

## Effect of plant based formulations on obesity indicators in humans.

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**ABSTRACT:** Obesity and other lifestyle diseases are increasing at an alarming rate globally. Plant based drugs are being used to control obesity as an alternative strategy to allopathic drugs and surgery. The present study was undertaken to observe the effect of different herbal formulations on obesity. The formulation comprised of honey mixed with juice extracts of plants like *Malus domestica*, *Allium sativa*, *Zingiber officinale* and *Citrus limonum*. Twenty volunteers were enrolled and they were given 10 ml of formulation for 90 days. It was observed that there was significant reduction in total body weight, BMI and waist circumference of the volunteers. The study indicates the possibilities of using these plants for management of debilitating diseases like obesity.

**KEYWORDS—Obesity, BMI, herbal formulations, plants, honey**

### INTRODUCTION

Obesity is an increasing epidemic worldwide and by 2005, obesity had affected 400 million adults.(1) According to WHO, obesity is related to cardiovascular diseases, hypertension, diabetes mellitus, gallbladder disease, cancer, endocrine and metabolic disturbances, osteoarthritis, gout, pulmonary diseases, as well as psychological issues, including social bias, prejudice, discrimination, and overeating (2). Since centuries, people across countries have been using natural products and plant based dietary supplement for weight control as use of allopathic and pharmacologic drugs despite being popular may show severe adverse toxicities thereby limiting their overall usefulness. Natural ingredients and medicinal plant preparations may enhance satiety, boost metabolism, and speed up weight loss (3,4).

The present study was undertaken to see the efficacy of some plant based formulations mixed with honey on obesity indicators like body weight, BMI and waist circumference and which may help in managing a healthy body.

### MATERIAL AND METHODS

Juices from the following plants -- *Malus domestica* (apple fruits), *Citrus limonum* (lemon fruit), *Zingiber officinale*(ginger rhizomes) and *Allium sativum* (garlic leaves) were extracted and mixed with honey. All plants and honey was procured locally. All plant juices were extracted in a blender. 500 ml of each juice was mixed with 1000 gm.honey. Boiled the mixture on gas burner to get desired consistency. It was cooled for 12 hours and the formulation was ready for use.

The study group comprised of twenty volunteers of 30-50 yrs age. Out of 20 volunteers

8 were males and 12 females. Their BMI varied between 25-35 kg/m<sup>2</sup> and their body weight was between 80-100 kg. Waist circumference ranged from 35-45 inches. Dose of 10 ml was given on empty stomach to each volunteer. This was followed by a glass of lukewarm water. Treatment was for 3 months and volunteers were asked to refrain from drinking milk and milk products for this period and were asked to maintain their daily routine. They were assessed for parameters like body weight, BMI, waist circumference periodically (**Table 1**).

Exclusion criteria- ----

Patients suffering from liver disease, arthritis, pulmonary tuberculosis, malabsorption or alcoholism were excluded from the study. Patients taking insulin, lipid lowering drugs, anti hypertensive agents or weight reduction drugs were not included.

### OBSERVATIONS

In this study significant reduction was observed in body weight, waist circumference and BMI.(**Table2**) of the volunteers Within one month volunteers showed decrease in body weight and by three months the decrease was upto 10 kgs. Waist circumference also decreased and by the end of the study period almost four inches reduction was observed.

BMI showed a variation from 1 to 5 kg/m<sup>2</sup>. It was also noted that herbal supplement with honey showed encouraging results in controlling some parameters of obesity without any side effects.

### DISCUSSION

All the ingredients of polyherbal formulation are known in the Indian traditional system of medicine for their antiobesity potential. These components

have been demonstrated to have beneficial effects in animal and human studies individually as well as in combination.

It was observed that honey and herbal products have positive and useful effect on reducing obesity and related risk factors. Anti obesity effects such as decreasing body weight, body mass index or waist circumference was seen in this study. Previous studies have also shown that medicinal herbal supplement are extensively utilized due to their effectiveness in managing chronic disorders (5,6). They are cost effective and without any side effects and therefore popular. Some herbal plants have anti-obesity and anti oxidant effects on body metabolism and fat oxidation (8, 12). Some medicinal plants have been investigated and reported to be useful in treatment of obesity diabetes, arthritis and other chronic diseases (9, 10) indicating the effectiveness of plant remedies in managing obesity and in maintaining healthy body weight.

As the present study also suggests, honey causes a mild reduction in body weight (1.3%) and body fat (1.1%) after taking daily for 30 days (13). Ginger also acts in reducing obesity and similar findings have been reported earlier (7) where ginger supplementation suppressed obesity induced by a high fat diet and it might be promising adjuvant therapy for treatment of obesity and its complications. Garlic also plays a role as the hypo-lipidemic action of garlic protein is primarily due to decrease in hepatic cholesterologenesis (11). These findings are encouraging and a detailed investigation of other parameters in volunteers can also be undertaken in the future.

The beneficial effect of this polyherbal preparation may be attributed to the components of this formulation. The antihyperlipidemic and antioxidant activity of this drug may be due to the

combined or individual effect of its ingredients. The possible mechanisms involved may include

1. Possible effect on insulin resistance by reducing adiposity.
2. Dietary fibre helps in the management of metabolic abnormalities.
3. Antioxidant effects by inhibiting oxidative stress. Biological antioxidant enzymes directly scavenge free radicals and prevent their conversion to toxic products.
4. Increased glucose metabolism and beneficial hypotryglyceridemic effect.

