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Utilising the Ethanolic Extracts of Leaves Garcinia Cambogia and Commiphora Mukul Herbal Pills Prepared for Treating Anti-Obesity Effects

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ABSTRACT

A complex disorder called obesity is characterised by an excessive quantity of bodily fat. It raises the risk of developing other illnesses and medical conditions like diabetes, high blood pressure, and heart conditions. When our BMI is 30kg/m^2 or greater, obesity is considered to exist. Today, more ailments are treated with traditional medicines—mostly herbal in nature—than with allopathic drugs. Compared to herbal drugs, allopathic drugs have higher side effects. The purpose of the current work is to create and assess the herbal tablet prepared using an ethanolic extract of Commiphoramukul and Garcinia cambogia leaves. Wet granulation was used to manufacture the formulation. Both the pre-compression parameter and the post-compression parameter of the prepared formulation were assessed. The calculation demonstrated that the permissible pre- and post-compression parameter is within bounds. Before and after the IEC's stability investigation, the Garcinia cambogia (HCA) content assay yielded results of 49.78% and 49.69%, respectively (Ion Exchange Chromatography). The content of Commiphoramukul (guggulsterones) was 12.38% and 12.26% before and after the UV Spectrophotometer stability investigation. The formulation was found to be reasonably stable based on the findings.

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INTRODUCTION

Obesity is a chronic metabolic disease brought on by a decrease in activity expenditure and an increase in calorie intake. Obesity is characterised by an excessive buildup of bodily fat as opposed to normal fat. It is a global health issue. Obesity is a substantial risk factor for developing a number of diseases, including dyslipidemia [1], diabetes mellitus, cancer, high blood pressure, and cardiovascular disease. In India, November 26th, 2010 is recognised as Anti-Obesity Day. If a person's body weight is over 20%, they are deemed obese. if someone has an overweight status and their BMI is between 25 and 29.9. You are deemed obese if your BMI is 30 or more. A person's BMI is calculated by dividing their weight in kilogrammes (kg) by their height in metres squared (kg/m^2) [2]. The Garcinia Cambogia (Vilaytiimlli) and Commiphoramukul combo medication was included in the herbal tablet formulation for the

treatment of obesity (Guggul). A herbal supplement called Garcinia Cambogia is primarily utilised as an anti-obesity medication and is still offered in capsule dosage forms, therefore tablet dosage versions were developed. Because herbal drugs have fewer negative effects than synthetic ones, they are more popular nowadays. For traditional drug delivery, the oral route of administration is the most common and effective. It has the benefits of convenience, simplicity in administration, increased design freedom for dosage forms, simplicity in manufacture, and cheap cost [3]. Tablets are solid preparations that typically result by compressing uniform quantities of particles and each contain a single dose of one or more active ingredients. Tablets are designed to be used orally. The term "compressed tablet" refers to a conventional, uncoated tablet that has been compressed and manufactured using one of three common manufacturing processes: wet granulation, double compaction, or direct compression. The goal of tablets in this category is typically to deliver quick medication release and disintegration. This type [4] of pill is the most common when medicine is intended to have a local effect in the GIT.

Pharmaceutical companies have employed herbal ingredients to treat a number of human ailments. The sour fruit of Garcinia cambogia has primarily been employed in food preparation and cooking. The primary active ingredient in Garcinia Cambogia's fruit extract that affects weight loss is hydroxycitric acid. The appetite is reduced or suppressed by hydroxycitric acid.

It has historically been used for a number of additional purposes, including astringent, constipating, cardiac tonic, anti-fungal, anti-diabetic, and decreasing cholesterol effects [5].

Z and E Guggulsterone, Guggulsterol I, II, III, IV, V, and Guggul Lipid are all present in Commiphoramukul. Guggul's oleoresin component is mostly used for its hypolipidemic properties.

