Final yr project

by Afsha Kazi

"EXTRACTION OF NATURAL COLORANT FROM BIOWASTE DATES PITS (SEEDS) FOR PHARMACEUTICALS AND COSMETICS."

Submitted in partial fulfillment of the requirements for the degree of
Bachelor of Pharmacy

by

BAWANI ALFAHAD FIROJ MAIMUNA Roll No. 16PH08
KAZI AFSHA JALALUDDIN NASEEMA Roll No. 16PH19
KHAN SAIQA SALAMAT NOORJAHAN Roll No.16PH26
KHAN SABIR MD. ASLAM RUKHSANA Roll No. 16PH30

Supervisor
PROF. MARIA LAL

Department of Pharmaceutics,
School of Pharmacy

Anjuman-I-Islam's Kalsekar Technical Campus Plot
No. 2 3, Sector -16, Near Thana Naka, Khanda Gaon,
New Panvel, Navi Mumbai. 410206
Academic Year: 2019-2020

CERTIFICATE

Department of Pharmaceutics,
School of Pharmacy,
Anjuman-I-Islam's Kalsekar Technical Campus
Khanda Gaon,New Panvel, Navi Mumbai. 410206

This is to certify that the project entitled **Extraction Of Natural Colorant From Biowaste Date Pits (Seeds) For Pharmaceutical And Cosmetics** is a bonafide work of **Kazi Afsha Jalaluddin (Roll No.:16PH19)** submitted for the appreciation of the degree of Bachelor of Pharmacy in Department of Pharmaceutics.

Name of Supervisor: **Prof. Maria Lal.**

Dean Director

Approval for Bachelor of Pharmacy

This project entitled entitled **Extraction of Natural Colorant from Biowaste Date Pits (Seeds) For Pharmaceutical and Cosmetics** by **Kazi Afsha Jalaluddin** is approved for the degree of Bachelor of Pharmacy in Department of Pharmaceutics.

Examiners

1. .....

2. .....

Supervisors

1. .....

2. .....

Declaration

I declare that this written submission represents my ideas in my own words and where others ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action by the Institute and can also evoke penal action from the sources which have thus not been properly cited or from whom proper permission has not been taken when needed.

Student Name : Kazi Afsha Jalaluddin

Roll No.: 16PH19

ABSTRACT

"EXTRACTION OF NATURAL COLORANT FROM BIOWASTE DATES PITS (SEEDS) FOR PHARMACEUTICALS AND COSMETICS."

Alfahad B[1], Afsha K[1], Saiqa K[1], Sabir K[1] and Maria L[1]

[1]Department of Pharmaceutical Chemistry, AIKTC School of Pharmacy, New Panvel, India-410206.

In pharmaceutical as well as cosmetic industries there has been use of synthetic as well as natural dyes. The use of eco-friendly, renewable biowaste is our major criteria behind this research. Using natural dye have less toxic effects compared to that of synthetic dyes.

Date seeds (*Phoenix dactylifera)* are about 12% of the date fruits. They constitute of carbohydrates, fats, proteins, tannins, etc. The oil present in date seeds also have medicinal properties and beneficial effects on skin and hair. The date seed extract is a yellowish brown extract which have dyeing property.

The extraction from date seed was done by several methods along with different pH conditions and final method was optimized. Their application as hair colorant was studied on wool fibre. Analysis of the extract was done by Shimadzu UV-Vis spectrophotometer. The darker extract was obtained in alkaline medium.

Keywords:- Natural dye, Date seeds, Hair colorant.

CONTENTS

Approval for Bachelor of Pharmacy…..3
Declaration 4
Table of Contents 7

1. **INTRODUCTION**
2. **REVIEW OF LITERATURE**
3. **AIM AND OBJECTIVE**
4. **PLAN OF WORK**
5. **EXPERIMENTAL**
6. **RESULTS AND DISCUSSION**
7. **CONCLUSION**
8. **FUTURE PROSPECTIVE**
9. **REFERENCE**

Table of contents

Sr no.	Name	Page no.
1	Introduction	9-14
1.1	Excipients	9
1.2	Classification of pharmaceutical excipients	10-14
2	Review of Literature	15-16
3	Aim and Objective	17
4	Plan of Work	18
5	Experimental Work	19-21
6	Results and discussion	22-32
8	Conclusion	33
9	Future prospective	34
10	Reference	35

ACKNOWLEDGMENT

I would like to take the opportunity to express my sincere thanks to my guide **Prof. Maria Lal**, Assistant Professor, Department of Pharmaceutics, AIKTC, School of Pharmacy, Panvel for his invaluable support and guidance throughout my project research work. Without his kind guidance & support this was not possible.

I am grateful to him/her for his timely feedback which helped me track and schedule the process effectively. His/her time, ideas and encouragement that he gave is help me to complete my project efficiently.

I would also like to thank Dr. Abdul Razak Honnutagi, AIKTC, Panvel, for his encouragement and for providing an outstanding academic environment, also for providing the adequate facilities.

I am thankful to Dr. Shariq Syed , Dean, School of Pharmacy, Panvel and all my B.Pharm. teachers for providing advice and valuable guidance.

I also extend my sincere thanks to all the faculty members and the non-teaching staff and friends for their cooperation.

Last but not the least, I am thankful to all my family members whose constant support and encouragement in every aspect helped me to complete my project.

Student Name : **Ms. Kazi Afsha Jalaluddin**
Roll Number : **16PH19**
Department of Pharmaceutics.
University of Mumbai.

