

# CHAPTER I

## INTRODUCTION

### 1.1 Background of the Study

Pregnant women are most vulnerable to the negative effects of consuming ready-made products such as ready-made supermarket syrup. Using carob as a healthy syrup alternative for pregnant women and children can be a better and safer choice. Therefore, the report will discuss the use of carob as a syrup alternative for pregnant women and children. The report will discuss the health benefits of carob, as well as how to use carob as a healthy syrup alternative for pregnant women and children.

Carob tree (*Ceratonia siliqua* L.) belongs to the Leguminosae family. It has been widely cultivated in the Mediterranean region. The fruit is a pod containing 10% - 20% seeds. Pods consist of 50% - 65% sugar (sucrose, glucose, fructose, and maltose), 1% - 5% protein, 0.2% - 0.8% fat, 11% - 16% crude fiber (mainly cellulose and hemicellulose), 1% - 6% minerals (mainly calcium, potassium, magnesium, sodium, phosphorus, copper, zinc, and iron), vitamins (E, D, C, Niacin, B6, and folic acid), adequate amounts of dietary fiber, and natural polyphenols; condensed tannins and proanthocyanidins (Ibrahim, 2020).

According to Roseiro et al. (2013), carob pods and seeds can be used as raw materials in the food, pharmaceutical and cosmetic industries. In the food industry, carob is used in preparing gum, sugar, alcohol, and as a natural additive (E 410). Because carob pods contain high levels of sugar (mostly 75% or more of sucrose), it is used as a natural sweetener, raw material for syrup production, crystal sucrose production, wine, pharmaceutical industry, carob honey in cakes and breads, sweetener for compotes and jam. Also due to its sweetness, chocolate-like taste, and low price, seedless pod powder is widely used in the Mediterranean region as a cocoa substitute for candies, biscuits,

cake products, breads, and beverages. Carob pod powder water extract contains sugar, soluble dietary fiber, water-soluble tannins, flavanol glycosides, and gallic acid. It has strong antioxidant activity and therefore can be used as a functional ingredient in food development. Rtibi et al. (2017) showed that carob pod water extract has antioxidant, antidiarrheal, antibacterial, antidiabetic, hypoglycemic, anti-glucose absorption, anti-inflammatory and anti-ulcer effects. Custodio et al. (2011) attributed these pharmacological actions to antioxidant activity, which neutralizes free radicals and/or inhibits fat per-oxidation.

This syrup also contains beetroot, which is also beneficial for pregnant woman and children. Several nutrients contained in beetroot are carbohydrates, protein, fiber and high-water content, vitamin A, vitamin C and calcium, iron, phosphorus. Sous-vide, also known as low-temperature, long-time cooking, is a method of cooking in which food is placed in plastic pouch or a glass jar and cooked in a water bath for longer than usual cooking times. The temperature is much lower than usually used for cooking, typically around 55 to 60 °C (130 to 140 °F) for red meat, 66 to 71 °C (150 to 160 °F) for poultry, and higher for vegetables. Steaming is used for making the beetroot soft. Sous-vide is used to infuse carob and beetroot together with water to make the syrup's base. With the way carob consist of a lot of vitamins, some are not water soluble. Vitamin E, D, and K don't carry over into the infusion process as it is not water soluble, but Vitamin C, B, and folic acid which is beneficial for pregnant women.

## **1.2 The Objectives of The Study**

The objectives of this study are following below:

1. To analyze the nutritional content of carob and beetroot, determine the specific vitamins, minerals, fiber, and bioactive compounds present in carob and beetroot to understand their potential health benefits and nutritional value.
2. To optimize the production process of carob and beetroot syrup by developing and refining methods for extracting and processing carob

and beetroot syrup, while ensuring maximum retention of nutritional content and desirable flavor profiles.