

Phytochemical Aspects and Development of Herbal Cookies for Treatment of Obesity

KG Bhutkar^{1*}, AR Sakore², Ruchi Kumari¹ and Khusboo Kachariya¹¹Department of Pharmacognosy, GSMCOP Wagholi, Pune, Maharashtra, India²Department of Pharmaceutical Chemistry, GSMCOP Wagholi, Pune, Maharashtra, India***Corresponding Author:** KG Bhutkar, Department of Pharmacognosy, GSMCOP Wagholi, Pune, Maharashtra, India.**Received:** March 05, 2018; **Published:** May 18, 2018**Abstract**

Obesity is a Multifactorial disorder of energy balance. It is characterized by an excessive Body Mass Index. If BMI is > 30 kg/m², it is called as obesity. Obesity leads to many multi disorders like- types-II diabetes, heart diseases, gout, sleep apnea, osteoarthritis, obesity hypoventilation syndrome etc. Obesity takes place due to lipids which are essential for healthy cell functions as long as they are not in excess amount in our body. There are three types of lipids: LDL (below 100 is optimum) HDL (above 60 it gives protection against heart diseases) and Triglycerides are stored as fats (above 150 it increases the rate of heart attack and stroke). Ant obesity drugs available in markets are such as Orlistat, Sibutramine, Amphetamine having side effects like abdominal cramp, GIT disorders, dry mouth, tachycardia, constipation, insomnia etc. So, to overcome these side effects herbal drugs are introduced as it is the oldest and most widely used system of medicine in the world today as they have less side effects and are easily available. We had formulated herbal cookies which are administered orally and degraded in stomach and it breaks the anabolism of lipid via β -Oxidation which is responsible for deposition of cholesterol in the body. The specialty of our formulation is that it increases lipolysis and energy expenditure which maintains the body weight and decreases fat absorption by preventing breakdown of dietary fat in GIT.

Keywords: High Density Lipoproteins; Multifactorial; Lipolysis; Low Density Lipoproteins; Triglycerides**Introduction**

Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have a negative effect on health. There are three types of lipids: LDL (below 100 is optimum) HDL (above 60 it gives protection against heart diseases) and Triglycerides are stored as fats (above 150 it increases the rate of heart attack and stroke). Diet quality can be improved by reducing the consumption of energy-dense foods, such as those high in fat and sugars, and by increasing the intake of dietary fiber. The stevia leaves are natural sweetener which helps cookies sweet taste. Turmeric and garlic are naturally boost the immune system and also acts as natural antiseptic action against bacteria and viruses. Garlic may protect against heart attacks and strokes and helps lower bad cholesterol level in body.

This aids the release of saliva, which prepares your stomach for food. the enzymes present in saliva that improve the digestive process, which helps in the body to break down fats this doesn't happen before food reaches the stomach, then it isn't processed properly and digestive problems such as bloating, constipation, diarrhea, wind and irritable bowel may result. Cookies are easier formulation to introduction of oral route of administration. Obesity is one of the common reasons for multiple diseases like heart attack, diabetes, osteoarthritis etc. in the formulation of herbal cookies use the ingredient to reduce the formation of lipid via breakdown of lipid metabolism in body. So, Limonene is hydrocarbon classified as a cyclic terpene. It is used in chemical synthesis as a precursor

to carvone and as a renewable- based solvent in cleaning products. The principle metabolites of limonene are (+) and (-) trans- carvel, a product of 6- hydroxylation-Limonene has a mild appetite suppressant effect, which can be used by anyone to help settle down their appetite [1-5].

Need for the Study

- The ingredients used in the formulation of herbal cookies are having high metabolism rate and it does not allow the bad cholesterol to get deposited within the body.
- The literature survey reveals that no significant work has been done regarding formulation of herbal cookies which has lipid lowering ability and which can promote the weight loss naturally by intake of cookies.

Objective for the Study

To reduce the body lipid level in body by administration of herbal cookies.

- To formulate herbal anti-obesity cookies
- To formulate cookies with minimal or null side effects and produce Desired effect to the individual [6-12].

Cholesterol Level in body [8-10]

- 200 milligrams per deciliter (mg/dL) or less is considered normal.
- 201 to 240 mg/dL is borderline.

- Greater than 240 mg/dl is considered high.

For HDL ("good cholesterol"), more is better [8-10]

- HDL 60 mg/dL or higher is good -- it protects against heart disease.
- HDL between 40 and 59 mg/dL are acceptable.
- Less than 40 mg/dL HDL are low, increasing the risk of heart disease.

