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FORMULATION AND EVALUATION OF PEDIATRIC HERBAL CHOCOLATE

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ABSTRACT

Children's favorite food is chocolate, whereas medicine is a thing they hate. so, the purpose of this study was to develop chocolate that included a medicine, i.e., medicated chocolate, in order to prevent disease. In pediatrics cough, and viral infection are the most common diseases. Cymbopogon Citratus is an herb which is having several medicinal properties such as antimicrobial, antibacterial, activity, etc. Hence, in the present investigation, an attempt was made to prepare a chocolate formulation of Cymbopogon Citratus which improves the pediatric patient's compliance acceptability. Further, preparing medicated chocolate is evaluated for general appearance, dimension, hardness, drug content determination, physical stability, etc.

KEYWORD: Medicated Chocolate, Pediatric, Antibacterial, cough, Cybmbopogon Citratus.

INTRODUCTION

Chocolate is adaptable food.[1] It is completely different taste and texture sensations. The chocolate is resist to microbial growth.[1] The chocolate contain saturated fat, poly phenols sterols etc.[1] Chocolate is medical important such as it increase HDL cholesterol level and decrease LDL cholesterol, lessening in hypertension etc.[2] The chocolate is very good way for drug delivery of active drugs.[3] Chocolate contain main ingredient is *Cocoa***.** Chocolate containing accurate amount of drug in suitable quantity is called as medicated chocolate.[4] The Chocolate having organoleptic characteristics to masking the unpleasant flavour with some active drugs.[5] The *Cocoa* is principle of base on chocolate and rich in polyphenols, catechins etc.[6] Chocolate are semisolid suspension, that fine solid particles from sugar and *Cocoa* making in fat phase[7], The most important compound of chocolate is *Cocoa* Butter a

mixture of different triglycerides solid in below 25^0C temperature but liquid in body temperature.[8] The herbal chocolate formulation to treatment of cough, immune booster and treatment of malnutrition children.[9] The different form and flavours of chocolate are produce by different active ingredient.[10]

It is also use for treatment of hormonal imbalance and to increased patient compliance.[11] Medicated Chocolate is prepared by using Chocolate base and the drug is incorporated into the prepared Chocolate based. The drug is incorporated into the Chocolate and the drug is released from the Chocolate.[12] Chocolate have been shown to help our body produce chemical known as Serotonin It makes feel Relaxed.[13] The Medicated Chocolate has a more patient compliance, it more appealing to children Cocoa powder found in vitamin A, phenolics and all Nutrient etc.[14] The dark Cocoa butter, lecithin sugar & vanilla.[15]

It is best drug delivery system for children.[1] Chocolate having some advantage like quick onset of action reduced in the drug dose of manufacture etc. Medicated herbal Chocolate is most acceptable for pediatrics.[4] Chocolate have five basic human taste quality that is sweet, salty, sour, bitter.[1] Chocolate have five basic human taste quality that is sweet, salty, sour, bitter.[2] This type of administration of drug delivery is multiple treatment make the patient due to difficulties to swollen.[2] The chocolate contain lecithin that is natural emulsifier. It is used in chocolate production to give its best of rheology.[2] The chocolate is medicated advantages such as lowering blood pressure, change blood flow of the brain, prevention cell damage & improve the blood glucose level.[2]

PLANT OF PROFILE

Lemon grass of scientific name is *Cymbopogon citratus*. It is word derives from the Greek, the words “kymbe” means boat and “pogon” means beard.[17] The *Cymbopogon Citratus* are use in traditional system of medicine and no side effect of allopathic medicine system lemongrasses plants are the phytochemicals having produced pharmacological effect. It is known as citronella grass a member of the Poaceae family and belongs to the genus Cymbopogon and 140 species throughtout the word.[18] *Cymbopogon citratus* fresh leaves are chemical 0.4% of volatile oil and 65% to 85% citral oil, 12-25% in myrcene.[19] The *Cymbopogon Citratus* are use in traditional system of medicine and no side effect of allopathic medicine system lemongrasses plants are the phytochemicals having produced pharmacological effect.[20] *Cymbopogon citratus* is use in soaps, detergents, tea, food industry, pharmacy industry etc. The lemongrasses are present in main chemical constituents

