



# Biomedical Approaches involving the Carob Tree (*Ceratonia siliqua* L.) for the Management of Obesity and Diabetes

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## INTRODUCTION & AIM

Obesity and type 2 diabetes are among the most pressing global public health challenges [1]. Their increasing prevalence is closely linked to unbalanced lifestyles, excessive calorie intake, and lack of physical activity.

Given the limitations of conventional treatments, there is an urgent need to explore natural, effective, and sustainable alternatives for the prevention and management of these metabolic disorders.



The carob tree (*Ceratonia siliqua* L.), a typical Mediterranean species, is gaining increasing attention as a source of bioactive compounds with therapeutic potential. Rich in dietary fiber, polyphenols, and antioxidants, carob offers nutritional and functional properties that can act on multiple metabolic mechanisms involved in obesity and diabetes [2,3,4].

Traditionally used in human and animal diets, this ancient plant is now being explored for its medicinal benefits.

### Objectives

- To evaluate the biomedical potential of carob in the prevention and management of obesity and diabetes.
- To identify the mechanisms of action of carob bioactive compounds on carbohydrate and lipid metabolism.
- To promote the use of carob as a natural and sustainable alternative to conventional therapies.



Obesity & Type 2 Diabetes



## METHODOLOGY

A literature review was conducted focusing on preclinical and clinical studies evaluating carob's effects on:

- Satiety and digestion
- Glycemic control
- Lipid metabolism
- Oxidative stress and inflammation



Literature Review

## MECHANISMS OF ACTION

### Satiety & Nutrient Absorption

- Promotes satiety
- Reduces fat absorption
- Modulates gut microbiota

### Glycemic Control

- Inhibits digestive enzymes (carbs & lipids)
- Improves glycemic stability
- Reduces caloric intake

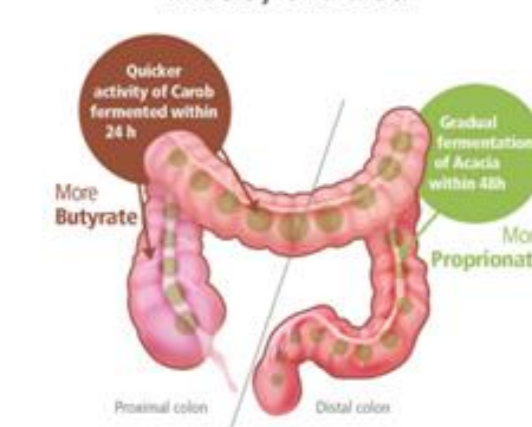
### Lipid Metabolism & Antioxidant Action

- Stimulates lipolysis
- Inhibits lipogenesis
- Reduces oxidative stress & inflammation

### EMPOWER A HEALTHIER MICROBIOME



Complementarity of Carob & Acacia in delay and area



## RESULTS & DISCUSSION

Carob (*Ceratonia siliqua* L.) extracts demonstrate multiple beneficial effects on metabolic health:

- Improved postprandial glucose levels: Clinical studies show that carob-based products can reduce blood sugar spikes after meals, thanks to their high fiber and polyphenol content.
- Lower fat storage and enhanced energy utilization: In animal models, supplementation with carob powder led to a significant decrease in body weight and fat mass, along with improved lipid profiles.
- Reduction of inflammation and oxidative stress: Antioxidant compounds in carob, especially polyphenols, help lower markers of inflammation and oxidative stress—two key contributors to obesity and diabetes.
- Better gut health: Carob supports a healthy and balanced intestinal microbiota, which plays a crucial role in weight regulation and metabolic functions.

These synergistic effects are attributed to the combination of dietary fiber, polyphenols, and antioxidants naturally present in carob, positioning it as a promising natural therapy for managing metabolic disorders.

## CONCLUSION AND FUTURE WORK

Carob (*Ceratonia siliqua* L.) emerges as a promising natural resource for the prevention and management of obesity and type 2 diabetes, thanks to its rich content in dietary fiber, polyphenols, and bioactive compounds. By modulating key metabolic processes, it offers a sustainable alternative to conventional treatments. Future studies should aim to isolate active constituents, validate their efficacy through clinical research, and develop innovative therapeutic applications.

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