For LDL ("bad cholesterol"), lower is better [4,8,9]

- An LDL of less than 100 mg/dl is optimal.
- An LDL of 100 to 129 mg/dl is near-optimal.
- LDL between 130 and 159 mg/dl is borderline high.
- LDL cholesterol between 160 and 189 mg/dl is high.
- An LDL of 190 mg/dl or more is considered very high.

Mechanism of lipogenesis and Lipolysis [6]

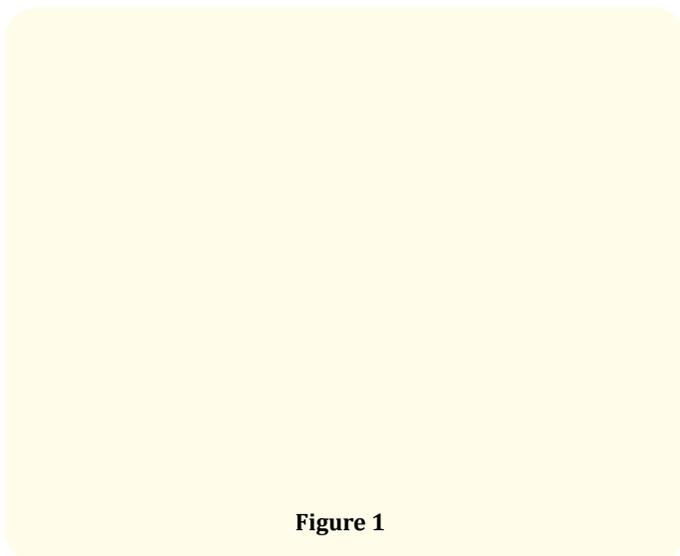


Figure 1

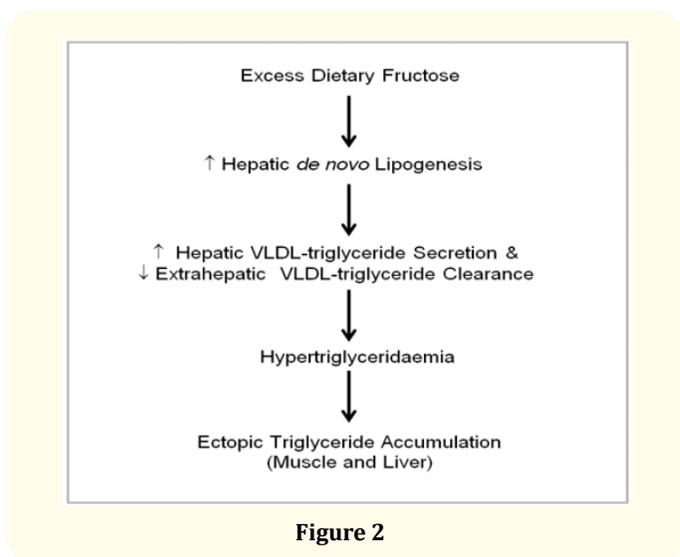


Figure 2

Materials and Methods

Place of Experiment

Genba Sopanrao Moze College of Pharmacy Wagholi, Pune.

Raw Materials

Garlic oil obtained by extraction method, D. Lemonime, olive oil, Turmeric powder, oats powder, stevia leaves powder, water.

Raw Materials

- All solid ingredient mixes separately and then addition of water and oil quantity.
- Heat oven to 375°F.
- Mix stevia leaves powder, Garlic oil, olive oil and D. Lemonime, stir in oats powder with water (dough will be stiff).
- Drop dough by rounded tablespoonfuls about 2 inches apart onto ungreased cookie sheet.
- Bake 8 to 10 minutes or until light brown (centers will be soft) (Figure 3).

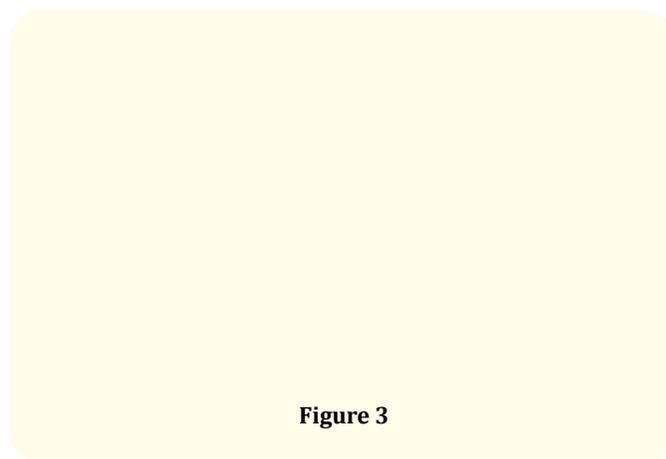


Figure 3

Organoleptic or Sensory Quality Analysis

Colour, Odor, Taste, Weight Variation, Spread Ratio, pH, Thickness, Hardness, Diameter, Etc. Was Performed [9,10,13-15].

