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Research Paper

Farmers are facing a problem how they will prepare plants extract in large quantity in very short time.

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ABSTRACT: Steam distillation is a departure process which contains in distilling water together with other volatile and non-volatile components. The steam from the boiling water carries the vapors of the volatiles to a condenser, where together are cooled and return to the liquid or solid state; while the non-volatile residues remain overdue in the boiling container. If the volatiles are liquids not mixable with water, they will spontaneously form a distinct phase after condensation, allowing them to be detached by decantation or with a strainer funnel. In that situation, a Clevenger apparatus may be used to return the condensed water to the boiling flask, while the distillation is in advancement. Otherwise, the condensed mixture can be administered with small distillation or some other separation technique. Steam distillation can be used when the boiling point of the matter to be extracted is higher than that of water, and the starting solid cannot be impassioned to that infection since of rottenness or other unsolicited reactions. It may also be useful when the quantity of the desired substance is small compared to that of the non-volatile residues. It is often used to separate volatile essential oils from plant substantial. It is

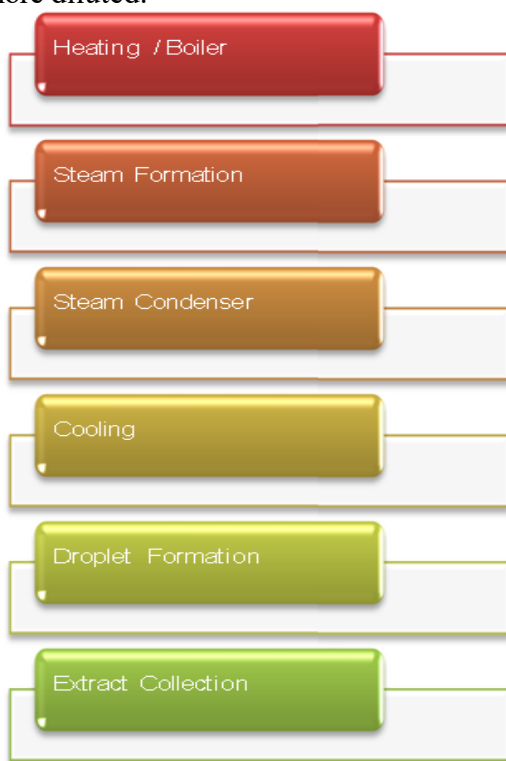
however much humbler and low-priced than those substitutions, and remains significant in certain manufacturing sectors.

KEYWORDS: mixture, distillation, Fertilizer

INTRODUCTION :

Steam distillation is a special type of distillation or a separation process for temperature sensitive materials like oils, resins, hydrocarbons, etc. which are insoluble in water and may decompose at their boiling point. The important nature of steam distillation is that it enables a compound or mixture of compounds to be distilled at a disease substantially below that of the boiling point(s) of the individual constituent(s). Vital oils contain substances with boiling points up to 200°C or higher temperatures. In the presence of steam or boiling water, however, these substances are volatilized at a temperature close to 100°C, at atmospheric heaviness. Fresh, or sometimes dried, botanic material is placed in the plant chamber of the still and the steam is allows to pass through the herb material under heaviness which softens the

cells and allows the Indispensable Oil to escape in vapor form. The temperature of the steam must be high adequate to vaporize the oil present, yet not so high that it destroys the plants or burns the Important Oils. Besides the steam tiny droplets of Essential Oil evaporates and travel through a tube into the still's condensation chamber. Here Essential Oil vapors condense with the steam. The indispensable oil forms a film on the surface of the water. To separate the Essential Oil from the water, the film is then decanted or speed-read off the top. The remaining water, a byproduct of distillation, is called floral water, distillate, or hydrosol. It retains many of the beneficial properties of the plant, making it valuable in covering care for facial mists and toners (A solution containing chemicals that can change the color of a photographic print). In certain situations, floral water may be preferable to be pure essential oil, such as when treating a sensitive individual or a child, or when a more diluted.