1 – INTRODUCTION

1.1 EXCIPIENTS:

The International Pharmaceutical Excipients Council (IPEC) defines an excipient as any substance other than the active drug or the prodrug that is included in the manufacturing process or is contained in a finished pharmaceutical dosage form. Non active pharmaceutical excipients are chemicals with a wide range of molecular sizes, from small molecules to large polymers, and a variety of unique physicochemical characteristics. (Lachman/lieberman's)

The overall contribution of excipients in dosage form designing can be better appreciated from the fact that more than 70% of the formulations contain excipients at the concentration higher than the drug. In reality, no single excipient would satisfy all the criteria; therefore, a compromise of the different requirements has to be made. Excipients are not inactive and have a substantial impact on the manufacture and quality, safety and efficacy of the drug substances in a dosage form. Further, variability in the performance of an excipient is a key determinant of dosage form performance. (Lachman/lieberman's)

The role of excipients includes:

1) Modulating solubility and bioavailability
2) Enhancing stability of drug in its dosage form
3) Helping drug to maintain a suitable polymorphic form
4) Maintaining pH and osmolarity of liquid products
5) Acting as antioxidants, suspending agent, emulsifier, aerosol propellants, base, tablet diluent
6) Preventing aggregation or dissociation
7) Modulating the immunogenic response of the drug (e.g. adjuvants). (Lachman/lieberman's)

   "Functionality": An excipient interacts with the drug in the dosage form and/or provides a matrix that affects critical quality attributes of the drug, including solubility, stability and bioavailability. "Safety and efficacy": Excipients, can be associated with adverse events, either by direct action or by formation of undesirable adducts. Excipients can improve the immunogenic properties of vaccines by acting as adjuvants. By modifying pharmacokinetic parameters such as absorption and distribution, excipients can change exposure patterns and thus influence both safety and efficacy outcomes. "Processability": good understanding of the functional contributions of excipients aid in the day-to-day manufacture of a dosage form. (Lachman/lieberman's)

1.2 CLASSIFICATION OF PHARMACEUTICAL EXCIPIENTS:

Excipients are categorized as compendial or noncompendial materials. Compendial excipients are the better characterized excipients and most likely to possess the desirable qualities. These materials are recognized as preferred excipients for pharmaceutical formulations. Non compendial excipients might also be used in pharmaceutical formulations. The use of these noncompendial materials is supported by Type IV drug master files (DMFs) in regulatory dossiers (i.e. new drug applications, abbreviated new drug applications, and investigational new drug applications). Excipients are of various origin: animal (e.g. Lactose, gelatin, stearic acid), plant (e.g. starches, sugars, cellulose, alginates) and synthesis (e.g. PEGs, polysorbates, povidone). (Lachman/lieberman's)

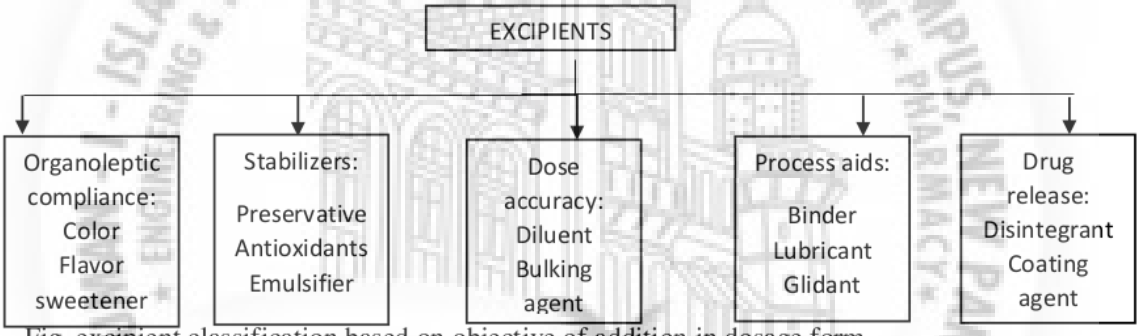


Fig. excipient classification based on objective of addition in dosage form

1.2.1 ORGANOLEPTIC AGENTS:

a) **COLORS**:

Coloring agent may be defined as substances employed in pharmacy for the purpose of imparting colors. The use of colorants in pharmaceutical dosage forms produces no direct therapeutic benefit, the psychological effects of color have long been recognized. The coloring of pharmaceuticals is extremely useful for product identification during manufacturing and distribution. Many patients rely on color to recognize the prescribed drug and strength. Patient compliance of an unattractive medication can also be improved by the careful selection of color. Natural coloring principles are obtained from animal, plant or mineral sources. (Lachman/lieberman's)

Animals have been the source of coloring principle from the earliest period. The dye 6, 6'-dibromoindigo (tyrian purple) was prepared by air oxidation of a colorless secretion obtained from the glands of snail, *Murex brandaris*. Cochineal from the insect *Coccus cacti* contains carmic acid, a bright red coloring principle and a derivative of anthraquinone. Many plants contain coloring principles that may be extracted and use as a colorants. Flavones such as rutin, riboflavin, hesperidin and quercetin are yellow pigments. Yellow color is also imparted by natural beta carotene obtained from carrots and glycosides such as saffron. Alizarin is reddish yellow dye obtained from madder plant. Mineral colors frequently are termed pigments and are used to impart color to preparations meant for external use. Titanium dioxide, red ferric oxide, yellow ferric oxide and carbon black are few examples. Although colors from plant, animal and mineral sources- at one time the only coloring agents available- remained in use early in this century, manufacturers have strong economic incentives to phase them out. (Lachman/lieberman's)

