	PRICE / LITER (RS.)	USES
1	PALMAROSA GRASS	GERANOIL	2000	PERFUMES
2	CHILI	CHILI OIL	3000	CHILI OIL EXTRACTS
3	CITRONELLA OR LEMONGRASS	CITRONELLA OIL	2500	PERFUMES, SOAPS, MOSQUITO REPELLANTS
4	TULSI	TULSI OIL	4000	MEDICINAL USES
5	JASMINE	JASMINE OIL	VARIED UPTO 2 LAKHS.	PERFUMES
6	SOPHIA	SOPHIA OIL	2000	MOSQUITO REPELLANTS.

TABLE 2 : DETAILS OF THE CROP

S. NO	CROP NAME	LOCATION	SEASON OF GROWTH
1	PALMAROSA GRASS	ARUPUKOTTAI, RAMNAD & VIRUDHUNAGAR REGIONS	JANUARY TO MARCH & AUGUST TO SEPTEMBER
2	CHILI	TUTICORIN, VIRUDHUNAGAR AND RAMNAD DISTRICTS	ALL SEASONS [BUMPER HARVEST]
3	CITRONELLA OR LEMONGRASS	ARUPUKOTTAI, RAMNAD & VIRUDHUNAGAR REGIONS	JANUARY TO MARCH & AUGUST TO SEPTEMBER
4	TULSI	KAYATHAR, PASUVANDHAI REGIONS	JANUARY TO MARCH
5	JASMINE	MADURAI & VIRUDHUNAGAR DISTRICTS	ALL SEASONS [PERIODICALLY AT TIMES OF LOW S.P.]
6	SOPHIA	ARUPUKOTTAI, RAMNAD & VIRUDHUNAGAR REGIONS	JANUARY TO MARCH & AUGUST TO SEPTEMBER

2) Extraction Model and Mechanism

By using the knowledge I gained from our collage, and using my idea with the guidance of the management of “ Jothi Elastomers”, I have designed a new apparatus.

This apparatus is much more advanced than the current available model , which also makes the ultimate process economically cheap. I hereby enclose with the designs of each individual parts that I have planned to include in my project model.

1. Still Apparatus.
2. Burner setup.
3. Auxillary equipments.
4. Condensor and
5. Sperator.

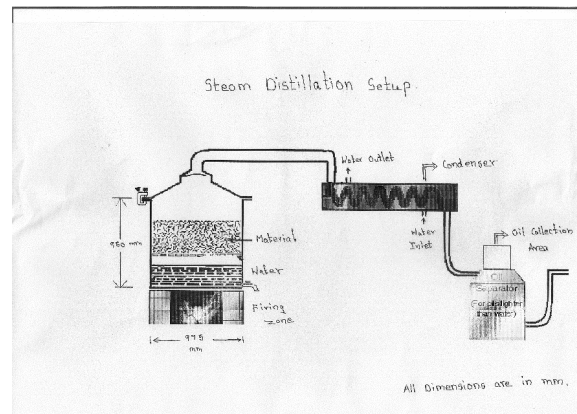


Fig 1 : Steam Distillation Setup

A feasibility study was also carried out and the results of those are included below:

TABLE 3 : RESULTS OF FEASIBILITY STUDY

NAME OF GRASS	COST	OIL CONTENT	TIME (HRS)	COST OF PRODUCTION (RS.)
PALMAROSA	FREE FROM (ROADSIDES, WASTELAND) AS IT'S A WILD HERB	0.65 %	2-3	250
SOPHIA	FREE FROM (ROADSIDES, WASTELAND) AS IT'S A WILD HERB	0.8 %	2-3	250
LEMONGRASS	FREE FROM (ROADSIDES, WASTELAND) AS IT'S A WILD HERB	0.8 %	2-3	250
GINGERGRASS	ALL TYPES OF LANDSCAPES, HILL SLOPES, VALLEYS, TERRAINS	0.5 T – 10 KG OIL.	2-3	250

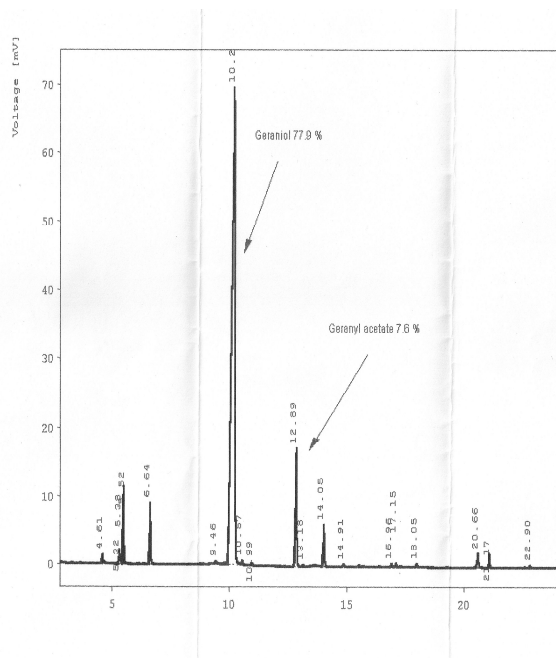


Fig 2 : Showing the presence of oil after extraction

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REFERENCES

- [1] Environmental Monitoring Service, <https://drive.google.com/file/d/0B5WG5DksSyFWdi1MOTBEZkpFmc/view?usp=sharing>
- [2] Environmental Monitoring Service, <https://drive.google.com/file/d/0B5WG5DksSyFWTjdkYmk1TkU5bVE/view?usp=sharing>
- [3] A Modern Herbal, Mrs.M.Grieve.
- [4] The Encyclopedia Of Grasses For Livable Landscapes, Mr.Rick Darke.
- [5] Wild Crop Relatives : Genomic and Breeding Resources, Mr.Chittranjan Kole
- [6] Manual of the grasses of the United States, Mr.A.S.Hitchcock.