Formulation of Herbal Chocolate by using Sunflower Seeds

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Abstract- Chocolate is children's favorite food and medicine is a dirty product. Therefore, the aim of this study is to create drug-containing chocolates like chocolate to prevent diseases. Many diseases such as cancer, blindness and other chronic diseases in children affect antioxidant deficiency. Therefore, we must create chocolate with sunflower seeds to provide antioxidant activity. In addition, medical products are evaluated for general appearance, size, hardness, breakage test, determination of drug content, physical stability, etc. It is also evaluated from different aspects.[1] Due to the widespread use of chocolate, the main purpose of this study was determined. Nutrition of children and adults. In today's age, stress, poor memory, lack of attention and late treatment are common problems. Although we all complain about our memory, most of the time it is beautiful and only begins to weaken with age or some kind of mental illness. Age, stress and emotions can lead to forgetfulness, forgetfulness, anxiety, high blood pressure, dementia and even more serious diseases such as schizophrenia and Alzheimer's disease.[4] There are many other medications that can improve memory, but they are used only because of side effects. In recent years, more and more schools and medical research centers have been investigating the role of plants in improving memory.[2] Additionally, pink tonic chocolate has many health benefits such as lowering blood pressure, improving blood flow to the brain, preventing cell damage, improving blood sugar, reducing the risk of heart attack, increasing HDL cholesterol, lowering LDL cholesterol.[7] Chocolate is a food that people love, drugs are something that people hate. Therefore, the aim of this study is to create chocolates containing drugs such as chocolate for the prevention of various diseases.[3] Sunflower seeds contain many vitamins such as vitamin B, vitamin C and vitamin E. Iron, calcium, manganese, phosphorus, selenium and copper are abundant. It has a low glycemic index. Therefore, to create the desired medicine, we need to create chocolate with sunflower seeds.

INTRODUCTION

A General Introduction to Chocolate Drug Delivery System Perhaps of the most famous food all around the world is chocolate and it has profoundly nutritious energy, quick digestion, and great absorbability. When consumed as a component of a reasonable and changed diet, chocolate can be both a wellspring of supplements too as joy, and can considered as be important for an invigorating, healthy eating regimen. Cured chocolate detailing is generally utilized for organization and it builds the patient's longing to consume the medicine. Sedated chocolate is ready by utilizing chocolate base and medication is integrated to arranged chocolate base. The sedated chocolate can be assessed for its appearance, dampness content, thickness, blossoming test. Cured chocolate is ready by utilizing chocolate base and the medication is integrated into arranged chocolate base. As the medication is consolidated inside the chocolate and the medication is let out of the chocolate, it is called as Chocolate medication drug delivery system.[5]

Application

Benefits of dark chocolate.

1. Very nutritious

If you buy quality dark chocolate with a high cocoa content, then it’s quite nutritious. It contains a decent amount of soluble fiber and is loaded with minerals. A 100-gram bar of dark chocolate with 70–85% cocoa contains 11 grams of fiber

- 66% of the DV for iron
- 57% of the DV for magnesium
- 196% of the DV for copper
- 85% of the DV for manganese

In addition, it has plenty of potassium, phosphorus, zinc, and selenium. Of course, 100 grams (3.5 ounces) is a fairly large amount and not something you should be consuming daily. These nutrients also come with 600 calories and moderate amounts of sugar.

2. Powerful source of antioxidants

ORAC stands for oxygen radical absorbance capacity. It’s a measure of the antioxidant activity of foods.

Basically, researchers set a bunch of free radicals (bad) against a sample of a food and see how well the antioxidants in the food can disarm the free radicals. Based on these studies, chocolate is considered rich in antioxidants. But the biological relevance of ORAC values is questioned, as it's measured in a test tube and may not have the same effect in the body. Research in humans does not always show the same range of antioxidant effects for chocolate. But experts say there isn't enough evidence yet to say for certain Dark chocolate is loaded with organic compounds that are biologically active and function as antioxidants. These include polyphenols, flavanols and catechins, among others. According to research, the polyphenols in dark chocolate may help lower some forms of LDL ("bad") cholesterol when combined with other foods like almonds and cocoa. One study showed that cocoa and dark chocolate had more antioxidant activity, polyphenols, and flavanols than any other fruits tested, which included blueberries and acai berries.