In contrast to natural coloring principles, chemically synthesized colors or synthetic coloring principles are less expensive, easier to produce, superior in coloring properties and only small amounts are needed. They blend well and don't impart unwanted flavors to foods and drugs. However, use of synthetic colors was at times a threat to health because they were used without discrimination between those that were toxic and those that were safe. Increasing health concern led to early studies and regulations that produced various lists of colors found suitable for addition to foods and drugs. The Federal Food, Drug and Cosmetic (FD&C) Act of 1938 made certification of the synthetic colorants mandatory. (Lachman/lieberman's)

The FD&C divided the synthetic colors into three categories: color permitted for food, drugs, and cosmetic (FD&C), color permitted for drugs and cosmetics (D&C), and colors permitted for externally applied drugs and cosmetics (external D&C). (Lachman/lieberman's)

b) CERTIFIED COLORANTS:

i) SOLUBLE DYES:

Dyes are water soluble synthetic organic molecules produced from highly purified intermediates derived from petrochemicals. Dyes exhibit their color by transmitted light. Water soluble dyes are offered in powder, granular, liquid, dispersion and paste form. The liquid form offers ease of handling, is dust-free, and is ready to use. However, it is probably the most expensive form of coloring. Dyes particularly in liquid form, is subject to light, heat and microbial stability problems. The powder from is least expensive but possess potential dust problems and can result in contamination. The granular dye is

recommended because dust problems are reduced, although, in some cases, it may have slower dissolution rates compared to powder form. Different forms of dyes are customized for specific uses and are selected by the user for their particular application. The instability to these parameters and the solubility limits differ from color to color and should be considered when selecting dyes use in various applications. (Lachman/lieberman's)

ii) **LAKE PIGMENTS**:

Lakes are insoluble pigments manufactured through the adsorption of a metal salt of a dye on a base of alumina hydrate. Properties that have made lakes are more suitable for coloring dosage forms are their relative opacity, stability with regards to light and heat, and ability to be used dry when coloring tablets made by direct compression. They are the only choice for coloring oils, fats and lipid formulations, because there are no oil-soluble colorants approved for this application. Only aluminum lakes are permitted for use in foods, drugs, and cosmetics. The shade and particle size are the two most important attributes. The shade of the lake may be influenced by the quantity of dye adsorbed onto the alumina hydrate and the particle size determines the tinting properties (coloring power) of a particular pigment. Smaller particle results in increased surface area, which allows for an increase in reflected light and hence more color. (Lachman/lieberman's)

1.3 Health effects of the most frequently used dyes for pharmaceuticals and nutraceuticals.(Leire Perez-Ibarbia et al.)

Dye	Allergic conditions	Hyperactivity	Reproductive toxicity	Genetoxicity	Carcinogenicity	Ref.
Tartrazine	May cause eye, skin, and respiratory tract irritation (mainly those patients with	Possible for children in combination with other dyes	No adverse effects up to levels of 773 and 1225 mg/kg/bw/day for males and females respectively	Biological significance of the positive genotoxicity results in other studies is uncertain	No potential to induce benign or malignant neoplasias	(Committee on Drugs, 1997; European Food Safety Authority, 2009g; Hallagan et al.,

	asthma and aspirin intolerance)					1995; Tanaka et al.,2008)
Quinoline Yellow	May cause urticaria, rhinitis and asthma (mostly when Quinoline Yellow is taken as part of a mixture with other synthetic colors)	Possible for children in combination with other dyes	A study in rats provides rationale for reevaluating the ADI	In vivo and in vitro assays (cellular models) showed potential mutagenicity	Levels up to 2500 mg/kg/bw/day in the rat and 7500 mg/kg/bw/day in the mouse revealed no evidence of carcinogenicity	(Committee on Dugs, 1997; European Food Safety Authority, 2009e; Maciosze k and Kononowicz, 2004)
Sunset Yellow	May cause urticarial and/or intolerance reaction (particularly amongst those with an aspirin intolerance)	Possible for children in combination with other dyes	No tumor induction	In vitro data indicate direct-acting oxidative genotoxicity may be induced by reaction products of azo dyes (including	No effects on tumor formation	(Committee on Drugs, 1997; European Food Safety Authority, 2009f; Sweeney et al., 1994)

				Sunset Yellow)		
Amaranth	Few isolated cases of urticaria	Possible in combination with other dyes	Several studies with no adverse effects in rat	No critical Genotoxicity	Anticarcinogen Effect	(European Food Safety Authority, 2010a, 2011; Maldonado Cervantes et al., 2010)
Ponceau 4R	Sensitization (due to a cross-reaction with some other material)	Possible in combination with other dyes	No adverse effect on reproduction	Unlikely to induce any significant genotoxic risk	Studies with Ponceau 4R do not show any carcinogenic effect	(European Food Safety Authority, 2009d; European Union, 2012b; Tanaka, 2006)

2- REVIEW OF LITERATURE

A) Study on optimizing dyeing of cotton using date pits extract as a combined source of coloring matter and bio-mordant.

