

# **Table of contents**

|                        | <b>Page</b> |
|------------------------|-------------|
| Dedication -----       | I           |
| Acknowledgement -----  | II          |
| English abstract ----- | III-IV      |
| Arabic abstract -----  | V-VI        |

## **Chapter One: Introduction**

|                     |   |
|---------------------|---|
| 1-1 General-----    | 1 |
| 1-2 Objective ----- | 2 |

## **Chapter Two: Literature review**

|   |    |
|---|----|
| 2-1 density and specific gravity -----                      | 3  |
| 2-2 Buoyancy of wood -----                                  | 7  |
| 2-3 method of determining density and specific gravity ---- | 8  |
| 2-4 variation in wood density -----                         | 9  |
| 2-5 Factors affecting density -----                         | 11 |
| 2-6 stereological analysis -----                            | 14 |
| 2-7 effect of density on other wood properties -----        | 16 |

## **Chapter Three: Materials and Methods**

|   |    |
|---|----|
| 3-1 Material -----                                      | 20 |
| 3-2 Methods -----                                       | 21 |
| 3-2-1 Determination of density by physical methods----- | 21 |
| 3-3 wood anatomy -----                                  | 23 |
| 3-4 stereological counts -----                          | 23 |
| 3-5 statistical analysis -----                          | 24 |

## **Chapter Four: Result and Discussion**

|  |    |
|--|----|
| 4-1 volume fraction of cells and their components----- | 25 |
| 4-2 densities obtained by different methods-----       | 26 |
| 4-3 Relationship between density and anatomy-----      | 32 |

## **Chapter Five: Conclusion-----**

|                  |    |
|------------------|----|
| References ----- | 34 |
|------------------|----|

## List of tables

|  | <b>Page</b> |
|--|-------------|
| Table 1: volume fraction of different cell components-----                                   | 25          |
| Table 2: volume fraction of different cell types -----                                       | 26          |
| Table 3: volume fraction of total cell wall, total cell lumen and<br>Anatomical density----- | 27          |
| Table4: densities obtained by physical method<br>and anatomical method-----                  | 29          |