Anti-inflammatory, antispasmodic, carminative, hypoglycemic, antiseptic, astringent, and anthelmintic [6] are some of the traditional uses of guggul. Wet granulation is used in the current work to create the herbal tablet from ethanolic extracts of garcinia cambogia and commiphoramukul leaves.

MATERIALS AND METHODS

Plant material Collection and Authentication

The leaves of Garcinia cambogia and Commiphoramukul plants were collected from a nearby location, Tirupati, Andhra Pradesh, India.

Plant materials were identified and authenticated by Dr. K. Madhava Chetty, Assistant Professor, Dept. of Botany, Sri Venkateswara University, Tirupati.

Chemicals used for preparation of Herbal Tablet

The chemical used in tablet preparation are Microcrystalline cellulose, Starch, Hydroxy propyl methyl cellulose (HPMC), Croscarmellose, Magnesium stearate and Aerosil. These chemicals are of analytical grade and are purchased from Arabindo labs, Hyd.

Preparation of Extracts

To make the extracts, dried leaves of Garcinia cambogia and Commiphoramukul were gathered, cleaned, and ground into coarse powders. Ethanol 95% vol/vol (75-78^0 C) was used to extract 1000 g of powdered materials for 72 hours of both leaf powders of Garcinia cambogia and Commiphoramukul. The materials were packed evenly in thimbles. Following extraction, the defatted extract was filtered to remove insoluble particles using Whatmann filter paper (No. 10). Vacuum distillation was used to concentrate the extracts. Until all solvent was gone, the concentrated extracts were evaporated using a rotary evaporator.

General Steps for Compressed Tablet Preparation

By adding the necessary amount of HPMC powder to the water while using a mechanical stirrer, paste-like Hydroxy Propyl Methyl Cellulose was created. The resulting mixture was then utilised to create a granule-binding solution. Accurately measured amounts of Garcinia Cambogia, Microcrystalline cellulose, and starch are properly combined, added gently to the HPMC slurry, and then added together with the powdered guggul extract. After being prepared, the granules are put through sieve number 18 and dried for 30 minutes at 50°C in a hot air oven. To create granules of the same size, the dried granular material was run through a sieve number 12 [7]. The various granule batches were then combined with calculated equal amounts of magnesium stearate and aerosil before being compacted into tablets using a double rotational compression machine (Table 1).

Pre-compression parameter for evaluation

Angle of repose

The funnel method was used to calculate the powder's angle of repose. A 2.5 cm-high funnel that was attached to a burette stand was used to funnel the powder. On the table, a graph paper was set down next to the funnel. The pile's height and radius were measured. Using the following formula, the powder's angle of repose was determined:

$$Angle\ of\ repose = \tan^{-1}(h/r)$$

Where, h = Height of the pile r = Radius of the pile

Bulk density

It is the ratio of the powder's total mass to its bulk volume. A measuring cylinder was filled with the powder once it had been weighed, and the original weight was recorded. Using this information, the bulk density was determined using the following formula

$$Bulk\ density\ (Db) = Mass\ (M)/Bulk\ volume\ (Vb)$$

Where, M is the mass of powder, Vb is the bulk volume of the powder.

Tapped density

It is the proportion of the powder's overall mass to its tapped volume. The powder was tapped 100 times to measure volume, and the tapped volume was recorded. It is provided by and stated in gm/ml.

$$Tapped\ density\ (Dt) = Mass\ (M)/\ Tapped\ volume\ (Vt)$$

Where, M is the mass of powder, Vt is the tapped volume of the powder.