LITERATURE SURVEY :

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May 29, 2018

The promise of data-driven decision-making is now being recognized broadly, and there is growing enthusiasm for the notion of “Big Data. While the promise of Big Data is real – for example, it is estimated that Google alone contributed 54 billion dollars to the US economy in 2009 – there is currently a wide gap between its potential and its realization. Heterogeneity, scale, timeliness, complexity, and privacy difficulties with Big Data impede progress at all phases of the pipeline that can create value from data. The problems start right away during statistics acquisition, when the data tsunami requires us to make decisions, currently in an ad hoc manner, about what data to keep and what to discard, and how to store what we keep reliably with the right metadata. Considerably data today is not natively in structured format; for example, tweets and diaries are weakly structured pieces of text, while images and video are structured for storage and display, but not for semantic content. The value of data explodes when it can be linked with other data, thus data socializing is a major creator of value. Since most data is directly generated in digital format today, we have the opportunity and the challenge both to inspiration the creation to simplify later linkage and to automatically link previously created data. Data analysis, organization, retrieval, and molding are other foundational challenges. Data analysis is a clear bottleneck in many applications, both due to lack of scalability of the fundamental procedures and due to the complexity of the data that needs to be analyzed. Finally, exhibition of the results

and its interpretation by nontechnical domain experts is crucial to extracting actionable knowledge. During the last 35 years, data management principles such as physical and logical independence, declarative inquiring and cost-based optimization have led, during the last 35 years, to a multi-billion dollar industry. More importantly, these technical advances have enabled the first round of business intelligence applications and laid the substance for handling and examining Big Data today.

PROBLEMS:

- Farmers are facing a problem how they will prepare plants extract in large quantity in very short time.
- Earlier various works has been carried out for extract of plants. The process and instrument was very costly, hazardous, acquiring large space, having lots of disadvantages.

SOLUTION :

- This is the first time we were reporting to design the extraction unit instrument for agriculture and pharmaceutical applications. This is the main objective of our project.
- We designed the extraction unit which is cost effective, ecofriendly, less hazardous, highly efficient instrument. Extraction unit is very efficient to prepare an extract of plant within a short period.

APPLICATIONS OF NEEM

Neem oil is extracted from the seeds of the neem tree and has insecticidal and

medicinal properties due to which it has been used in pest control in rice cultivation. Neem seed cake (residue of neem seeds after oil extraction) when used for soil amendment or added to soil, not only enriches the soil with organic matter but also lowers nitrogen losses by inhibiting nitrification.[7] It also works as a nematicide. Neem leaves are used as green leaf manure and also in preparation of litter compost. Neem leaves are also used in storage of grains. Twigs of neem when tender is used as green manure after decomposing and widely incorporated in rice cultivation fields. Neem (leaf and seed) extracts have been found to have insecticidal properties. It is used as foliar spray and in treating seeds in rice cultivation.[6] Neem bark and roots also have medicinal properties. Bark & roots in powdered form are also used to control fleas & sucking pests in rice cultivation.

1. Neem used as Fertilizer

The material left after oil is squeezed out from seeds and is popularly known as the seed cake; It acts as a bio fertilizer and helps in providing the required nutrients to plants.[12] It is widely used to ensure a high yield of crops. Neem is used as a fertilizer both for food crops and cash crops, particularly rice and sugarcane crop.

Benefits: Neem seed cake performs the dual function of both fertilizer and pesticide, acts as a soil enricher, reduces the growth of soil pest and bacteria, provides macro nutrients essential for all plant growth, helps to increase the yield of plants in the long run, bio degradable and Eco friendly and excellent soil conditioner.[12]

2. Neem used as Manure

Manure is any animal or plant material used to fertilize land especially animal

excreta for improving the soil fertility and thus promoting plant growth.[11] Neem manure is gaining popularity because it is environmental friendly and also the compounds found in it help to increase the nitrogen and phosphorous content in the soil. It is rich in sulphur, potassium, calcium, nitrogen, etc. Neem cake is used to manufacture high quality organic or natural manure, which does not have any aftermaths on plants, soil and other living organisms. It can be obtained by using high technology extraction methods like cold pressing or other solvent extraction. It can be used directly by mixing with the soil or it can be blended with urea and other organic manure like farm yard manure and sea weed for best results.[12]

3. Neem as urea coating agent

Neem and its parts are being used to manufacture urea coating agent to improve and maintain the fertility of soil. The fertility of the soil can be measured by the amount of Nitrogen, Potassium and Phosphorous it has; there are certain bacteria found in soil, which denitrify it. Use of neem urea coating agent helps to retard the activity and growth of the bacteria responsible for denitrification.

4. Neem as Soil Conditioner

Neem seed granules or powdered seeds are used to manufacture the soil conditioner. It can be applied during sowing of plants or can be sprinkled and raked into the soil. The process of sprinkling should be followed by proper irrigation so that the product reaches the roots.[12] It is a natural soil conditioner that helps improve the quality of soil, thereby enhancing the growth of plants and fruits. Organic soil conditioner is gaining popularity in agricultural industry, not only in Asian countries like India but also in western counterparts such as USA, UK and

Australia.

