An-Najah National University

Faculty of Graduate Studies

Use of Complementary and Alternative Medicine, CAM, among Cancer Patients in Northern West Bank, Palestine

By

Amneh "Mohammed Adel" Hamada

Supervisor

Prof. Dr. Mohammed S. Ali-Shtayeh

This Thesis is submitted in Partial Fulfillment of the Requirements For the Degree of Master of Biological Science, Faculty of Graduate Studies, An-Najah National University, Nablus, Palestine.

2012

Use of Complementary and Alternative Medicine, CAM, Among Cancer Patients in Northern West Bank, Palestine

By

Amneh "Mohammed Adel" Hamadah

This Thesis was defended successfully on 4/11/2012 and approved by:

Defense Committee Members		Signature
- Prof.Mohammed S.Ali-Shtayeh	(Supervisor)	----------
- Dr.Yahya Faidy	(External Examiner)	----------
- Dr. Majdi Dwekat	(Internal Examiner)	----------

Dedicated

This thesis is especially dedicated to all people who are interested in science and to my family especially my parents, brothers, sister and to all my friends.

Acknowledgements

I wish to express my deepest gratitude to my supervisor, Prof. Dr. Mohammed S. Ali-Shtayeh. My deepest thanks for Dr. Ahmad Husein who help me in laboratory experiments. My deepest thanks for Rania Jamous who help me in data analysis. My thanks go to all those who help me in my work at Al-Watani Hospital, especially the oncologist of the department Dr. Yousef Al-Horany for allowing me to interview patients at any time I need and all nurses for their help me to know the type of cancer of patients. My thanks go to Dr. Abed-Alrhman Al-shunar the chairman of the governing body of the Palestinian and Family Planning and Protection Society and to all members of the administrative Divine to let me out while working for the study. My dearest thanks are addressed to my parents, my brothers and their sons and daughters and my sister for their love and endless support. My special thank go to all my college working in the tissues and inspection center and breast mammography (anti-cancer center) of the navel Palestinian Family Planning and Protection Society especially laboratory technetion Amal sbouh and Nobough Tofaha for performing the work on my behalf.

إقرار

أنا الموقع أدناه مقدم الرسالة التي تحمل العنوان :

Use of Complementary and Alternative Medicine, CAM, among Cancer Patients in the Northern West Bank, Palestine

اقر بأن ما اشتملت عليه هذه الرسالة إنما هو نتاج جهدي الخاص ، وان هذه الرسالة ككل أو أي جزء منها لم يقدم من قبل لنيل أية درجه علميه أو بحث علمي أو بحثي لدى أية مؤسسه تعليمية أو بحثيه أخرى.

Declaration

The work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's name: **اسم الطالب:**

Signature: **التوقيع:**

Date: **التاريخ:**

List of Abbreviations

List of Contents

List of Tables

List of Figures

XII

Use of Complementary and Alternative Medicine, CAM, among Cancer Patients in Northern West Bank-Palestine

By
Amneh "Mohammed Adel" Hamadah
Supervisor
Prof. Mohammed S. Shtayeh

Abstract

Background: The use of complementary and alternative medicine (CAM) by cancer patients is very common and varies between populations and has increased over the last decade all over the world. This study was conducted to define the prevalence, pattern of use, and factors influencing the use of CAM by Palestinian cancer patients.

Objectives: To evaluate the extent of CAM use among cancer patients in Northern West Bank, and investigate the antioxidant activity of the main five plants used by cancer patients.

Methods: This is a cross–sectional study involving the direct administration of questionnaire to all cancer patients seen at the Oncology Department, Wattani Hospital, Nablus, PA, from Dec 2010 to June 2011. Five of the most used plants were tested for antioxidant activity by determination of total phenolic compounds, total flavonoid concentration, DPPH, and B-Carotene–Linoleic assays.