Compressibility index

The following formula was used to get the percentage compressibility index of the bulk medication based on the apparent bulk density and the tapped density.

$$\%\ Compressibility\ index = \frac{tapped\ density - bulk\ density}{tapped\ density} \times 100$$

Hausner's ratio

Hausner's ratio is the proportion between tapped density and bulk density. It is a proximate indicator of how easily powder flows. The formula used to calculate it is as follows.

$$Hausners\ ratio = Tapped\ density\ (Dt)/Bulk\ density\ (Db)$$

Post-compression parameter for evaluation

Weight variation

20 tablets were individually weighed before the average weight was determined. Additionally, a percentage variation was generated using both average and individual weight. The formula used to determine it was as follows [8, 9]:

$$\%deviation = \frac{Average\ weight - Individual\ weight}{Average\ weight}$$

Dimensions

Using a digital vernier calliper, the tablet's thickness and diameter were measured. Three of the medication's tablets were chosen at random and each was measured separately.

Friability

The toughness of a tablet is measured by its friability. The friability of the pill was assessed using the Roche Fraibilator. 10 pills were precisely weighed and put into the friabilator chamber, which rotates at 25 rpm for 4 minutes, dropping the tablets over a 6-inch distance with each rotation. 100 rotations took 4 minutes to complete, after which the tablets were reweighed. The formula used to compute the % friabilator is

$$Friability\ (\%) = \frac{Initial\ weight\ (W1) - Final\ weight\ (W2)}{Initial\ weight\ (W1)} x100$$

Time to Disintegrate Disintegration time is the length of time it takes for a pill to disintegrate into tiny granules or pieces. The disintegration test is conducted in a device that has a basket rack assembly with six glass tubes, each measuring 7.75 cm in length and 2.15 mm in diameter, with a #10 mesh sieve at the bottom. 28 to 32 times per minute, the basket is raised and lowered in 900 ml of medium that is kept at a constant 37 °C. Each tube held six tablets, and the time it took for all of the tablet fragments to pass completely through sieve number 10 was taken as the tablet's disintegration time. Hardness The amount of force needed to crush tablets during a compression test. The procedure for assessing a tablet's hardness involves crushing the tablet between two jaws. The Pfizer tester was used to determine the tablet's hardness. kg/cm^2 is the unit of hardness.

Stability analysis According to ICH criteria, the stability investigations were completed in a highly satisfactory manner. Stability tests were conducted in the current study at 40 °C and 75% RH for a predetermined amount of time up to 3 months for optimal formulations. The tablets were placed in aluminium packaging that had a polyethylene coating inside for stability testing. These sample containers were put in desiccators with a 75% relative humidity setting. Animal Model For this investigation, albino wistar rats weighing between 150 and 200 g each were employed. Wistar albino rats of the 4 months old, healthy variety, weighing between 150 and 200 grammes [10]. The animals were divided into five groups, each with six rats, and kept in a conventional laboratory environment with a temperature of (16^o C) and a 12/12-hour light/dark cycle. Rodent chow pellets and unlimited amounts of water were given to the animals. The Institutional Animal Ethics Committee (IAEC), Sanzyme Bio Labs Pvt Ltd. Hyderabad (Vide letter no. 1643/PO/E/2023/CPCSEA. Anti-Obesity activity Induction of Obesity Diet high in fat Corn starch (15%), lard (17.6%), mineral mix (3.5%), sugar (27%) casein (20%), vitamin

mix (1%) cellulose powder (5%), choline bitartrate (0.2%), and methionine (3g) are the other ingredients. Above all, high-fat diet elements were combined, made into a pellet, and given to the animal every morning with water available at all times [11]. The diet was followed for four weeks. Rats' weight was increased after four weeks, inducing obesity in the rats as a result. Designing an experiment

Group I: A healthy-weight control group given a regular diet

Group II: High-fat diet-fed obese control group (HFD)

(Ob + Orl.) Group III: Standard treatment for obesity using orlistat 10 mg/kg

q(Ob + Comb.) Group IV: C. Mukul and G. Cambogiat-ablet for the obese, 550 mg/kg

(Ob + Comb + Std.) Group V: Combination (orlistat) tablet for obesity and dosage of 280 mg/kg.