3. May improve blood flow and lower blood pressure
The flavanoids in dark chocolate can stimulate the endothelium, the lining of arteries, to produce nitric oxide (NO) One of the functions of NO is to send signals to the arteries to relax, which lowers the resistance to blood flow and therefore reduces blood pressure. Many controlled studies show that cocoa and dark chocolate can improve blood flow and lower blood pressure, though the effects are usually mild However, one study in people with type 2 diabetes and high blood pressure showed no effect, so take this with a grain of salt. It's possible that people who are already receiving treatment for high blood pressure may not get any additional benefit from adding cocoa flavanols to their diet.

4. Raises HDL and protects LDL from oxidation
Consuming dark chocolate can improve several important risk factors for heart disease. It may protect against high cholesterol. In a small study, eating dark chocolate supplemented with the flavanol lycopene was found to significantly decrease levels of total cholesterol, LDL ("bad") cholesterol, and triglycerides. Some forms of LDL cholesterol are more likely to oxidize, which happens if they react with free radicals in your body. Oxidation makes the LDL particle itself reactive and capable of damaging other tissues, such as the lining of the arteries in your heart. It makes perfect sense that cocoa lowers oxidation-prone forms of LDL. It contains an abundance of powerful antioxidants that do make it into the bloodstream and protect lipoproteins against oxidative damage. The flavanols in dark chocolate can also reduce insulin resistance, which is another common risk factor for diseases like heart disease and diabetes. However, dark chocolate also contains sugar, which can have the opposite effect.

5. May reduce heart disease risk.
The compounds in dark chocolate appear to be highly protective against the oxidation of LDL. In the long term, this should cause much less cholesterol to lodge in the arteries, resulting in a lower risk of heart disease. In fact, research show a fairly drastic improvement. Over time, a number of studies have shown that consuming flavanol-rich cocoa or chocolate can lower blood pressure and improve cardiovascular health.
A review of studies revealed that eating chocolate 3 times per week lowered the risk of cardiovascular disease by 9%. Eating chocolate more often showed little additional benefit. Another review suggested that eating 45 grams of chocolate per week lowers cardiovascular disease risk by 11%. Consuming more than 100 grams per week does not appear to produce health benefits. A 2017 clinical trial found that subjects who consumed almonds with or without dark chocolate showed improved LDL cholesterol levels. Although all of these findings are promising, more evidence is needed to know if it was the chocolate that reduced the risk. However, since the biological process is known (lower blood pressure and lower oxidization-prone LDL), it's plausible that regularly eating dark chocolate may reduce the risk of heart disease.

6. May protect your skin from the sun
The bioactive compounds in dark chocolate may also be great for your skin. The flavanols can protect against sun damage, improve blood flow to the skin, and increase skin density and hydration. The minimal erythemal dose (MED) is the minimum amount of UVB rays required to cause redness in the skin 24 hours after exposure. Studies have shown that MED can increase and even double after consuming high-flavanol dark chocolate or cocoa for 12 weeks. The result is that your skin has better protection from the

sun. If you're planning a beach vacation, consider enjoying some extra dark chocolate in the prior weeks and months. But check with your doctor or dermatologist before forgoing your normal skin care routine in favor of more dark chocolate. And remember that chocolate can't replace sunscreen and other forms of sun protection.

7. Could improve brain function

The good news isn't over yet. Dark chocolate may also improve the function of your brain. Studies show that eating high flavanol cocoa can improve blood flow to the brain in young adults. This may explain why eating cocoa daily appears to improve attention, verbal learning, and memory. Cocoa flavanoids may also help maintain cognitive function in older adults with mild cognitive impairment and reduce the chance of progressing to dementia. But more research is needed. Additionally, cocoa contains stimulant substances like caffeine and theobromine, which may be a key reason why it can improve brain function in the short term.

