



# REVIEW ON ANTI-OBESITY ACTIVITY OF SOME INDIGENOUS PLANTS

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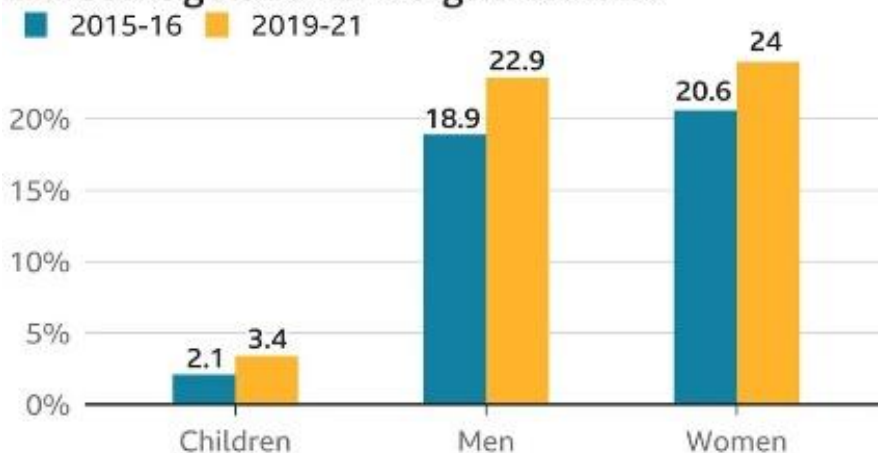
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**Abstract:** Obesity is an important global health concern and is associated with high morbidity and mortality rates. Modern methods of treatment, such as synthetic drugs and surgery, still have to be improved to show safety and efficacy. The main concerns with such treatments are the high costs and serious complications. Consequently, there is great interest in using plant-based medicinal agents as an alternative therapy. This study aims to review the studies on accessible botanical sources for treating obesity. Based on published studies, this review attempts to explain how these medicinal plants act in humans to cause weight loss, and, which method of use is safer and more efficient. The present study describes the screening of eight herbs namely *Cosmos caudatus*, *Pluchea indica*, *Lawsonia inermis*, *Carica papaya*, *Piper betle*, *Andrographis paniculata*, *Pereskia bleo*, and *Melicope lunu* for their anti-obesity and antioxidant activities. *Cosmos caudatus* was selected for further study, and the extraction solvent components with the best anti-obesity and antioxidant potential were determined. Hundred percent *Cosmos Caudatus* ethanolic extract was found to be the most efficacious and showed the highest anti-obesity and antioxidant activities.

## INTRODUCTION

Overweight or obesity is a major risk factor for many chronic diseases, including diabetes mellitus, cardiovascular diseases, and cancer. Obesity was previously considered a health issue in developed countries, but is now common worldwide, particularly in urban areas. There are many etiologic factors for this, including genetic, metabolic, behavioral, and environmental variables. The rapid increase in the prevalence of overweight and obesity suggests that behavioral and environmental influences are predominant, rather than biologic changes. There are 2 parts to the obesity equation: 1) an increased intake of foods with excessive amounts of fat, salt, and sugars, but less, minerals, and other nutrients; and 2) a decrease in physical activity due to increasingly sedentary lifestyles, changing modes of transportation, irregular daily routines, and increasing urbanization. Nowadays, despite of high cost and potentially risky side effects, the need for natural products against obesity is under investigation, which may be an alternative strategy for developing effective, safe anti-obesity drugs within economical risk. It is also known that natural anti-obesity preparations can induce weight loss through several mechanisms with less risk of side effects. To date, many reviews on anti-obesity agents have been consummated but focusing only on Bangladeshi medical plants with anti-obesity activities is still not found. Therefore, the present review aimed to collect or update data on potential anti-obesity herbal plants available in Bangladesh and assess the scientific data including active components and mechanisms of action against obesity in humans.

## Percentage of overweight Indians



**Graph shows how many people in India are obese**

### **METHODOLOGY: -**

**Names of plants with anti-obesity activity and their mechanisms of action, studied using animals or cells as models:**

- ACORUS CALAMUS LINN (ARACEAE)
- CORDIA ECALYCVLATA VELL (BORAGINACEAE)
- PREMNA INTEGRIFOLIA LINN (VERBENACEAE)
- DIMOCARPUS LONGANS LEENH (SAPINDACEAE)
- CITRUS AURANTIUM L. (Rutaceae)
- DALBERGIA SISSOO DC. (Leguminosae)
- EREMOCHLOA OPHIUROIDES (Munro) Hack (Poaceae)

### ▪ ACORUS CALAMUS LINN (ARACEAE): -

**Parts of Herb:** - Rhizome, roots and leaves

**Mechanism of Action:** - The ethyl acetate extract of Acorus calamus can inhibit the activity of  $\alpha$ -glucosidase.

