INTRODUCTION

Water is one of the basic necessities of life. Without one to two liters of water per day a human being cannot survive, and to lead a minimal human existence, one needs between 20 and 50 liters of water per day for drinking, preparation of food, and personal hygiene. For many people, this bare minimum is unattainable, because clean water is scare.

Although two-thirds of the earth's surface is covered by water, only 0.8% is available for human beings to use-and even this small fraction is largely contaminated. More than half the population of the third world has no adequate access to clean drinking water; three- quarters have no sanitary facilities

Raw water contains different types of impurities that have harmful effects on human health. Water is subjected to some forms of treatment before its use. The main goal of water treatment is to produce potable and palatable water i.e. acceptable water to use, which is biologically and chemically safe for human uses, and meet certain water quality standard.

Coagulation – flocculation followed by sedimentation, filtration and disinfection is used world wide in the water treatment industry before the distribution of treated water. Aluminum salts are by far the most widely used coagulant in water treatment. However, recent studies have pointed out several serious draw backs of using aluminum salts, such as Alzheimer's disease and similar health related problems associated with residual aluminum in treated waters, besides production of large sludge volumes. There is also the problem of reaction of alum with natural alkalinity present in the water leading to a reduction of pH, and a low efficiency in coagulation of cold waters. A significant economic factor is that many developing countries can hardly afford the high costs of imported chemicals for water treatment.

Ferric salts and synthetic polymers have also been used as coagulants but with limited success, because of the same disadvantages as in the case of aluminum salts. Therefore, it is desirable that other cost effective and more environmentally acceptable alternative coagulants be developed to supplement if not replace chemicals. In addition, the use of chlorine in water treatment steps lead to some carcinogenic problems.

Therefore, natural coagulants of vegetable and mineral origin were in use in water treatment; they are biodegradable and are presumed for human heath. It also can reduce the treatment cost if available locally.

Aim and Objectives of Study

The aim of this study is to conduct an experimental study of a new process for water treatment using natural plants in coagulation and disinfection in a pilot plant consists of flocculation tank, sedimentation tank and roughing filter followed by fine filter column, to investigate their efficiency in water treatment.

The study was carried out to:

1. Evaluate the effect of each unit (flocculation, sedimentation and filtration) using natural plants on the physical, chemical and biological removal of impurities (Turbidity, Alkalinity, Algae, Bacteria …) from the raw water.
2. Determination of the optimum dose in each plant by using (*Moringa oleifera*, *Mangifera indica*, and *Prunus armeniaca*) as a coagulant and as a coagulant aid with alum.
3. Determination of the optimum flow rate (discharge) through flocculation and sedimentation units and the optimum rate of filtration through filtration unit.
4. To evaluate the use of *Moringa oleifera* as a disinfectant in filtration units.
5. To evaluate the use of *Moringa oleifera* seeds, *Mangifera indica* and *Prunus armeniaca* seeds for drinking water treatment, and compare it with alum as a coagulant.