Results: A total of 300 cancer patients were interviewed; 65 (21.67%) were males and 235(78.33%) were females. Ages ranged from one year to 85years. Breast cancer 81(27%), colon 29(9.67%), liver and skin 16(5.33%) were predominated. 165 (55%) patients have used CAM at some time during their current cancer illness; 135 (45%) patients have not

used any form of CAM. There were more females than males among the CAM users. The use of CAM was not affected by age, marital status, level of education, religion, place of birth, and residence but significantly associated with breast cancer and stage of treatment chemotherapy. The most frequently used CAMs were, herbs 153(92.73%), animal products 132 (44%) especially honey 98(32.67%), prayers and Koran, oil treatment and Folk remedy. Most CAM users 118 (39.33%) were achieved the sought effects, but 38 (12.67%) did not. The majority of patients 104 (34.67%) did not discuss their use of CAM with their doctors- mostly because doctors did not believe. Friends 90 (30%) and family members 89(29.67%) were the main referrals for CAM use. Most of CAM users reported that they used CAM because they believed it strengthen the immune system, curing disease, slow down progress of disease, relief of symptoms and reducing medication side effects. The most five plants used by cancer patients were *Arum palaestinum*, *Nigella ciliaris*, *Phoenix dactylifera*, *Matricaria aurea*, *Citrus limon*. Ethanolic and water extracts of these plants were investigated by determination of total phenolic compounds, total flavonoid concentrations, DPPH, and carotene-Linoleic acid assays using different concentrations of extracts and DPPH. The scavenging effect against DPPH was calculated as mg/ml IC50 compared to α-tocopherol, the higher the concentration of extracts the higher the inhibition effect and in ethanolic extracts more than water extracts. *Phoenix dactalifera* had the highest free radical scavenging capacity while *Citrus limon* had the highest of total flavonoid and phenolic compounds concentration. *Matricaria*

aurea had the least B-carotene degradation compared to synthetic α-tocopherol.

Conclusion

Our study confirms that CAM use is common among cancer patients in Northern Wes Bank, Palestine. It is significantly associated with breast cancer and stage of treatment chemotherapy and most common in females than males. Most of patients achieve the sought effects, and did not discuss CAM use with doctors. Friends and family members were the most referrals for CAM use. The most five plants used were tested for antioxidant activities using DPPH, Carotene-linoleic acid assay, total flavonoid concentrations, and total phenolic compounds concentration. *Citrus limon*, *Nigella ciliari*s, *Phoenix dactylifera* and *Matricaria aurea* were the most plants had antioxidant activities but *Arum palaestinum* soaked in water dried, and boiled revealed antioxidants activity but the less compared to others. These plants can be used for cancer treatment either by killing tumor cells or reducing its number and strengthen the immune system of patients.

Chapter One
Introduction

Introduction

1.1CAM Definition

Cancer remains one of the major causes of mortality worldwide. Conventional therapy of cancer includes chemotherapy, surgery, and radiation, as well as hormone therapy and immunotherapy (Schernhamer et al., 2009). Cancer accounted for 10% of total mortality in the West Bank from 1999 through 2003 (Niveen, et al., 2008). Lung cancer is the most common cause of cancer deaths among men, followed by cancers of the prostate, colon, liver and bile ducts, and stomach. Breast cancer is the most common cause of cancer deaths among women, followed by cancer of the liver and bile ducts, colon, lung, and stomach (Alaa, 2009).

According to the Palestinian Ministry of Health report and based on data from the Palestinian cancer registry in the West Bank, crude cancer incidence in the Palestinian Territories in 1999 was 66.8 per 100,000, which was lower than cancer incidence in neighboring countries such as Jordan and Egypt (Cancer incidence in Palestine, 1998-1999).

Complementary and Alternative Medicine (CAM) have been defined by the National Center for Complementary and Alternative Medicine as a group of diverse medical and healthcare systems, practices, and products that are not presently considered to be part of conventional medicine (Edzard et al., 2010).

