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Formulation and Evaluation of Cinnamon Gummies for the Management of PCOS

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Abstract

:Cinnamon gummies have emerged as a potential dietary supplement for managing Polycystic Ovary Syndrome (PCOS). This study explores the efficacy of cinnamon gummies in regulating blood sugar levels, improving insulin sensitivity, and alleviating common PCOS symptoms such as menstrual irregularities and hirsutism. The bioactive compounds in cinnamon, particularly cinnamaldehyde, are known for their anti-inflammatory and antioxidant properties, which may contribute to hormonal balance and reduced oxidative stress in PCOS patients. Preliminary results suggest that regular consumption of cinnamon gummies can be a convenient and palatable alternative to traditional cinnamon supplements, potentially enhancing patient adherence and outcomes. Further research is warranted to establish optimal dosages and long-term effects.

Keyword: cinnamon, Agar, Sodium benzoate

Absorbic acid ,vitamin c ,Antioxidant, antimicrobial Gummies Sodium benzoate

1. INTRODUCTION

Polycystic Ovary Syndrome (PCOS) is a common endocrine disorder affecting women of reproductive age, characterized by hyperandrogenism, ovulatory dysfunction, and polycystic ovaries. Its management often involves lifestyle changes, medication, and natural supplements. One such promising natural supplement is cinnamon, traditionally known for its medicinal properties. Cinnamon has been shown to improve insulin sensitivity and reduce blood sugar levels, which are critical aspects of managing PCOS.

Cinnamon gummies, a convenient and palatable form of supplement, have gained popularity as an alternative method for incorporating the benefits of cinnamon into daily regimens. These gummies offer a user-friendly way to consume cinnamon, potentially aiding in the management of PCOS symptoms through improved metabolic function and hormonal balance. This introduction aims to explore the efficacy and potential benefits of cinnamon gummies in the context of PCOS management.

2. MATERIAL AND METHOD

Material- 1. Materials

Cinnamon powder

- Gelling Agents: agar-agar
- Sweeteners: honey
- Acidulants: Citric acid .Absorbic acid
- Flavoring Agents: Natural cinnamon aroma, vitamin C
- Coloring Agents: beetroot powder/amaranth
- Preservatives: Sodium benzoate
- Solvents- : Water

1. Preformulation

A preformulation study involves evaluating the physicochemical properties of the active ingredient cinnamon extract to ensure compatibility and stability in the final product.

1.Organoleptic Properties

The cinnamon powder was evaluated for its color, odor, and taste by a panel of experts.

2 Microscopy

A small sample of cinnamon powder was examined under a light microscope to assess particle shape and size.

3. Particle Size Distribution

The particle size distribution was determined using a laser diffraction particle size analyzer. Samples were dispersed in ethanol and measured for particle size range.

4. Solubility Analysis

Solubility tests were conducted by dissolving 1 g of cinnamon powder in 10 mL of water, ethanol, and methanol at room temperature. The solutions were stirred for 30 minutes, filtered, and analyzed using UV-Vis spectroscopy.

5. Moisture Content

Moisture content was measured using. Approximately 100 mg of cinnamon powder was tested for water content.

6. Bulk and Tapped Density

Bulk and tapped densities were measured by placing 10 g of powder in a graduated cylinder, recording the initial volume, then tapping the cylinder until no further volume change was observed.

7. Flow Properties

The flow properties were assessed by measuring the angle of repose using a fixed funnel method. Carr's index and Hausner ratio were calculated from bulk and tapped densities.

8.Identification of drugs using FT-IR

The acquired FT-IR of the medication demonstrates the identification of distinct functional groups that were compared with the reference spectra, and no significant difference was seen, confirming the purity of the powder of cinnamon..

2. Formulation Process

2.1 Preparation of Cinnamon powder

- Obtain cinnamon powder and check there preformulation.

2.2 Preparation of Gummy Base

- Hydration: Dissolve the agar-agar agent in water and allow it to hydrate for 30 minutes.
- Heating: Heat the hydrated mixture at until fully dissolved.
- Sweetening: Add honey sweetener to the mixture and continue heating until completely dissolved.
- Acidulant Addition: Incorporate the acidulant to adjust the pH and enhance the gelling properties.

2.3 Incorporation of Cinnamon Extract

- Mixing: Slowly add the cinnamon extract to the gummy base while continuously stirring to ensure even distribution.

2.4 Flavoring and Coloring

- **Flavor and Color:** Add the desired flavoring and coloring agents to the mixture, ensuring thorough mixing.

2.5 Molding and Setting

- Pouring: Pour the mixture into silicone molds designed for gummies.
- Cooling: Allow the mixture to cool at room temperature for 1-2 hours.
- Setting: Transfer the molds to a refrigerator and let them set for 12-24 hours.

3. Evaluation of Gummies

1 pH of the Gummies

-Blending a gummies into invariant paste.

-Calibrating the pH cadence and conforming the sample temperature to room

-temperature before measuring the pH.

2 Physical Evaluation

- Appearance (color, shape, clarity)
- Texture (firmness, chewiness)
- Weight uniformity
- pH measurement

3. Chemical Evaluation

- Assay of active ingredients
- Content uniformity
- Disintegration/dissolution time
- Moisture content (e.g., Karl Fischer titration)

3. Friability Testing: Constantly dropping a sample of gummies over a fixed time, using a rotating barrel with rotating barrel with a baffle. The result is examining for broken tablets, and the chance of tablet mass lost through dicing.

through dicing.