From this article it was understood that date seed extract is used in textile industry for dyeing of fabrics. Phenolic content was analysed. It was found that the highest colour strengths and the better fastness properties were registered in case of dyeing experiments developed using the ultrasonic extracts. Those above results could be due to the highest metallic content present in the ultrasonic extracts, which has functioned as a bio-mordant properly extracted from date pits powder. **(Ahlem Guesmi et al.)**

B) Valorization of natural dye extracted from date palm pits (*Phoenix dactylifera*) for dyeing of cotton fabric. Part 2: Optimization of dyeing process and improvement of colorfastness with biological mordants

This paper investigates the feasibility of dyeing cotton fibers with solution extracted from date pits which are abundant vegetal material. The studied parameters are pH of the dye bath, temperature and duration of dyeing. The fastness properties of dyed samples were also evaluated. Obtained results indicate interesting sweat, washing and rubbing fastness in the range of 4–5. Three metallic mordants (*Alun*, $ZnSO_4$ and $CuSO_4$) and three biological mordants (*gall nuts*, *chlorophyll (a)* and *green almond shell*) were used to improve the degree of absorption as well as the color fastness of cotton fabrics dyed with aqueous extract from date pits. The obtained results showed high improvement of fastness (sweat, friction, washing and light fastness) for biological mordants than the metallic ones. **(MarwaSouissi et al.)**

C) **Application of phenolic compounds as natural dye extracted from date-pits: dyeing studies of modified acrylic fibres**

This research work involves the dyeing of acrylic fabric with natural dye extracted from date pits powders using Soxhlet extraction process. The effect of dye bath pH, salt concentration, dyeing time and temperature were studied. **(Hajera Dhahri).**

D) Chemical Composition of Date–Pits and Its Potential for Developing Value–Added Product – a Review

the industrial application of date seed powder was:

1. As source for edible oil.
2. As source for dietary fibres.
3. Used as poultary feed.
4. Used as coffee drink alternative.
5. As water filtration medium.
6. Used for its antimicrobial properties.

Heatlh application of date seeds powder.

1. Antioxidant properties.
2. Also reduce side effects of some drugs.

E) Usage of Date (Phoenixdactylifera L.) Seedsin Human Health andAnimal Feed

Date seeds have several medicinal properties. Some are listed here:

1. It prevents DNA damage.
2. It has antiviral activity.
3. It treats problems related to blood sugar.
4. It helps in treating kidney and liver problems.

Date seed oil obtained from date seed also have some beneficial effects.

1. It prevents premature greying of hair.
2. It moisturizes the hair.
3. Prevents thinning of hair.
4. Provides nourishment to the scalp.
5. Fights free radicals.
6. Also have some skin benefits. **(Mohamed Ali Al-Farsi).**

3-AIM & OBJECTIVE

- The main part of any formulation is its appearance. Colorful dosage form increases the patient compliance. For such purpose different types of dyes are used.
- There is more use of synthetic dyes since they are easy to produce, less expensive and are required in small amount. But we cannot deny the fact that these synthetic dyes are harmful for nature as well as human. So there should be increasing use of natural dye.
- Since, it is a general fact that people trust more on natural ingredients. So the rationale behind this study is to extract natural colorant from the bio-waste.
- Here, bio-waste used is date seed. Date seed have been used as feed for various animals like sheep, cattle, camel. Date seed powder have also been used in replacement of coffee powder. Date seed powder contains high amount of fiber so it is also used as dietary-fiber provider in bakery products.
- The main objective is extraction of yellowish brown coloring solution from date seed powder and using it into pharmaceutical formulation as well as cosmetics. We need to study how much colored substance is extracted. We need to study the effect of color extracted for its safety and purity, dyeing property. Also shades at different pH need to be studied. Further, converting the dye into lake pigments should also be done.
- And if this procedure gets successful, then the pharmaceutical industry will come up with additional natural dye.

https://www.healthbenefitstimes.com/date-seed/

4-PLAN OF WORK

Month	Work
July- august	Selection of • Domain • Project topic.
September-october	Literature review
November	❖ Collection of date seeds and converting it into powder form. ❖ Selection of solvent. (trial and error method) ○ Water ○ Ethanol ○ Acetone
December	❖ Selection of extraction method: ○ Bath sonicator. ○ Probe sonicator ○ Magnetic stirrer ○ Reflux condensor
January	❖ Selection of pH of extraction: ○ Acidic ○ Alkaline ○ Neutral ○ Alcoholic ❖ Analysis of colored component: ○ UV spectroscopy. ○ Gravimetric analysis. ○ Phytochemical tests.
February	❖ Formulating artificial syrup using the extract as colorant. ❖ Staining wool fibre using extract as dye. ❖ Oral presentation of the project.
March	Thesis work and submission.

5-EXPERIMENTAL WORK

1. EXTRACTION OF COLORED COMPONENTS:

a) Date seeds were powdered using grinder and sieved. 20 g was macerated with distilled water (150 ml) and refluxed for 3 hours. The extract was filtered and kept for further use.

b) Date seed powder (20g) was weighed and macerated with 1% NaOH (150ml) solution and refluxed for 3 hours. The filtrate was kept for further use.

2. EXTRACTION OF COLOURED COMPONENT AT DIFFERENT pH :

a) Aqueous method: 5g powdered sample was taken and boiled with 50ml of water at 100 degree Celsius. The solution was then filtered and pH was recorded.

b) Alkaline method: 1g of NaOH was dissolved in 100 ml of water. The powder sample was boiled in the made alkaline medium. The solution was cooled and filtered and the pH was recorded.

c) Acidic method: 1ml of HCL was dissolved in 100 ml of water. The powdered sample was boiled in this medium. The solution was filtered and pH was recorded.

d) Alcoholic method: 50ml of ethanol was added to 50 ml of water. The powdered was added to this medium and boiled. The solution was filtered and pH was recorded.