Benefits: Neem is a natural soil conditioner that helps improve the quality of soil, thereby enhancing the growth of plants and fruits.[11] It not only helps the plants grow, but also prevents them from being destroyed by certain pests and insects. Organic soil conditioner is gaining popularity in agricultural industry. Because they are organic, they have no harmful effects and are cheaper than the other soil conditioners. This natural soil conditioner is also multi-functional and in the sub tropical regions. Neem soil conditioner application in plantation crops is known to be a soil enhancer that help to increase its fertility.[12]

5. Neem as fumigant

Neem tree has been used against household, storage pests and crop pests. Neem pest fumigant is available in gaseous state and is used as a pesticide and disinfectant. It is being used by a large number of countries on a commercial basis by farmers and agriculturists. [12] This 100% natural product is being exported as it is non toxic and does not affect the environment. It assumes more importance in developing countries where millions of deaths are reported every year due to the accidental intake of synthetic pest fumigants. This natural fumigant not only kills pests but also affects them negatively by acting as feeding and oviposition deterrence, mating disruption, inhibition of growth etc.

EXPERIMENTAL SETUP:

The diagram of experimental setup is shown below. The experiment was conducted in a Stainless Steel Extraction Unit. It consist of one round steel drum of dome shape structure capacity of

50 lit approx which have heating coils inside to heat, which is then connected with steel pipe which goes through one end of condenser which is used for cooling the formed steam and then from other end of condenser the water droplet receiving pipe is connected from which cooled water droplet is goes and collected in collecting drum. The thermostat is also used for measurement of rising temperature of boiling unit And cooling water unit is separated connected at bottom side which supplies continuously cooled water to condenser for cooling the steam. this unit is connected to condenser from two point, one is input and other is output. From input point the cooled water is supplied to condenser to cool down the steam and from output point the heated water is collect out in cooling Drum, then this heated water is again get cooled in cooling drum and it again supply to condenser, this process is happen continuously. The separating funnel is used for the separation of essentialoil and extract water.



Fig. 1 Experimental Setup of Steam Distillation Unit

CONCLUSION:

Steam distillation is a special type of distillation or a separation process for temperature sensitive materials like oils, resins, hydrocarbons, etc. which are insoluble in water and may decompose at their boiling point. The temperature of the steam must be high enough to vaporize the oil present, yet not so high that it destroys the plants or burns the essential oils. Farmers are

facing a problem how they will prepare plants extract in large quantity in very short time. This is the first time we were reporting to design the extraction unit instrument for agriculture and pharmaceutical applications. This is the main objective of our project. Earlier various works has been carried out for extract of plants. The process and instrument was very costly, hazardous, acquiring large space, having lots of disadvantages. This is the first time we were designing the extraction unit which is cost effective, ecofriendly, less hazardous, highly efficient instrument. Extraction unit is very efficient to prepare an extract of plant within a short period. The advantage of Steam Distillation is that it is a relatively cheap process to operate at a basic level, and the properties of oils produced by this method are not altered. As steam reduces the boiling point of a particular component of the oil, it never decomposes in this method. This method apart from being economical, it is also relatively faster than other methods.

REFERENCE

1. "The Encyclopedia of Chromatography", edited by Dr. Jack Cazes of Florida Atlantic University.
2. R. Oprean; M. Tamas; R. Sandulescu; L. Roman
"Essential oil analysis. I. Evaluation of essential oil composition using both GC and

MS “ fingerprints. J. Pharm. Biomed.

htm

3. A.Tezel; A. Hortacsu; O. Hortacsu, “*Multi-component models for seed and essential oil extraction*” Supercritical Fluids.

12. “Essential Oil Steam Distiller “from the webpage of <http://www.heartmagic.com/>

4. “*Chromatography Theory* ” Jack Cazes (Florida Atlantic University) and Raymond P.W. Scott (University of London).

5. R. P. W Scott “*Chromatographic Detectors* “, Marcel Dekker, Inc., New York.

6. “*Extraction of Essential oil*” from webpage of AWorldofAromatherapy.com/essential_oils.

7. “Essential_Oils_Introduction “ from the webpage of <http://www.theherbsplace.com/index.html>.

8. “Making Essential Oils - Methods of Essential Oil Extraction” from the Webpage of <http://www.anandaapothecary.com/essential-oils.html>

9. “Methods of Extraction Essential Oil” from the webpage of http://www.aromathyme.com/essential_oils.html

10. “Chemical Constituents of Essential oils” from the webpage of <http://healingdeva.com/selena2.htm>
<http://healingdeva.com/selena3.htm>

11. “What are Essential Oils, How are Essential Oils Made, How to Make Essential Oils “from the webpage of <http://www.deancoleman.com/index>.