For 28 days, the aforementioned treatment was administered to the appropriate group of animals. All of the animals received a daily high-fat diet along with herbal suspension medication [12]. The combination medicine G. Cambogia and C. mukul pill was triturated in a mortar and pestle with 0.5% CMC, 0.1% Tween 80, and enough water. After everything was well combined, suspension was created. Each day, a fresh medication suspension was made. The solution was stored in a colourful, airtight bottle and kept at room temperature until use [13]. The animal's body weight was used to compute the volume of the medication suspension.

Pharmaceutical Research

Body Weight

Using a digital weighing scale, the body weight (in grams) was recorded on day one and then every week for 30 days [14].

Food Intake

For a period of 30 days, the daily food intake of five groups of six rats was monitored and the means of those measurements were computed [15].

Organ Weight

On day 28, rats were sacrificed by having their heads severed from their necks. The liver and heart, among other organs, were isolated, formaline-washed, dried on filter paper, and weighed [16]. The ratio of organ weight to body weight (mg/g) was noted.

Bio-Chemical parameter

After an animal was given ether anaesthesia and allowed to starve for the previous night, blood was removed via the retro-orbital channel. On the 28th day of the study (after therapy), blood was taken. Using standard biochemical kits acquired from Ambica Diagnostic kit pvt.Parbhani, collected blood was centrifuged to separate for evaluation of lipid profile [17]. Total Cholesterol (TC), Triglyceride (TG), High Density Lipoprotein (HDL), and Low-Density Lipoprotein (LDP) were estimated.

RESULTS

Preliminary research

Pre-formulation investigations are the initial step in the logical creation of a pharmacological substance's dosage form. Pre-formulation studies' goal is to assemble a database of knowledge about the medication material that can be used to create various dosage forms. Investigation of the physical and chemical characteristics of the drug material alone and when mixed with excipients is known as pre-formulation (Tables 2 and 3).

Studies on stability

Physical and chemical factors Herbal weight-loss tablet (F4) after three months at 40°C ± 2°C, and 5% relative humidity (packing: blister pack) (Table 4 and Table 5).

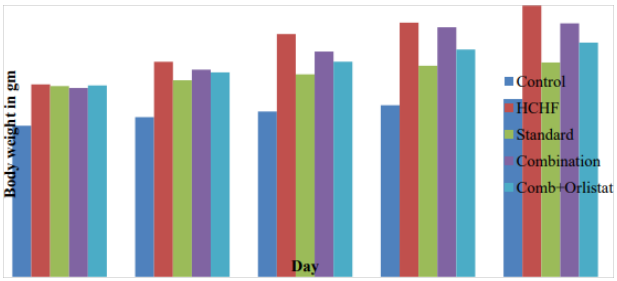

Figure 1: Effect of HCHFD on body weight

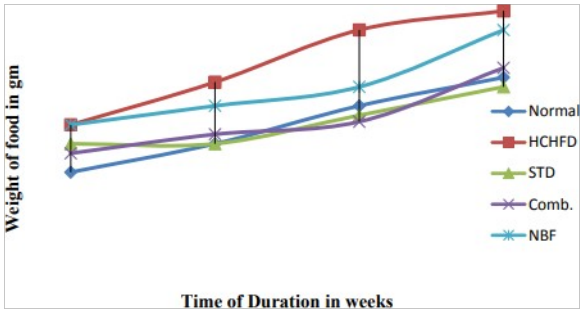

Figure 2: Effect of HCHFD on rat food intake

Preliminary research

Impact on physical weight

The body weight of the rats in the HFD group increased significantly ($p<0.05$) compared to the control group. Animals in the Orlistat group had a

Table 1: Composition of Herbal Formulation

Sr. No.	Ingredients	Composition
1	Garcinia Cambogia	500 mg
2	Commiphora Mukul	50 mg
3	Microcrystalline cellulose	170 mg
4	Starch	20 mg
5	Croscarmellose	25 mg
6	Hydroxy propyl methyl cellulose	20 mg
7	Magnesium Stearate	10 mg
8	Areosil	5 mg