3. EXTRACTION USING ULTRASOUND:

1g of sample was taken and 50ml water was added in a beaker and it was covered with aluminum foil. The ultrasonic probe was lowered into the beaker and started. At every half an hour interval the sample was withdrawn and analysis was done using UV-Vis spectrophotometer.

The same procedure was repeated with ethanol and UV analysis was done.

4. EXTRACTION USING BATH SONICATOR:

1g of sample was taken and 50ml water was added in a beaker and kept it into the bath sonicator for 3 hours. After every half an hour the sample was withdrawn and was analyzed using UV-Vis spectrophotometer.

The same procedure was repeated with ethanol and UV analysis was done.

5. UV SPECTROSCOPIC ANALYSIS OF COLORED COMPONENTS:

The extracted sample was analyzed using Shimadzu UV-Vis spectrophotometer in the range of 200-400nm.

6. PHYTOCHEMICAL ANALYSIS:

The powdered sample of date seeds was tested for the phytochemicals such as carbohydrates, proteins, amino acids, alkaloids, flavonoids, tannins, saponin, etc.

7. GRAVIMETRIC ANALYSIS:

The extracted solution each from bath sonicator, probe sonicator, magnetic stirrer and reflux condenser, all the subjected to gravimetric analysis.

The extract was taken in the porcelain dish and then kept in hot air oven and solvent was evaporated.

The amount of colored component obtained was recorded and the % yield was calculated using the formula:

$$\%\text{yield of natural colorant} = \frac{natural\ dye\ extract\ obtained\ (g)}{amount\ of\ plant\ material\ used\ (g)}$$

8. FORMULATION OF ARTIFICIAL SYRUP:

Using date seed extract as colorant artificial coloured syrup was formulated.

The following is the formulation table for the same:

INGREDIENTS	QUANTITY
Sodium sacchrine	200 mg
Sodium carboxymethylcellulose	500 mg
Glycerin	5 ml

Vanillin	0.2 g
DATE SEED EXTRACT (0.1%) as colorant	0.4ml
Purified water	qs 1000ml

9. USING THE EXTRACT AS HAIR COLORANT:

Impact and extent of colour migration of natural dye by using wool hair as dye evaluation model.

The extract of different pH was made by using above mentioned method and the wool fibre was immersed into the extract and kept for 24 hours.

Then the wool fibre was observed under microscope to see the migration of color from extract to wool fibre.

6-RESULTS AND DISCUSSION:

1. CHARACTERIZATION OF AQUEOUS EXTRACT USING UV-VISIBLE SPECTROSCOPY:

The absorbance spectrum the visible range [200 nm-400 nm] of the extracted solution obtained from date palm pits is shown in Figure 1.

The aqueous dyeing solution was characterized by UV-visible spectroscopy using Shimadzu model PU UV/visible spectrophotometer.

The obtained spectra shows the presence of maximum absorbance at 340.4nm.