**Studied Model:** - Mice (albino, Swiss strain)



ACORUS CALAMUS LINN (ARACEAE)

▪ **CORDIA ECALYCVLATA VELL (BORAGINACEAE)**

**Parts of Herb:** - Whole plant

**Mechanism of Action:** - Anti-obesity activity of the *C. ecalyculata* is mediated by anorectic central action, facilitating binding to adenosine receptors, thereby promoting an extension of adrenalin.

**Studied Model:** - Mice (albino, Swiss strain)



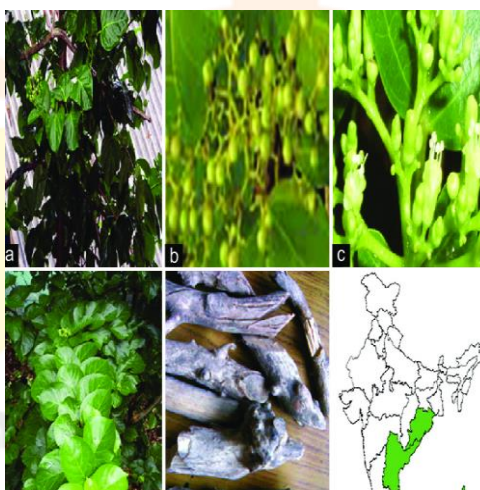
**CORDIA ECALYCVLATA VELL (BORAGINACEAE)**

▪ **PREMNA INTEGRIFOLIA LINN (VERBENACEAE):-**

**Parts of Herb:** - Roots

**Mechanism of Action:** - Serum glucose, triglycerides, total cholesterol, LDL and VLDL levels were significantly reduced in animals treated with *P. integrifolia* extract

**Studied Model:** - Female Swiss Albino mice, fed with cafeteria diet



**PREMNA INTEGRIFOLIA LINN (VERBENACEAE)**

▪ **Dimocarpus longans Leenh (Sapindaceae):-**

**Parts of Herb:** - Flower

**Mechanism of Action:** - Through a combination of reduced exogenous lipid absorption, normalization of hepatic PPAR- $\gamma$  gene expression, inhibition of pancreatic activity and SREBP1c and FAS gene expression, and increased fecal triglyceride excretion.

**Studied Model:** - High-calorie diet - Male Sprague-Dawley rats.



**DIMOCARPUS LONGANS LEENH (SAPINDACEAE)**

▪ **CITRUS AURANTIUM L. (Rutaceae)**

**Parts of Herb:** - Fruits, leaves

**Mechanism of Action:** - It inhibits Akt activation and GSK3 $\beta$  phosphorylation, which induces the down-regulation of lipid accumulation and lipid metabolizing genes, inhibiting adipocyte differentiation.

**Studied Model:** - studied on cell line as model (3T3-L1 preadipocytes)



**CITRUS AURANTIUM L. (RUTACEAE)**

▪ **Dalbergia sissoo DC. (Leguminosae)**

**Parts of Herb:** - Inhibits pancreatic lipase and can be used as an anti-obesity agent in suitable form.

**Mechanism of Action:** - Inhibits pancreatic lipase and can be used as an antiobesity agent in suitable form.

**Studied Model:** - Chicken, pancreas



**DALBERGIA SISSOO DC. (LEGUMINOSAE)**

▪ **EREMOCHLOA OPHIUROIDES (MUNRO) HACK (POACEAE)**

**Parts of Herb:** - Whole Plant,

**Mechanism of Action:** - Expression of C/EBP and PPAR, the central transcriptional regulators of adipogenesis. Moreover, this plant down-regulates phosphorylation levels of Akt and GSK3

**Study Model:** - Mouse 3T3-L1 preadipocytes



**EREMOCHLOA OPHIUROIDES (MUNRO) HACK (POACEAE)**

**CONCLUSION: -**

Natural products identified from traditional medicinal plants have always paved the way for the development of new types of therapeutics. Generally, most of the compounds were isolated from natural sources despite which or list at a semi-synthetic derivative of Lipstatin have been approved by the US food and drug administration for the treatment of obesity. Or, list, it is a potential inhibitor of pancreatic lipase (PL) which is a lipolytic enzyme that hydrolyses dietary fats in the first step of lipid metabolism.

There have been many reports on other effects such as anti-oxidative stress effects which may be important in the management of other diseases like cardiovascular diseases and diabetes. The anti-obesity drugs are generally preferred based on high efficacy and effectiveness. The exploration of natural sources has provided new developments in the understanding of complex and redundant physiologic mechanisms. Such exploration will lead to a safe and efficacious pharmacological treatment.

Different methods have been used to reduce body weight and its complications for many years. Disappointing results after cessation the lifestyle modification or pharmacotherapy impelled the researchers and physicians to rethink to find a new, safe, and striking therapeutic alternative for this global health concern.

Herbal medicines have been in attention as an effective option to reduce body weight and body fat.

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