Table 2: Organoleptic characteristics of Commiphoramukul and Garcinia cambogia

Property	Garcinia Cambogia	Commiphora Mukul
Colour	Light Yellowish brown	Creamy white
Odour	Characteristic	Characteristic
Taste	Sour taste	Acrid taste

Table 3: Loss on Drying (LOD) Results

Sr. No.	Active Pharmaceutical Ingredients	Standard LOD	Observed LOD
1	Garcinia Cambogia	5.0%	4.2%
2	Commiphora Mukul	5.0%	4.1%

Table 4: Formulation's pre- and post-compression parameters

Pre-Compression Parameters	
Angle of repose (Θ)	23.81±0.099
Bulk density gm/ ml	0.356±0.112
Compressibility index %	13.24±0.034
Tapped density gm/ml	0.655±0.108
Hausner's Ratio	1.14
Post-Compression Parameters	
Formula Avg. Weight (mg)	806.4±0.12
Thickness (mm)	6.31±0.04
Hardness kg/cm	3.7±0.03
Friability %	0.22
Disintegration Time (min.)	11 min

Table 5: Stability study findings

Parameter	Initial month	After 3 months
Description	Creamish white colour	No change
Avg. weight (mg)	806.2 mg	806.1 mg
Hardness kg/cm2	3.7 kg/cm2	3.6 kg/cm2
Thickness (mm)	6.31 mm	6.33 mm
Friability (%)	0.21 %	0.20 %
Disintegration Time (min)	11 min.	12 min.

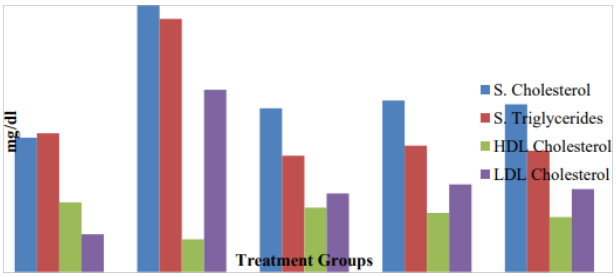

Figure 3: Effect of Rat's Lipid Profile

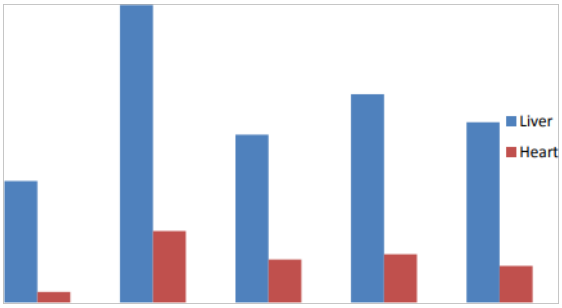

Figure 4: Effect on Organ Weight

significantly ($p<0.01$) lower body weight than those in the HFD group. When compared to the orlistat group, the combination + orlistat group significantly reduced body weight. Animals in the combination group saw a substantial ($p<0.001$) body weight loss compared to those in the orlistat group (Figure 1).

Effect of food consumption

When compared to control group I, the high fat diet group's daily food intake significantly ($p<0.05$) increased. When compared to group II HFD, the treatment group using orlistat exhibits a significant ($p<0.01$) reduction in daily food intake. In comparison to the orlistat group, the combination+ orlistat group significantly reduced daily food intake (Figure 2).

Lipid profile impact

When compared to the control group I, the group II high fat diet animals showed a significant ($p<0.05$) rise in triglycerides, low density lipoprotein, and cholesterol levels while a decrease in high density lipoprotein. When compared to the HFD II group, the Orlistat group mice significantly ($p<0.005$) reduced their levels of cholesterol, triglycerides, and low-density lipoprotein while increasing their levels of high-density lipoprotein. In comparison to the Orlistat group, the combination + Orlistat group significantly reduced triglycerides, low density lipoprotein, and cholesterol levels while marginally increasing high density lipoprotein (Figure 3).