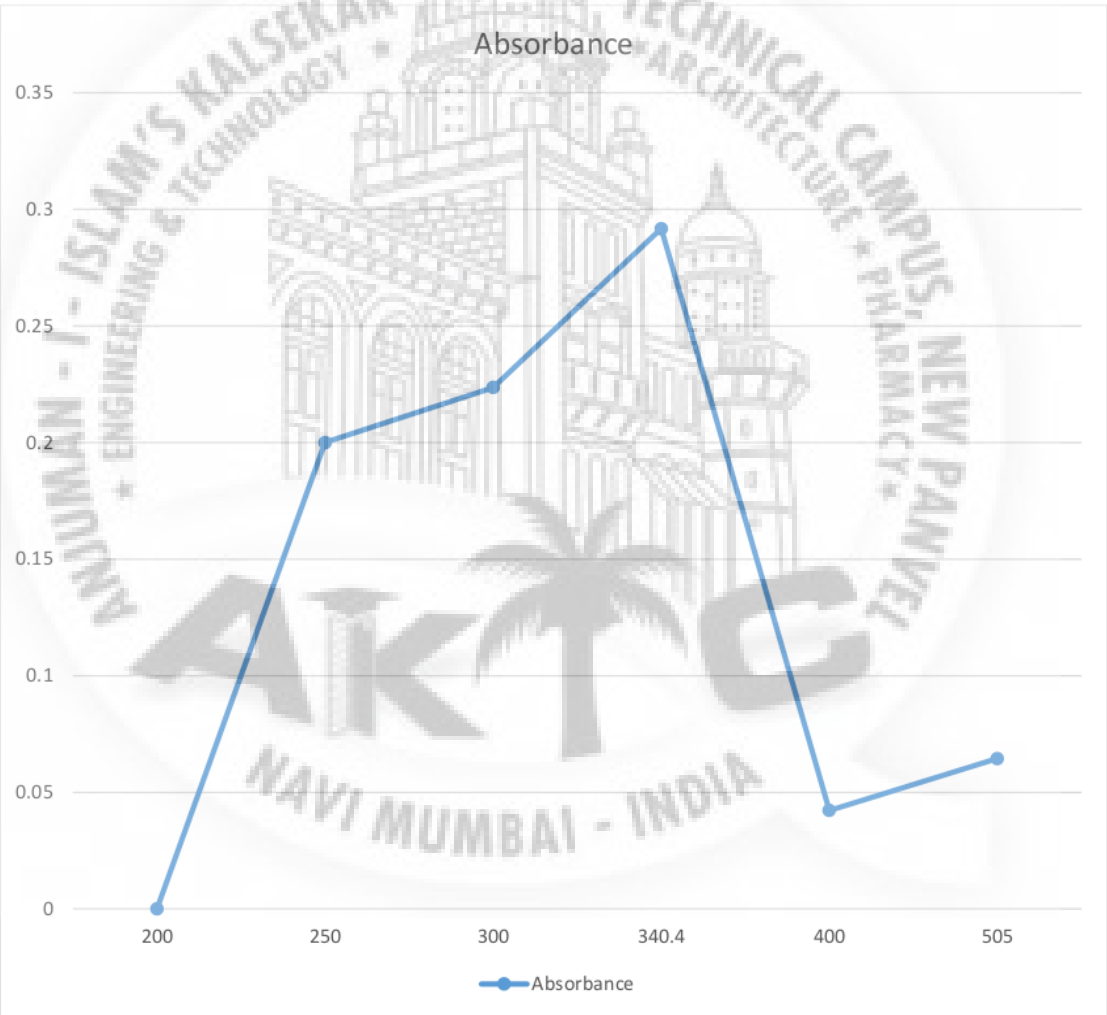


Fig. 1 Visible absorbance spectrum of the extracted dye solution from date palm pits powder

2. SELECTION OF EXTRACTION PROCESS:

UV–VIS spectrum of natural dye obtained showed an increase in the increase growth with time upto 60 min (probe ultra-cavitation), 120 (bath sonicator) and 90 min (magnetic stirring) .

The fall in the absorbance could be relatable to the excess frequency and heat produced leading to degradation of secondary metabolites present in date seeds.

Hence bath sonicator method was selected as process for further experimentation.

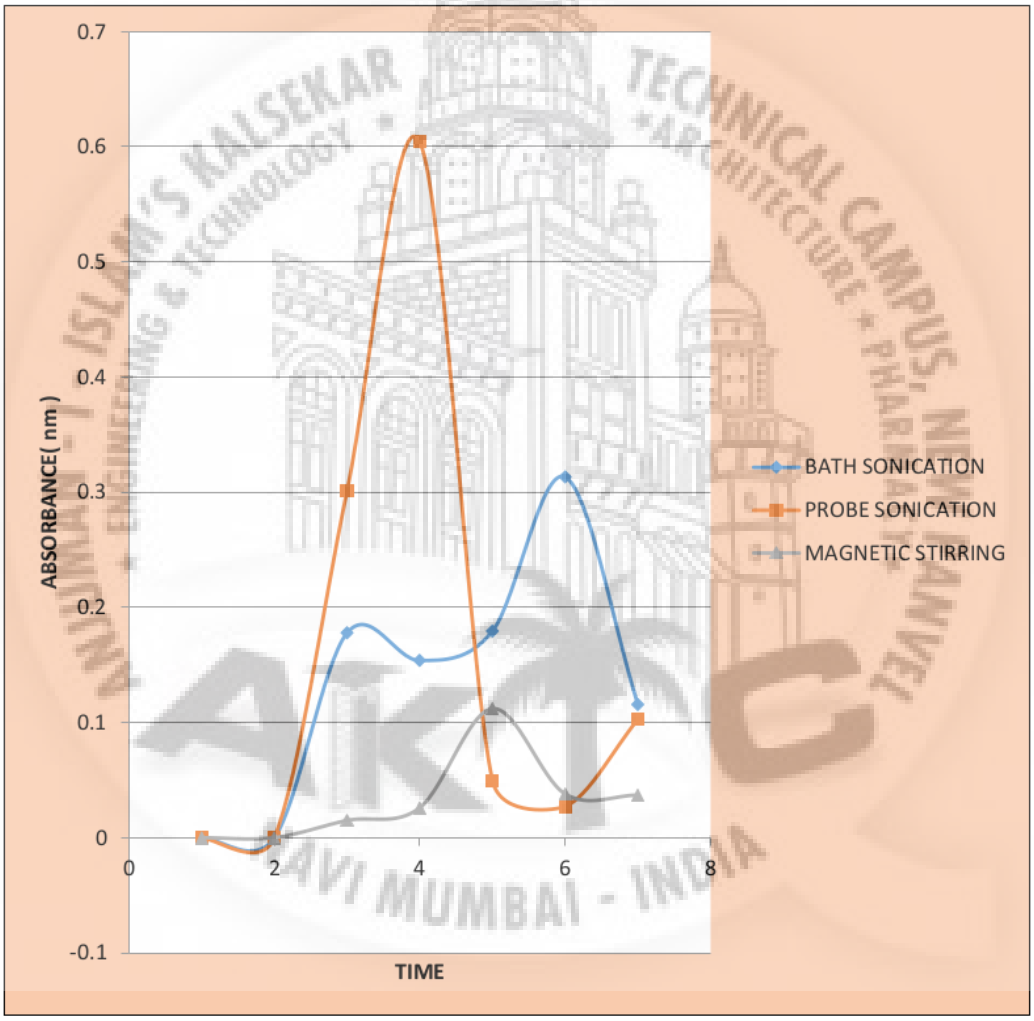


Fig 2: UV-VIS comparison of methods employed for extraction of date seed colourant dye.

3. EFFECT OF TIME PERIOD FOR ULTRACAVITATION ON EXTRACTION:

The protein solubility reduction could be due to the decrease of electrostatic repulsions and the hydrophobic interactions induction of protein aggregation at pH 4 to 4.5.

Time (min)	Turbidity (MS , BS, PS)	Precipitation (MS, BS,PS)
30	---	---
60	--+	---
90	--+	--+
120	-++	--+
150	-++	-++
180	+++	+++

Table 1. Effect of time period for ultracavitation on extraction.