BENEFITS OF WHITE CHOCOLATE

1. Rich in Antioxidants

White chocolate is full of powerful antioxidants, which can help fight off free radicals and protect your body from oxidative stress. Polyphenols and flavonoids are two types of antioxidants that can be found in white chocolate, and they may help protect the body from inflammation, improve cardiovascular health, and even support healthy skin.

2. Good Source of Minerals

White chocolate is full of essential minerals that can benefit your health in numerous ways. Magnesium, calcium, and potassium are all found in white chocolate, and they can help regulate your blood pressure, help your blood vessels, support bone health, and even improve your digestive system.

Additionally, it contains zinc which helps boost immunity and iron for healthy red blood cell production.

3. Contains Healthy Fats

White chocolate is a great source of healthy fats, including monounsaturated and polyunsaturated fats. When you eat chocolate, it can help lower bad cholesterol levels and reduce your risk of heart disease and stroke.

Additionally, these types of fat, unlike saturated fat, can also help keep you feeling fuller for longer, which can aid in weight loss when consumed in moderation.

4. Helps Reduce Stress

White chocolate contains theobromine, a natural compound that helps to reduce stress and improve your mood. It works by stimulating the release of endorphins, which are hormones responsible for producing feelings of happiness and contentment.

Additionally, it can also help to reduce anxiety levels by promoting relaxation.

5. Boosts Energy Levels

White chocolate is a great source of caffeine, which can help to give you a boost of energy when you need it most. Caffeine can help to improve your concentration and focus, so it's the perfect pick-me-up for long days or difficult tasks.

6. Improves Physical Endurance

White chocolate has been found to improve physical endurance by delaying fatigue during exercise. Made with milk powder and pure cocoa butter, it boosts your energy!

7. Enhances Cognitive Function

White chocolate is packed with nutrients that can help improve cognitive function, such as omega-3 fatty acids, B vitamins, and antioxidants. These can help boost your brain power and even improve your memory. Additionally, the caffeine content of white chocolate may also help to enhance focus and concentration.

BENEFITS OF SUNFLOWER SEEDS

1. Immunity Booster

- Immunity boosting effects of sunflower seeds are due to the presence of vitamin E, zinc and selenium in them.
- Vitamin E enhances immune responses and protects against several infectious diseases. It is also a powerful antioxidant and prevents free radicals from damaging healthy cells in our body.
- Zinc protects our body from inflammation, allergies and invading pathogens, thus preventing infections and increasing overall immunity.

2. Reduces Cholesterol

- The fibre content of sunflower seeds benefits by decreasing the levels of LDL cholesterol in the blood.
- Niacin or vitamin B3 present in sunflower seeds reduces total cholesterol levels and risk of heart diseases.
- Vitamin B5 or pantothenic acid in sunflower seeds increases HDL cholesterol and reduces total serum cholesterol levels.

3. Cardioprotective Effects

- Sunflower seeds are rich in oleic and linoleic acid and low in saturated fats and sodium. They also contain magnesium, potassium and fibre.
- They help to lower blood pressure and serum cholesterol levels. Consuming them also reduces the occurrence of arrhythmias. All these effects help to protect our body from occurrence of cardiovascular disorders.

4. Reduces risk of Cancer

- Beta-sitosterol, a phytosterol present in sunflower seeds helps to prevent breast cancer. [9] It inhibits the growth of tumour cells, decreases the size of the tumour and also prevents metastasis.
- Presence of strong antioxidants in sunflower seeds also reduces the risk of cancer.
- Consumption of these seeds also reduces the chances of colon cancer

5. Management of Diabetes

- Sunflower seeds are useful in reducing blood sugar levels in patients with type 2 diabetes mellitus. It is a chronic condition that leads to high levels of blood sugar in your body as the cells do not respond to insulin as well as they should.
- A few of the symptoms include increased thirst and hunger, frequent urination, unexplained weight loss, fatigue and blurred vision.