As there is no such study of poly herbs available for comparison, the dose of ingredients has been calculated on previous knowledge. This may be a limiting factor and can be modified according to the results for a future plan.

It can be concluded that the polyherbal preparation of traditional medicinal plants, is an effective measure in controlling glycemia and dyslipidemia. It appears to be a safe and effective oral agent able to bring about favourable and significant changes in clinical and biochemical parameters of obesity. .

## CONCLUSIONS

Managing obesity to lead healthy lives is becoming a challenge today. Two different anti obesity treatment drugs Orlistat and Sibutramine currently are in use in the market but they show hazardous side effects (14). There is a urgent need to suggest herbal or alternate remedies to tackle this lifestyle disease. More natural products need to be investigated and clinical trails are needed to prove the success of herbal medicines in battling obesity.

## REFERENCES

1. A. M. Wolf, and G. A. Colditz. Current estimates of the economic cost of obesity in the United States. *Obesity Research*. 1998, 6 (2): 97-106
2. . World Health Organization. "Obesity and overweight," March 4, 2009;  
URL: <http://www.who.int/mediacentre/factsheets/fs311/en/index.html>
3. N. I. Larson, M. T. Story, and M. C. Nelson. Neighborhood Environments:: Disparities in Access to Healthy Foods in the US. *American journal of preventive medicine*. 2009, 36 (1): 74-81. e10.
4. M. A. McCrory, B. R. Hamaker, J. C. Lovejoy et al. Pulse consumption, satiety, and weight management. *Advances in Nutrition: An International Review Journal*. 2010, . 1 (1): 17-30.
5. Jong Pil Park, Jis Hee Kim, Moonki Park, John won yun Potential agents for cancer and obesity treatment with herbal medicines from the green garden .  
*Biotechnology and Bioprocess Engineering*.  
December 2011, Vol. 16, Issue 6, PP 1065-1076.

6. Amin ka, Nagy MA  
Effect of carnitine and herbal mixture extract on obesity induced by high fat diet in rats.  
Diabetol metab syndr. 2009, Oct. 16 : 1 (1) : 17  
PMID : 19835614 [Pubmed]
7. Saravanan G, Ponnurugan P., Deepe MA, Santhi kumar B.  
Anti obesity action of ginger root - effect on lipid profile, Disutim Leptin, amylase and lipase in male obese rates induced by a high fat diet. JSCI Food agriculture, 2014 March 2010 doi : 10.1002.
8. L-K Han et al - Anti obesity effect of natural products, Studies in natural product chemistry 2005, 1st edition 30-79-110.
9. Shirin Hasani - Ranjbar, Bagher Lorijani and Mohammed Abdollahi. A systemic Review of the potential herbal sources of future of drugs effective in oxidant related diseases. Inflammation and allergy - drug targets - 2009, 8, 2-10.
10. Shirin Hasani - Ranjbar, Bagher Lorijani and Mohammed Abdollahi. A systemic Review of the efficacy and safety of herbal medicines used in the treatment of obesity world Journal of Gastroenterology 2009, 15 (25) : 3073-3085, ISSN 1007-9327 CMY 1219R.
11. Mathew B.C., Daniel R.S., Augustikt. Hypolipidemic effect of garlic protein substituted for casin in diet of rates compared to those of garlic oil.  
Indian J Exp. Biol. 1996, April, 34 (4) : 337-40.
12. Moro co, Basile G : Obesity and medicinal plants fitoterapia Aug 2000. Suppl 71:573-582.
13. Yaghoobi N', Al-waili N, Ghayour-mobarhan M. Parizadeli SM  
Natural Honey and cardiovascular risk factors, effect on blood glucose, cholesterol, cholesterol, triacylglycerde, CRP and body weight compared with sucrose, Scientific world journal 2008 April.
14. Kang JG, Parkcy  
Anti obesity drugs : A review about their effects and safety.  
Diabetes metab J, 2012 Feb 36 (1) : 13-25, doi : 10:4093/d mg

**Ingradients of polyherbal formulation-**

<u>Botanical name</u>	<u>Common name</u>	<u>Hindi name</u>	<u>Parts used</u>	<u>ratio</u>
<u>Malus domestica</u>	<u>apple</u>	<u>sev</u>	<u>fruit</u>	<u>1</u>
<u>Zingiber officinale</u>	<u>ginger</u>	<u>adrak</u>	<u>rhizome</u>	<u>1</u>
<u>Allium sativum</u>	<u>garlic</u>	<u>lehsun</u>	<u>leaves</u>	<u>1</u>
<u>Cirus linonum</u>	<u>lemon</u>	<u>nimbu</u>	<u>fruit</u>	<u>1</u>
	<u>honey</u>	<u>shahad</u>	<u>whole</u>	<u>2</u>

**Table-1**

**Baseline characteristic-**

**Parameters**

<u>Age (years)</u>	<u>30-50</u>
<u>Sex (M/F)</u>	<u>8 M-12 F</u>
<u>BMI</u>	<u>25-35</u>
<u>Waist circumference</u>	<u>90-110</u>
<u>Weight</u>	<u>75-95</u>

**Table -2**

**Change in parameters after 3 months**

<b><u>BMI(kg/m<sup>2</sup>)</u></b>	<b><u>1-2</u></b>
<b><u>Waist circumference(cm)</u></b>	<b><u>1-2</u></b>
<b><u>Weight (kg)</u></b>	<b><u>2-5</u></b>

**Table-3**

**Side effects**

<b><u>Nausea</u></b>	<b><u>1</u></b>
<b><u>Burning epigastrium</u></b>	<b><u>1</u></b>