4. SELECTION OF SOLVENT:

On the basis of preferable acceptance and reduced toxicity, water was used as the preferred solvent as compared to ethanol/ methanol.

The uv-visible spectrum of the extract by bath sonicator with different solvent was plotted and found out that the extraction by water is much better than ethanol.

Fig. 3 uv-visible spectra of comparison of different solvent for extraction.

5. SELECTION OF pH CONDITION:

For proteins present overheating could cause protein denaturation and precipitation.

For the two studied date varieties, the low solubility of date seed proteins was obtained at pH between 4 and 4.5.

Hence possibility of precipitation in acidic solution could be the possible reason.

Higher solubility of proteins may be the possible reason for clarity in alkaline solution.

pH conditions	Absorbance at 340.4 nm	Precipitation
Aqueous	0.0859	YES
Alkaline	0.3587	NO
Acidic	0.2052	YES
Alcoholic	0.1128	NO

Table 2. Effect of pH on absorbance and extraction of natural colorant.

6. STABILITY STUDIES:

All the four extracts were kept at room temperature (30-31◦C)in a tightly closed contains for further use.

Fig4. extract of date seed in different pH

7. OPTIMIZED EXTRACTION METHOD:

With respect to preliminary studies on type of solvent, methods , extraction time and pH, Bath sonicator was preferred for further extraction process at 30 min under alkaline pH 10 using water as solvent.

Also reflux condenser gives better yield at alkaline medium.

8. GRAVIMETRIC ANALYSIS:

The maximum yield was obtained from bath sonication and reflux condenser.

Also at alkaline pH with bath sonication and reflux condensor the yield was appreciable as compared to other methods.

For further use we used reflux condenser and alkaline medium for studies.

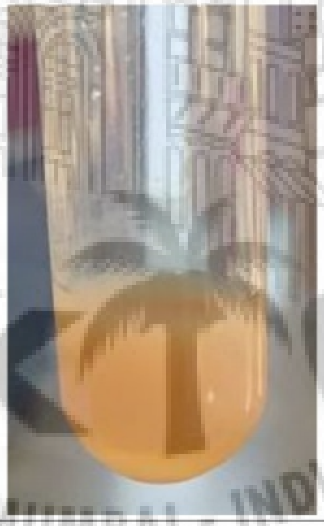
Method	Ph	% Yield of natural colourant	Precipitation
Magnetic stirring	Neutral	4	No
Bath sonication	Neutral	16.5	NO
Probe sonication	Neutral	13.3	YES
Magnetic stirring	Acidic	10.2	YES
Magnetic stirring	Alkaline	13.9	NO
Bath sonication	Alkaline	21.1	NO
Reflux condenser	Alkaline	22.5	NO

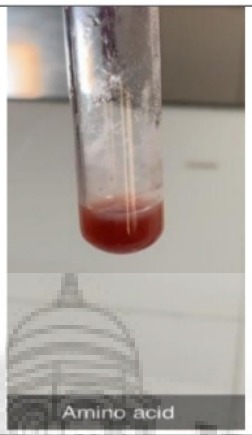
Table3. Percent yield of natural colorant by different extraction methods and pH conditions .

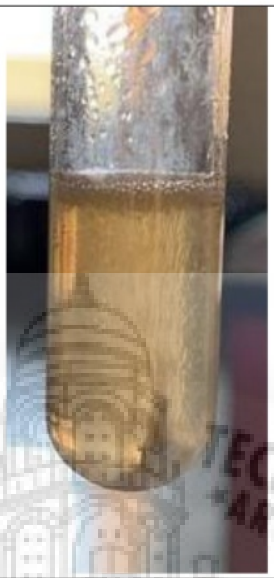
9. PHYTOCHEMICAL STUDIES:

This study was done to find out what phytochemical is present in the date seed powder.

It was found out that the tannins were present which is responsible for the dark color of the extract.

Phytochemicals	Test	Inference
Carbohydrate	Molish test 	Carbohydrates present
Proteins	Million's test 	Proteins absent
Amino acids	Ninhydrin test	Amino acid present

	 Salkowski test	
Steroids	 Foam test	Steroids present
Saponin glycosides		Saponin present
Flavonoids	Shinoda test	Flavonoids absent

	 Dragendroffs test	
Alkaloids	 With dil. KmNO4	Alkaloid present
Tannins		Tannins present

10. APPLICATIONS IN PHARMACEUTICAL FORMULATIONS AND COSMETICS:

a) Artificial syrup:

In this date seed extract (0.1%) was used as colorant.

b) As Hair colorant:

The effect of the date seed extract was studied on the wool fibre.

It was observed that the the migration of color happened from alkaline extract to the wool fibre.

The following are pictures of microscopic view of wool fibre dipped in different Ph extract.

Control sample

Model hair stained with acidic extract

Model hair stained with Alcoholic

Model hair stained with alkaline extract

7-CONCLUSION:

- Natural colourants provide an environmentally safe option for its applications in various pharmaceutical areas.
- Instead of using new resources,it is better to utilize renewable resources.
- So we used biowaste (date seed) and extracted dye out of it.
- It was found that the application of ultrasound can increase the extraction of dyes from biowastes date pits.
- It was also observed that when alkaline conditions were observed extraction of natural component was in larger amounts.
- The alkaline extract proves to give more migration of color to wool fibre as compared to that of other pH condition.
- Compared to aqueous extract, alkaline extract was more stable at normal room temperature.
- There was no precipitation in alkaline medium, the extract was very clear and was very dark in color.
- We also used it as colorant in artificial syrup, which does not interfere with the properties of other excipients.