The words (complementary) and (alternative) refer to a large variety of therapy methods and life styles that are not part of conventional therapy (Geva et al., 2005). The American Cancer Society defines complementary

therapies as treatment used along with conventional medicine, while alternative therapies are designed for use instead of conventional therapy (The American Cancer Society, 2000 ; Vickers, & Cassileth, 2001; Richardson, 1999). For some CAM practices there is scientific evidence that is both beneficial and safe. For many other practices, evidence is lacking or inconclusive. It is not meant to replace traditional cancer treatment, but is available to alleviate side effects or improve patients sense of well being. A large percentage of people with cancer use some form of complementary or alternative treatment.

1.2 Background

Over the past two decades, the use of complementary and alternative medicine (CAM) has been rapidly increasing among patients with cancer throughout the world (Wade et al., 2008). Many studies done in western countries have documented that CAM use is both very common and varies among populations. It is estimated that 30%-50% of the general adult population of industrialized nations use one form of CAM or another, studies of cancer patients showed a 7-83% prevalence rate for the use of CAM in the industrialized world (Emmanuel and Anarodo, 2007). The type of CAM therapies varying depending on age, level of income, level of education, and perceived cause and prognosis of the disease (Sparber &Wootton, 2000). The use of CAM in these nations is more common among females; young adults middle aged individuals, persons with higher levels of education, and members of higher socioeconomic classes (Wotton, & Sparber, 2001; Richardson et al., 2000).

Among cancer populations, studies from the developing countries are mainly from Turkey and countries in Asia. Studies about using CAM among cancer patients in the Western region of Turkey showed that nearly half of the patients (42.3%) of 220 cancer patients were using at least one form of the CAM method (Arzu et al.,2009) and another study among 55 cancer patients 87.2% uses CAM (Arzu et al.,2009).

A study about using CAM among cancer patients attending the out patients departments of King Hussein Cancer Centre (KHCC) a specialist cancer centre in Amman showed that out of 1138 cancer patients 404 (35.5%) were using at least one form of CAM and most of them were above 48 years of age CAM (Afifi et al., 2010).

In most countries, including Palestine, standard treatment options for cancer include surgical interventions, chemotherapy, radiotherapy, and endocrine therapy. However, a considerable number of cancer patients, even those who live in North America and Western Europe, have been reported to also use various types of CAM therapies (DiGianni et al., 2002, Richardson et al., 2000 , Rees et al., 2000, Matthews et al., 2007).

Two previous studies (1997-2001) in Israel hospitals, one in Tel Aviv and the other in Jerusalem, comprising 100 and 1.027cancer patients, revealed 58% and 51% rates of CAM use, respectively (Raveh, 1997; Paltiel et al., 2001). Another study among cancer patients in northern Israel showed that the overall rate of CAM use was 17% (Hana et al., 2005). Other studies conducted in Israel found that those using CAM tended to be women of a

younger age with a higher education and a Western origin (Bernstein et al., 2001; Azaz-Livshits et al., 2002).

Integration of CAM within cancer supportive care is promoted in the US and Europe during the last two decades mainly due to CAM's extensive use , and increased awareness to efficacy and safety issues (Ben-Arye, et al., 2008). In the Middle-East, traditional herbal medicine is a leading CAM modality in the context of cancer care (Yildirim et al., 2006; Afifi et al., 2010; Ben-Arye 2006 ; Pud et al., 2005). The contemporary prevalence of CAM use among patients with cancer was studied in several Mediterranean countries including: Jordan (Yildirim, et al., 2006), Israel (Ben-Arye, et al., 2006), and Turkey (Tarhan et al., 2009) and may approach half of the patients.

In Palestine (West Bank and Gaza), the rate of CAM use among cancer patients is unknown. The use of traditional herbs and remedies in treating various ailments including cancer is however well known and relatively common (Ali-Shtayeh et al., 2000; Ali-Shtayeh, & Jamous, 2006, 2008). To the best of our knowledge, no study has been conducted to date with the purpose of examining this topic within the specific population of cancer patients in Palestine. Therefore, the aim of the present study is to define the prevalence, pattern of use, and factors influencing the use of CAM by cancer patients in the Northern West Bank. Another aim was to take the main five plants used by cancer patients and tested for antioxidant activity.