Result-

1. Preformulation

Organoleptic properties

Color-light brown

Taste-sweet and spicy

Odor-aromatic characteristic cinnamon odor

2- Microscopy-

50-200microns

3 Particle Size Distribution

100-150

4 Solubility Analysis

Ethanol	Highly soluble
Acetone	Soluble
Water	Slightly soluble

5 .Moisture Content-

The moisture was be found 8.2%w/v.

6. Bulk Density-

The bulk density was be found 0.56g/ml.

7 Flow Properties-

The angle of repose was 34%

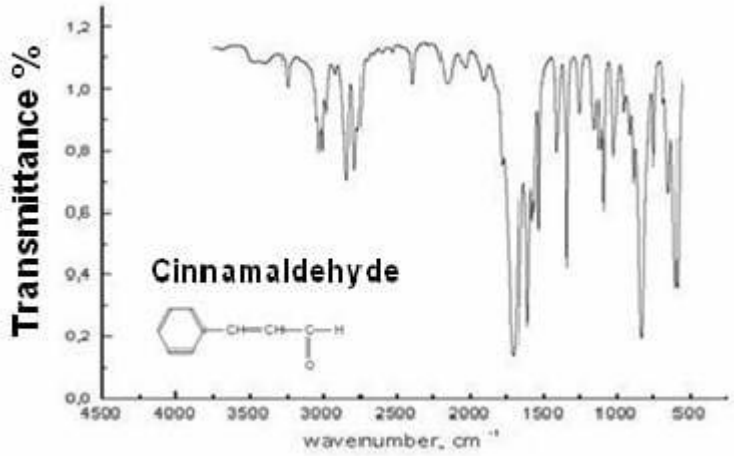
Carr,s index was17.6%

Hausner ratio was 1.21

Good flow properties.

.

8.Identification of drugs using FT-IR



2. Formulation Process

2.1 Preparation of Cinnamon powder

Evaluation

1 Ph-

pH range	Gummy solution in water
5%W/V	3.5-4.0

2 Physical evaluation

Appearance	Uniform colour ,no air bubble
Texture analyzer	2.5N
Weight uniformity	5.0± 0.1g.
pH	4.5

3 Chemical evaluation

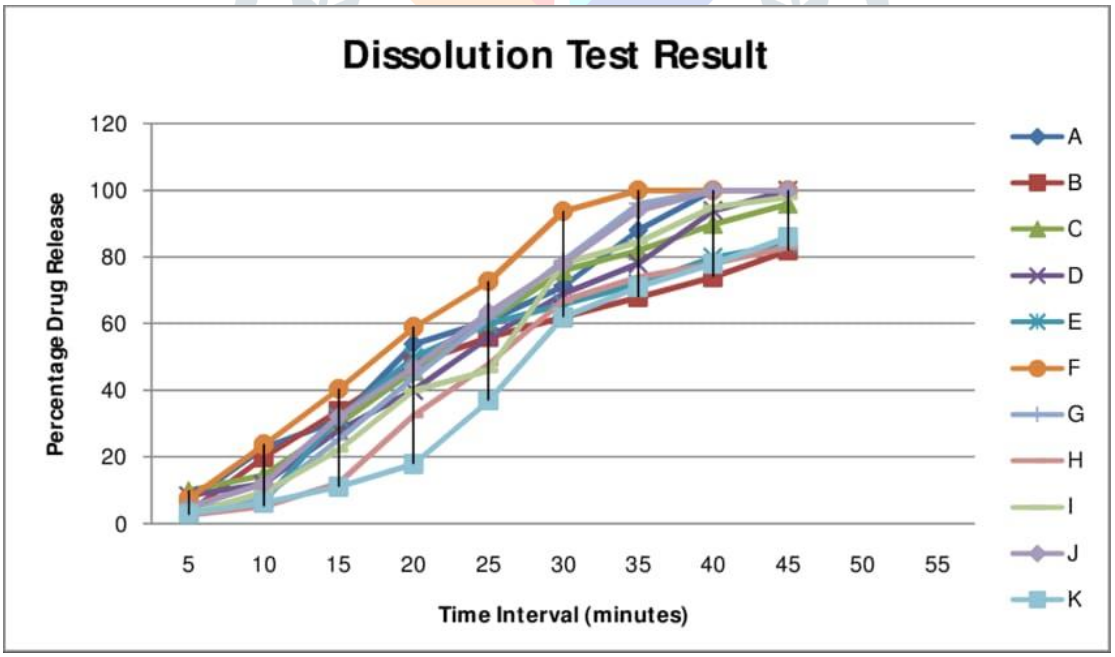
Assay	98%
Content uniformity	Variation was less than 2%
Dissolution Time	5 min saliva stimulant
Moisture Content	15%

4 Friability Testing

Sample	Initial Weight (g)	Final Weight (g)	Friability (%)
1	200	195	2.5
2	198	194	2.0
3	205	201	1.95
-	-	-	-
Average	201.2	197.8	2.15

5 IN-Vitro dissolution

Sr No	F1	F2	F3	F4
1	0	0	0	O
2	5	23	23.01	26.01
3	10	42	39.01	42.01
4	15	53	48.82	62.01
5	20	72	69.02	71.01
6	25	92	89	91.02



CONCLUSION-

Cinnamon gummies formulated for the management of PCOS offer a promising dietary supplement option, combining the therapeutic benefits of cinnamon with a user-friendly delivery method. The positive impacts on insulin sensitivity, inflammation, and antioxidant status highlight their potential in supporting PCOS management. Through comprehensive formulation and rigorous evaluation, cinnamon gummies can emerge as an effective adjunct in the dietary management of PCOS, contributing to improved quality of life for those affected by this condition.

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