8-FUTURE PROSPECTIVE:

- Lyophilization of the given colored extract into free flowing powder
- Conversion of dye into lake pigment for further use into colored cosmetics.
- Fortification of formulations along with colourant role.
- Performing comparative toxicity test of colored extract with standard synthetic colorant on cell lines.

9-REFERENCES

[1] Lachman/Lieberman's The Theory and Practise of Industrial Pharmacy, Fourth Edition.

[2] Study on optimizing dyeing of cotton using date pits extract as a combined source of coloring matter and bio-mordant Ahlem Guesmi &Naoufel Ben Hamadi

[3] Valorization of natural dye extracted from date palm pits (*Phoenix dactylifera*) for dyeing of cotton fabric. Part 2: Optimization of dyeing process and improvement of colorfastness with biological mordants MarwaSouissi[ac] AhlemGuesmi[bd] AliMoussa[bc]

[4] Application of phenolic compounds as natural dye extracted from date-pits: dyeing studies of modified acrylic fibres. Hajera Dhahri,Ahlem Guesmi &Naoufel Ben Hamadi.

[5] Chemical Composition of Date–Pits and Its Potential for Developing Value–Added Product – a Review Mohammad Zakir Hossain1 , Mostafa I. Waly2 , Vandita Singh2 , Venitia Sequeira2 , Mohammad Shafiur Rahman2 *

[6] Chemical Composition of Date–Pits and Its Potential for Developing Value–Added Product – a Review. Mohammad Zakir Hossain1 , Mostafa I. Waly2 , Vandita Singh2 , Venitia Sequeira2 , Mohammad Shafiur Rahman2 *

[7] A new approach for studying the dye ability of a multifibres fabric with date pits powder: a specific interest to proteinic fibers. Ahlem Guesmi, Hajra Dhahri. Naoufel Ben Hamadi.

[8]Effective natural dye extraction from different plant materials using ultrasound. Venkatasubramanian Sivakumar, J. Vijaeeswari, J. Lakshmi Anna.

[9]Safety and regulatory review of dyes commonly used as excipients in pharmaceutical and nutraceutical applications. Leire Perez-Ibarbia, Tobias Majdanski, Stephanie Schubert, Nobert Windhab, Ulrich S. Schubert.

[10]Extraction of natural dyes from *Curcuma longa, Trigonella foenum graceum and Nerium oleander,* plants and their application in antimicrobial fabric. R. Mari Selvam, G. Athinarayanan, A. Usha Raja Nanthini, A.J.A. Ranjit Singh, K. Kalirajan, P. Mosae Selvakumar.

Final yr project

ORIGINALITY REPORT

0%	0%	0%	0%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

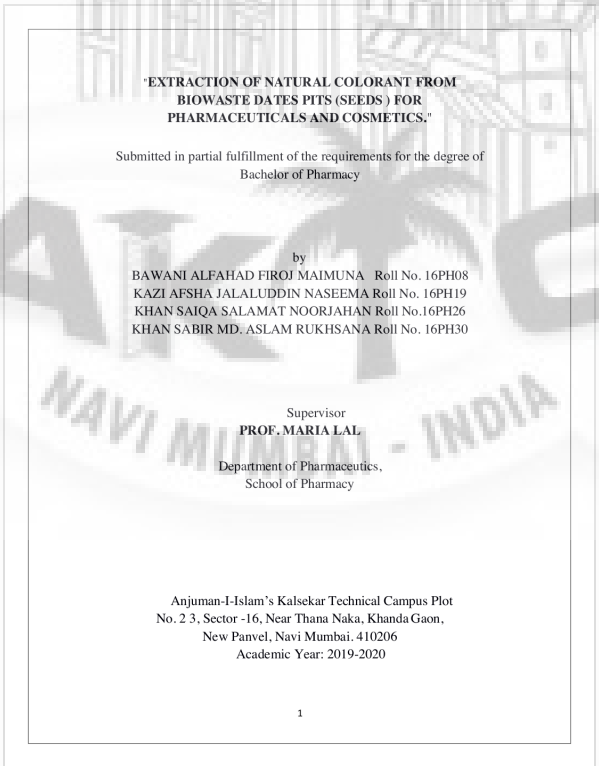
Exclude quotes	Off	Exclude matches	< 40%
Exclude bibliography	Off		

Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	Afsha Kazi
Assignment title:	Final yr project
Submission title:	Final yr project
File name:	FINAL_THESIS.pdf
File size:	909.49K
Page count:	35
Word count:	5,109
Character count:	27,946
Submission date:	07-Aug-2020 03:13AM (UTC+0700)
Submission ID:	1366670352



"EXTRACTION OF NATURAL COLORANT FROM BIOWASTE DATES PITS (SEEDS) FOR PHARMACEUTICALS AND COSMETICS."

Submitted in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy

by

BAWANI ALFAHAD FIROJ MAIMUNA Roll No. 16PH08
KAZI AFSHA JALALUDDIN NASEEMA Roll No. 16PH19
KHAN SAIQA SALAMAT NOORJAHAN Roll No.16PH26
KHAN SABIR MD. ASLAM RUKHSANA Roll No. 16PH30

Supervisor
PROF. MARIA LAL

Department of Pharmaceutics,
School of Pharmacy

Anjuman-I-Islam's Kalsekar Technical Campus Plot No. 2 3, Sector -16, Near Thana Naka, Khanda Gaon, New Panvel, Navi Mumbai. 410206
Academic Year: 2019-2020

1