6. Boosts function of Brain

- Sunflower seeds contain vitamin B6. It improves mood and concentration and enhances memory. It releases serotonin and norepinephrine in our body.
- Sunflower seeds also help to ease symptoms associated with premenstrual syndrome (PMS)

7. Helps in Weight Loss

- Sunflower seeds are rich in proteins and fiber. They make us feel full for a long time, reduce our food intake and finally reduce the number of calories consumed. This helps in reduction of weight.

8. A Powerhouse of Energy

- Sunflower seeds are a good source of thiamine (vitamin B1). Thiamine helps to breakdown carbohydrates, proteins and fats present in our food into energy. They also help in muscle building.
- A handful of sunflower seeds can give you instant energy when consumed.

9. Helps in Treatment of Anemia

- Sunflower seeds are a good source of iron. Consuming these seeds helps to up our iron levels; thus helping people suffering from anemia.

10. Helps to Detox our Body

- Sunflower seeds have potent antibacterial activity. They help in effectively removing bacteria and germs from cells.
- They also help to flush out toxins from our body.

11. Good for our Skin

- Consuming sunflower seeds benefits the skin as it makes our skin glow, and the antibacterial and antifungal activity of these seeds also prevents infections, thus keeping our skin clear.
- Oleic and linoleic acids, present in sunflower seeds help in the formation of collagen and elastin, speeding up wound healing. They also prevent the formation of scars.

12. Helpful During Pregnancy

- During pregnancy, the benefits of eating sunflower seeds are many as they are loaded with Vitamin E, which is a nutrient known to be extremely beneficial for prenatal health.
- This means, Vitamin E helps in the development of the baby inside the womb. Therefore, sunflower seeds are an effective source of nutrition for pregnant women and their babies.

13. Reduces Inflammation

- People suffering from chronic inflammation can find relief by consuming sunflower seeds either as part of trail mix or by adding them to their breakfast cereal or even by sprinkling some on their soup or salad.
- The health benefits of sunflower seeds include anti-inflammatory properties such as flavonoids, Vitamin E and other compounds. Experts have found that consuming sunflower seeds as part of any of your meals 3-5 times a week significantly lowered vulnerability to chronic conditions such as arthritis or joint pain

Image 1:- sunflower seeds.

Needs and objective of chocolate:

Needs:

- Chocolate improve level of antioxidant.
- Improve blood circulation and lower the blood pressure.
- Reduce heart disease risk.
- Improve brain function.
- Sunflower seeds improve bone health.
- Sunflower seeds manage the risk of cancer.

Objective:

- Formulated chocolate improves bone health.
- This chocolate reduces the risk of heart failure.
- It even reduces the risk of cancer.
- This chocolate improves the blood circulation.

MATERIAL AND COMPOSITION

Material

Sr no.	Ingredient
1	Dark chocolate
2	White chocolate
3	Sunflower seeds
4	Sugar
5	Salt

Table 1:- list of ingredient.

Composition

Sr no	Ingredient	F1	F2	F
1	Dark chocolate	3gm	3gm	3.5gm
2	White chocolate	3.5gm	3.5gm	3gm
3	Sunflower seeds	2gm	2gm	2gm
4	Sugar	1gm	0.5gm	1gm
5	salt	0.009gm	0.005	0.005gm

Table 2:- composition of chocolate with sunflower seeds.