Organ weight impact

When compared to the control group, the organ weight of the HFD group increased significantly ($p<0.05$). Animals in the orlistat group had a significantly ($p<0.01$) lower organ weight than those in the HFD group. In comparison to the Orlistat group, the combination with orlistat generated a considerable reduction in organ weight. Compared to the orlistat group, combination group animals showed a significant ($p<0.001$) reduction in organ weight (Figure 4).

DISCUSSION

The blends' analysis for the tablet pre-compression parameter revealed that the blends' angle of repose, bulk density, tapped density, compressibility index, and hausner's ratio all fell within acceptable bounds. Then, additional research was done on tablet's post-compression setting:

1. Each formulation's overall weight was not kept constant, but the weight variance was kept to a maximum of 5%.
2. Friability was discovered to be less than 5% and was deemed suitable between 0.21% and 0.35%.
3. The average tablet thickness was determined to be between 6.32mm and 6.43mm across all formulations.
4. Each formulation's tablet hardness was examined, and it was discovered to be satisfactory in the range of 3.8 to 5.2 kg/cm^2.
5. The manufactured pills underwent a 15-minute disintegration time assessment.

It is commonly acknowledged that rats fed a high-fat diet allow their appetites to be stimulated, which increases body weight as compared to rats fed regular chow pellets. When compared to other combinations, the combo tablet C.MukulandG. Cambogia was shown to be the best one in the current study.

Our findings showed that the combination had a strong synergistic effect on the development of obesity in rats fed a high-fat diet. The body weight, organ weight, and serum lipid profile of the rats in our varied treatment groups all showed these effects.

These findings imply that a combination of C. Mukul and G. Cambogia supplements may lessen weight gain brought on by a high-fat diet; yet, the combined group appeared to have low body weight due to anorexia.

Combination tablet therapy reduces the levels of TC, TG, and LDL in the blood while increasing the ratio of HDL. Orlistat plus combination therapy has a better effect on lipid levels than combination therapy alone.

Organ weight, such as that of the liver and heart, increases with the HFD diet, whereas the action of combination tablets causes a reduction in organ weight, but combination plus orlistat has a stronger effect than combination alone.

When given the combination orally at doses of 275 mg/kg/day, the wistar rats used in the study did not exhibit any mortality or adverse effects. Thus, the combination of garcinia cambogia and Commiphora provided a good margin of safety.

CONCLUSION

Garcinia cambogia and commiphoramukul are two medications used in tandem to treat obesity. This 800 mg combination tablet was created utilising various excipients. In order to identify the pure extract, tests for description, solubility, pH, measurement of guggulsterones, and estimation of HCA were conducted. Before being punched into tablets, the powder and mixes were subjected to tests for bulk density, tapped density, compressibility index, and hausner's ratio. Wet granulation was used to create the formulation, and super disintegrant was added because guggul tablets dissolve very slowly while they are still bound to the tablet. As a result, a superdintegrant was added, and the tablet disintegrated within the allotted time. The F4 formula was distributed to all batches. Then, an accelerated stability study for the Formulation was conducted. The tablets were packaged in blister packs, and stability testing was done on them at 400°F, 20°F, and 75% RH, 5% RH for three months. Tablets were assessed for testing, however there was no discernible change over the course of the stability investigation. The findings of this study demonstrate that a tablet containing Garcinia Cambogia and C.Mukul has a positive impact on body weight, reducing weight gain. As a result, this study's findings offer some biochemical support for the use of Garcinia Cambogia and Chaga mukul as an antihyperlipidemic agent with both therapeutic and preventive actions against hyperlipidemia; nevertheless, more research is needed to understand the potential mechanism of action.