of essential oil like limonene, citral, elemol, citronellal, 1,8 cineole, citronellol, linalool, geraniol, methylheptenone, b-carophyllene, geranylformate and geranyl.[21] *Cymbopogon citratus* are pharmacological effect such as analgesic, antipyretic, spasmolytic, tranquilizer, anti-microbial activity, anti-fungal activity, anti-protozoan activity.[22] Anti-oxidant activity, anti-diarrhoeal activity, anti-mutagenic activity, anti-Inflammatory activity, anti-malarial activity.[23,24] The lemongrass contain 1 to 2% essential oil in dry states.[25] It is chemical of citral a combination of neral and geranial isomers, which is used as a raw material for the ionone, vitamin A.[26]

Lemongrass is many use in many used in many Thai cuisines.[27] The quality of lemongrass is depends upon different particle size of chemical contents.[28] The new techniques of extraction process such as extraction of oil with dense carbondioxide that technique use in industry.[29] That application biofuel production because higher content essential oil.[30]

Uses of lemongrass plant[30]

Lemongrass is used for treating digestive tract spasms, cough, and fever.
It is used for vomiting, abdominal pain and fungal.
It is also used to the kill the germs and microorganism.
It is also used as aromatherapy for muscle pain.
Lemongrass is also used flavouring agent.

MATERIAL AND METHODOLOGY

1. Plant collection and authentification

The lemongrass whole plant was collected from home garden. The whole plant was send to the Smt. Kasturbai walchand college, (Arts-science), Sangli for authentication of plant. This plant specimen is identified and confirmation to the best of knowledge by using authentic floristic reference- plants of the online. Authentication of plant is completed by under the respected sir Mr. M. D. WADMARE (Asso. Prof. & head department of botany) Smt. K.W. College, sangli. The authentication Ref.no :- smkc/dbot-03.

2. Material[1,4]

Cymbopogon citratus (Lemongrass leave extract), Dark Chocolate base, sugar syrup.[2]

3. Method of extraction by decoction[2]

The dry lemongrass leave were collected garden and wash with water.

The dry leaves were crush with help of grinding machine. Further to take a 40gm of lemongrass powder and added 700ml of distilled water.

The lemongrass leave powder boil with distilled water. Then up to ¼ water quantity reduce for the 1 to 2 hour that is decoction method. The extra care should taken avoid the excess of heating.

Excess water present in extract were removed by evaporating heating mantle instrument. After evaporation process to kept it few 2 to 3 day in room, for naturally evaporation. It will form sticky and reddish colours of lemongrass extract.

(1.1)

(1.2)

Figure 1: Lemongrass extraction method.

4. Formulation of herbal chocolate[1,2]

Table No. 1: Formulation Table.

Sr.No.	Ingredients	Quantity Taken	
		Batch I	Batch II
1.	Chocolate base	5gm	5gm
2.	Sugar	2gm	5gm
3.	Lemongrass Extract	250mg	250mg
4.	Water	q.s	q.s

5. Preparation of medicated Chocolate[1]

1) Take a water bath then headed upto 50^0C temperature is set. The Chocolate base was melted with the help of porcelain dish. The Chocolate was melted upto the free flowing nature.

2) Prepared simultaneously simple sugar syrup (2gm sugar and 1ml water). The sugar neither more thick nor liquid nature.
3) After Chocolate is melted, then addition of simple sugar with appropriate quantity of above the quantity of the ingredients and mix well the help of the glass rod.
4) The appropriate quantity of lemongrass crud extract added in a melted Chocolate and mix well in a continuous stirred.
5) The Chocolate base containing extract was pour into the silicon Chocolate mould and kept in a room temperature.
6) Poured the Chocolate mould was refrigerated upto the 6 to 7 hours, till whole Chocolate mass completely solidified nature.

(2.1).

Figure 2: Preparation of medicated Chocolate.

6. Evaluation of Chocolate[1,2,4]

- Preliminary Phytochemical screening
- General appearance
- Hardness
- Dimension
- Physical stability
- Drug content determination

1. Preliminary Phytochemical screening[16]

Following organic chemical constituent screened for presence or absence formulation such as carbohydrate, protein, amino Acid, fats, glycoside, vitamins, phenolic compound, alkaloids, flavonoids etc.