METHOD OF PREPARATION

At first keep the water for boiling. When the water starts boiling add double boiler to it add the measured amount of chocolate base or compound and even add the white chocolate to the double boiler. Melt the dark chocolate and white chocolate compound till the desired consistency. Once the chocolate is melted and mixed properly add the required amount of sugar and mix till it dissolves completely. After the sugar is mixed add a pinch of salt to balance the bitterness of dark chocolate. Till this process crush the sunflower seeds. Add these crushed seeds to the melted chocolate mix it properly pour this mixture to the silicon mold and keep in freezer for approximately 6 to 7 hours. Till the chocolate gets hard [4]

Image 2 Melted chocolate

Method of preparation in flow chart
By the method of double boiler melt the chocolate base/ compound
When the base is melted add sugar and a pinch of salt to balance electrolyte.
Appropriate quantity of sunflower seed was added to melted chocolate.
Mix the crushed sunflower seeds in chocolate mixture.
Add this mixture to a silicon mold with simultaneous stirring.
Keep in refrigerator till chocolate becomes hard.[1]

Evaluation
1. Phytochemical analysis
2. General appearance
3. Hardness-Hardness of chocolate was measured by Monsanto Hardness Tester.
4. Blooming test

Fat Bloom

When the thin layer of fat crystals form on the surface of chocolate formulation. This will cause the chocolate to lose its gloss and a soft white layer will appear, giving the finished article an unappetizing look.[1] Fat bloom is caused by the recrystallization fat and/or a migration of a filling fat to the chocolate layer. Storage at a constant temperature will delay the appearance of fat bloom.

Sugar Bloom
This is rough and irregular layer on top of chocolate formulation. This is caused by condensation (when chocolate is taken out of the refrigerator). This moisture will dissolve the sugar in the chocolate. When the water evaporates, sugar recrystallizes into rough, irregular crystals on surface.[5] This results into unpleasant look.

Test sample of chocolate was subjected to treatment cycles contains. 30 ºC for 11 hours
Shifting of temperature for 1 hour 18 ºC for 11 hours
Shifting of temperature for 1 hour
Observed the test sample of chocolate whether blooming has taken place.

5. Physical stability To check the physical stability, sample of chocolate was kept in closed container for 1 month at 28 ºC After one month interval, Test sample of chocolate was observed for physical appearance and drug degradation.

6. Drug content determination Drug content of medicated chocolate was determined by Thin Layer Chromatography. Here, control was taken as aqueous Tulsi extract and test as melted chocolate sample. TLC plates were prepared by using silica G and plates were activated for ½ Hr. Spotting was carried out on both plates, such as control plates and test strips using capillary tubes. Run two plates on mobile phase, e.g. 7:3:2 toluene: ethyl acetate : water ratio. After two plate runs, air dry the plates. Also use the iodine chamber to see the two plates. Determination of chemical content in chocolate by comparing RF values of two plates (control and test plates)

Phytochemical analysis
To 2-3 ml of aqueous extract, add a few drops of the following reagents

Phytochemical screening

Sr No.	Laboratory test	Result
1	5% Fecl3 solution	Blue and black
2	Lead acetate solution	Formation of precipitate
3	Brominated water	Decolorization of brominated water
4	Dilute iodine solution	Red for while

General appearance

Color - dark brown

Smell - Chocolatey, no punch, no smoke Taste - slightly
Texture - Smooth and even

Dimension
It was measured by Vernier's calipers.
Batch I –
Height :- 8.97 ±0.12
Diameter :- 31.05 ±0.03

Batch II-
Height :- 8.47 ±0.049
Diameter :- 31.13 ±0.021
Hardness
Batch I - 0.2 Kg/cm² Batch II - 0.3 Kg/cm

CONCLUSION

In the present study, development of Pediatric Herbal Chocolate having antitussive activity was carried out. Aqueous extract of Tulsi leaves was prepared and phytochemical analysis was carried out to check the presence of desired compounds that shows the acceptable results. By using prepared extract medicated chocolate prepared and evaluated for general appearance, dimension, hardness, blooming test, drug content determination and physical stability. From above study, we concluded that the chocolate provides smooth and creamy texture to the formulation and are good for masking the unpleasant taste associated with some drugs. Also, good oral drug delivery system to gives therapeutic effect.

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