Biochemical Quality Analysis

Protein content, fat content, crude fiber content, Carbohydrate content, Energy kg. call Determination [10,11,13,14,16-18].

Extraction of garlic oil

By Continuous Hot Extraction.

Extraction of Limonin

By Steam Distillation [13,18,19].

Formula

Table 1 all ingredients mix with sufficient Quantity of water and keep in oven for 40-50°C at 10 mints.

Result and Discussion

Table 2 general evolution parameter and table 3 Physical parameters of cookies prepared from different levels of oats flour

Sr. no	Ingredient	A	B	B	D	E
1	Garlic oil	1 ml	2 ml	3 ml	-	5 ml
	Garlic extract	-	1.5 gm	-	1.5 gm	2 gm
2	D-Limonine	2 ml	4 ml	1 ml	1.5 ml	2 ml
3	Olive oil	20 ml	25 ml	15 ml	25 ml	25 ml
4	Turmeric	1 gm	2 gm	1 gm	1.5 gm	2.5 gm
5	Oats powder	100 gm				
6	Stevia leave	17 gm	20 gm	25 gm	10 gm	20 gm
7	Water	5 ml				

Table 1: All ingredients mix with sufficient Quantity of water and keep in oven for 40-50°C at 10 minutes.

Formula	Colour	Odour	Taste	Weight variation	Spread Ratio	Thickness (mm)	pH	Hardness	Diameter
A	Yellow	Orange	Sweet	6	3.2	14	6.8	29	4.2
B	Pale yellow	Orange	Sweet	6.5	2.5	15	6.2	25	4.3
C	Yellow	Orange	Sweet	7.5	1.8	15	7.0	26	4
D	Yellow	Orange	Sweet	8	2.7	16	6.5	28	4.4
E	Yellowish Brown	Orange	Sweet	8.8	1.1	14	7.3	31	5

Table 2: General evolution parameter.

Formula	Moisture %	Protein %	Fat %	Crude fiber %	Ash %	Carbohydrate %	Energy kg. Cal
A	2.3	8.12	1.6	0.8	0.80	13	312.48
B	2.4	7.9	2.3	0.2	1.49	21	298.13
C	3	9.11	1.9	0.9	1.89	20	345.12
D	1.8	7	1.4	0.8	1.27	19	311.23
E	2	12.23	1	1	2.82	22	369.78

Table 3: Physical parameters of cookies prepared from different levels of oats flour.

According to above composite design of herbal cookies general evolution parameter and physical parameter of Herbal cookies in table no 02 and table no03 shows weight variation, spreading ratio, thickness, pH, hardness and diameter, percentage of moisture, protein, Fat, pcrude fiber, ash, carbohydrate and energy kg. Cal was found in table no 02 and table no 03 show the optimize result was obtained. The table no 02 and table no 03-model variable response were selected cookies a significant and valuable result was obtained. The formula 'A' shows very good result was observed as compare to other cookies B, C, D and E. the variables.

Conclusion

From the formulation of these cookies it's found that these cookies increase the energy expenditure and increases lipolysis which maintains the body weight of obese individual, which decreases fat absorption by preventing breakdown of dietary fat in GIT. Garlic, limonin and olive oil and stevia leaves addition into cookies formulation had considerable effects on physicochemical and sensory properties of cookies. It may be concluded from the study that garlic and limonin along with nutritive substance like olive oil, turmeric and stevia leaves can be successfully incorporated in oats flour in cookies which enhanced nutritional quality with acceptable sensory attributes. Hence, development and utilization of such functional foods will not only improve the nutritional status of the population but also helps those suffering from degenerative diseases cause by lipid. More studies should be conducted to investigate the possibility of using degenerative

as an ingredient in other food products in order to increase applications of such value-added food ingredient.

Summary

The aim of this research was to formulate a preparation which can help to overcome from the multifactorial disease called obesity. And somehow, we have succeeded to make the exact formulation and have reached our acquired activity.

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