1.1 Test for carbohydrate (fehling's test): Take a 5ml fehling solution was added 0.5mg of extract and boiling water bath. To form of yellow or red precipitate. To indicate presence of carbohydrate.

1.2 Test for alkaloids (wagner's test): The take few drops of wagner solution added in a 10mg of extract to formation of reddish brown precipitated. To indicate that presence alkaloids.

1.3 Test for flavonoids (lead acetate test): few drops of lead acetate solution added in 10mg of lemongrass extract. To formation of yellow colour precipitated. To indicate that presence of flavonoids.

1.4 Test for phenols and tannins (lead acetate test): To taken 10mg of extract and added in a 0.5ml of 1% lead acetate solution. To form precipitated indicate that phenols and tannins presence.

1.5 Test for saponins (foam test): To take a 20ml of distilled water added 0.5ml extract with a shaken well in a graduated cylinder for a 15min. The form of foam to length of 1cm.

1.6 Test for steroids and sterols (salkowski's test): The 2ml of chloroform solution dissolved in 5mg extract. Then equal volume of concentrated sulphuric acid was added side of the test tube. Upper layer is red and lower layer is yellow with green.

1.7 Test for glycosides: Take a 1ml of water added was 0.5mg of leave extract. Then added aqueous NaOH solution to form yellow colour.

1.8 Test protein & amino acids (ninhydrin test): To drops of freshly prepared ninhydrin reagent was added 0.5mg extract and heated. To formation of pink colour.

2. General appearance[1,2]

Colour	:	Dark Brown
Order	:	Chocolaty
Test	:	Slight sweet
Texture	:	Smooth and even
Appearance	:	Glossy, even shine

3. Dimension[2]

Dimension was measured by the vernier's calipers. The veniers calipers to adjust first then used it was remove error. Then to note down the reading of chocolate.

4. Hardness[2]

The Monsanto hardness tester was used by the measure of hardness of Chocolate. Chocolate is tied with upper part of Monsanto hardness tester. Then adjust the movable scale zero marking. The pressure create by hand on Monsanto tester handle up to the breaking of chocolate. Then noted the reading.

5. Physical stability[2]

To determine physical stability of the medicated Chocolate. It is kept in a closely tide container for a 1 month at 20^0C temperature. After 1 month, to observe test sample of physical appearance for medicated Chocolate.

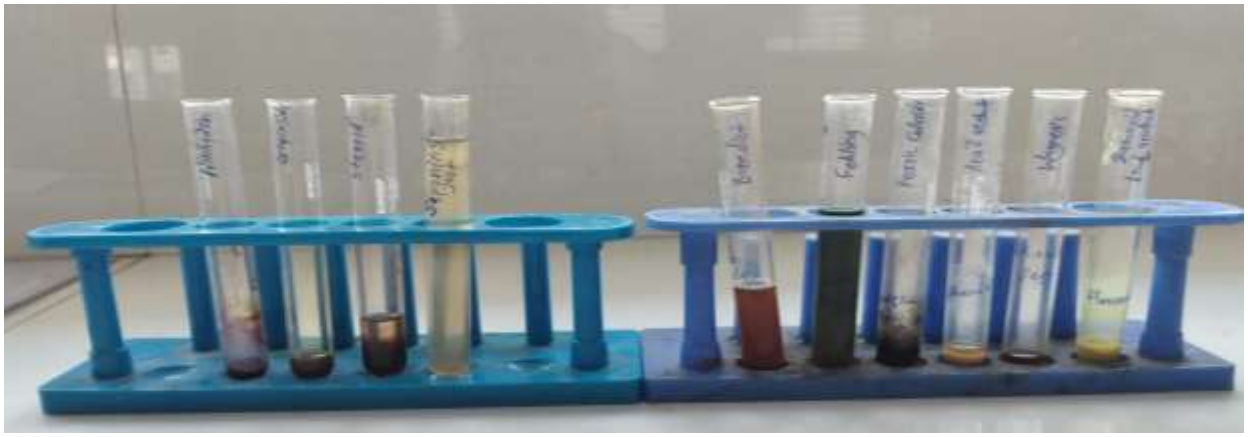
6. Drug content determination[1,4]

The medicated Chocolate of drug content was measured by using thin layer chromatography techniques. The lemongrass extract is control and the melted medicated Chocolate as test. To prepared thin layer chromatography plate by silica gel. The silica gel powder was added appropriate quantity of distilled water to formation of slurry. The slurry pour into the slide with the help of dropper and the plate was kept in hot air oven at 1 ½ hour. Then spotting was carried out both plate. To prepared mobile phase by using ethyl acetate : ether. That is ratio 3:1. The both the plate kept in mobile phase 5 to 10 min. After running both plate air drying. The fully dry plate was kept in iodine chamber to identified the visualization of spots. The Rf value determine for a compared by the both plate. The determine the medicated Chocolate was determine.