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Conflict of Interest

The authors attest that they have no conflict of interest in this study.

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REFERENCES

[1] Alekhya RT, Shama NS, Kumar A. Formulation and Evaluation of Herbal Chocolate in the Treatment of Obesity. International Journal for Pharmaceutical Research Scholars (IJPRS). 2014;3(2):143–163.

[2] Patel R, Patel J, Kakkar S. Formulation & Development of Anti-Obesity Liquid Formulation Containing Garcinia Cambogia Extract, L-Carnitine and Chromium Picolinate. Indo Global Journal of Pharmaceutical Sciences. 2013;3(1):40–51.

[3] Lachman L, Lieberman HA, Kanig JL. The theory and Practice of Industrial Pharmacy. tablets; Third Edition. Varghese publishing house. Vol. 294; Bombay; 1987. p. 413–413.

[4] Geetha RV, Lakshmi T, Roy A. Garcinia cambogia (Malabar Tamarind): A Pharmacological Review. Journal of Pharmacy Research. 2011; 4(5):1464–1466.

[5] Rao M, Shivpuje, Godbole, et al. Design and Evaluation of Sustained Release Matrix Tablets Using Sintering. International Journal of Pharmacy and Pharmaceutical Sciences. 2015; 8(2):115–121.

[6] Gopinathan S, Naveenraj D. Anti-obesity Potential of ClerodendrumPhlomidis Linn and Garcinia Cambogia Linn -A Comparative Animal Model Study. World Journal of Pharmaceutical Research. 2014;3(9):1083–1111.

[7] Chandrasekaran CV, Vijayalakshmi MA, Prakash K, et al. Review Article: Herbal Approach for Obesity Management. American Journal of Plant Sciences. 2012;3:1003–1014.

[8] Lee J, et al. Regulation of Obesity and Lipid Disorders by Herbal Extracts from Morus alba, Diet-Induced Obese Mice. Journal of Ethnopharmacology. 2008;115(2):263–270.

[9] Pinder RM, Brogden RN, Sawyer PR, et al. Fenfluramine: A Review of Its Pharmacological Properties and Therapeutic Efficacy in Obesity. Drugs. 1975;10(4):241–323.

[10] Brenot P, Herve P, Petitpretz F, et al. Primary Pulmonary Hypertension and Fenfluramine

Use. British Heart Journal. 1993;70(6):537–541.

[11] Connolly HM, Crary JL, Mcgoon MD, et al. Valvular Heart Disease Associated with FenfluraminePhentermine. New England Journal of Medicine. 1997;37(9):581–588.

[12] Swinburn BA, Caterson I, Seidell JC, et al. Nutrition and the Prevention of Excess Weight Gain and Obesity. Public Health Nutrition. 2004; 7(1A):123–146.

[13] Park JP, Kim JH, Park MK, et al. Potential Agents for Cancer and Obesity Treatment with Herbal Medicines from the Green Garden. Biotechnology and Bioprocess Engineering. 2011; 16(6):1065–1076.

[14] Amin KA, Nagy MA. Effect of Carnitine and Herbal Mixture Extract on Obesity Induced by High Fat Diet in Rats. Diabetology & Metabolic Syndrome. 2009;1(17):1–14.

[15] Pickering RP, Grant BF, Chou SP, et al. Are Overweight, Obesity, and Extreme Obesity Associated with Psychopathology? Results from the National Epidemiologic Survey on Alcohol and Related Conditions. Journal of Clinical Psychiatry. 2007;68(7):998–1009.

[16] Dickerson FB, Brown CH, Kreyenbuhl JH. Obesity among Individuals with Serious Mental Illness. Acta Psychiatrica Scandinavica. 2006; 113(4):306–313.

[17] Simon GE, Korff V, Saunders M, et al. Association between Obesity and Psychiatric Disorders in the US Adult Population. Arch Gen Psychiatry. 2006;63(7):824–830.

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