RESULT AND DISCUSSION

Table No. 2: Preliminary Phytochemical screening.[16]

Sr.No.	Test of extract	Observation	Indication
1.	Test for alkaloids (Wagner's test)	Reddish brown	Present
2.	Test for flavonoids (Shinoda test)	Yellow ppt	Present
3.	Test for phenols and tannis (Lead acetate test)	Precipitates form	Present
4.	Test for carbohydrates (Fehling test)	Yellow ppt	Present
5.	Test for saponins (Foam test)	No foam	absent
6.	Test for steroids (salkowsaki's test)	No red colour	absent
7.	Test for glycosides	No yellow	absent
8.	Test for protein (Ninhydrin test)	No pink	absent



(3.1)

Figure 3: Preliminary Phytochemical screening.

Evaluation test of Chocolate

General appearance[1,2,4]

Colour : Dark Brown

Order : Chocolaty

Test : Slight sweet

Texture : Smooth and even

Appearance : Glossy, even shine

Table No. 3: Hardness test.[2]

Sr No.	Temperature of Chocolate	Indication
1.	28^0 C of Chocolate	2.5 kg/cm^2
2.	Room Temperature	1.5 kg/cm^2

(4.1) **(4.2)**

Figure 4: Hardness of medicated Chocolate.

Dimension test[1]: The measured by Vernier's callipers.

Batch I – Height : 2.67

Diameter : 2.94

Batch II – Height : 2.65

Diameter : 2.96

(5.1)

(5.2)

Figure 5: Diameter and Height of medicated Chocolate.

Physical stability[2]: The physical stability of batch -I after 1month was good and smoothy. Physical stability of the batch – II after 1 month was unstable because of excessive sugar.

(6.1)

(6.2)

Figure 6: Physical stability of Chocolate.

Drug content determination[1,2]

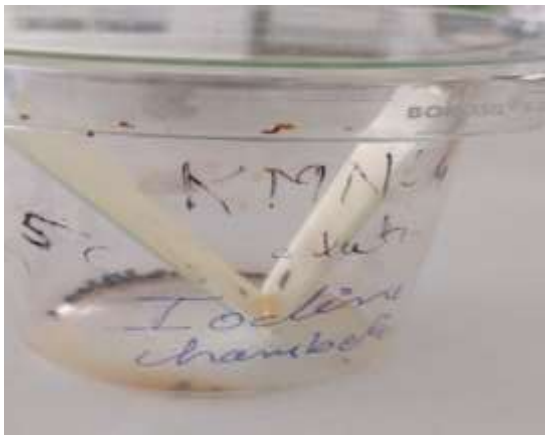
- Distance travelling by the solvent of the control :- 6.8 cm
- Distance travelling by the solute of the control :- 1.5 cm
- Distance travelling by the solvent of the test : - 6.7 cm
- Distance travelling by the solute of the test : - 1.6 cm

$$\text{Rf value} = \frac{\text{Distance travelling by solute control}}{\text{Distance travelling by solvent control}}$$

- Rf value of control = 0.22
- Rf value of test = 0.23

(7.1)

(7.2)



(7.3)

(7.4)

Figure 7: Thin layer chromatography of medicated Chocolate.

Rf value of test and control as a approximately same to determine the drug content.

CONCLUSION

In the present study, development of pediatric herbal chocolate was carried out. Extract of lemongrass was prepared and phytochemical analysis was carried out to check present of desired compound that shows acceptable results.

Prepared medicated chocolate were evaluated for general appearance, hardness, physical stability and drug-content. Wide scope is available for further studies using suitable models.

From the above study, it was concluded that chocolate masks the unpleasant taste associated with drug and it can be an good drug delivery system.

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