1.3 Antioxidant activities

Plants are potential sources of natural antioxidants. They absorb suns radiation and generate high levels of oxygen as a product of photosynthesis. Oxygen is easily activated by ultraviolet radiation, and heat from sunlight produces toxic reactive oxygen species. Plants produce various antioxidative compounds to counteract these reactive oxygen species in order to survive (Lu Foo, 1995). Many antioxidant compounds naturally occurring in plant sources have been identified as free radical or active oxygen scavengers (Duh PD, 1998). These compounds are used to preserve food quality, mainly by the prevention of oxidative deteriotion of constituent lipids. The peroxidation of unsaturated lipids in living organisms has recently received increasing attention in relation to the possible association between lipid oxidation and a wide possible range of degenerative diseases, including aging, cancer, diabetes, and cardiovascular diseases (Yagi, 1997). Thus, antioxidants are important inhibitors of lipid peroxidation not only for food protection but also as a defense mechanism of living cells against oxidative damage (Halliwell,1991).

Oxidation is essential to many living organisms for the production of energy to fuel biological processes. However, the uncontrolled production of oxygen derived free radicals is involved in the onset of many diseases such as cancer, rheumatoid arthritis, and atherosclerosis as well as in degenerative processes associated with aging (Halliwell and Gutteridge,1984). Almost all organisms are well protected against free radical damage by enzymes such as superoxide dimutase and catalase, or

compounds such as ascorbic acid , tocopherols and glutathione (Mau et al.,2002). When the mechanism of antioxidant protection becomes unbalanced by factors such as aging, detritions of physiological functions may occur resulting in diseases and accelerated aging.

Free radicals are types of Reactive oxygen species (ROS), which include allergen, nitricoxide radical, hypochlorite radical, and various lipid peroxides. All these are capable of reacting with membrane lipids, nucleic acids, proteins and enzymes and other small molecules, resulting in cellular damage. various ROSs can be formed in different ways, including normal aerobic respiration,

stimulated polymorphnuclear leukocytes, macrophages and peroxisomes. These appear to be the main endogenous sources of most of the oxidants produced by cells. Exogenous sources of free radicals include tobacco smoke, ionizing radiation, certain pollutants, organic solvents and pesticides.

Free radicals may be defined as chemical species associated with an odd or unpaired electron. They are neutral, short lived, unstable and highly reactive

to pair up the odd electron and finally achieve stable configuration. They are capable of attacking the healthy cells of the body, causing them to lose their structure and function.

Naturally there is a dynamic balance between the amount of free radicals produced in the body and antioxidants to scavenge or quench them to protect the body against deleterious effects. The amount of antioxidant

principles present under normal physiological conditions may be insufficient to neutralize free radicals generated. Therefore, it is obvious to enrich our diet with antioxidants to protect against harmful diseases. Hence there has been an increased interest in the food industry and in preventive medicine in the development of "Natural antioxidants" from plant materials. That is why plants with antioxidant properties are becoming more and more popular all over the world. So antioxidants neutralize the toxic and 'volatile' free radicals by giving hydrogen atoms or scavenging them (Vaidya and Devasgayam, 2007) Unsaturated organic compounds

$\rightarrow RO^{\cdot}2 + ArOH \rightarrow ROOH + ArO^{\cdot}$

$RO^{\cdot}2 + ArO^{\cdot} \rightarrow$ non-radical products.

Free radical formation is associated with the normal natural metabolism of aerobic cells. The oxygen consumption inherent in cell growth leads to the generation of a series of oxygen free radicals. The interaction of these species with molecules of a lipidic nature produces new radicals hydro peroxides and different peroxides. This group of radicals (super oxide, hydroxyl and lipoid peroxides) may interact with biological systems in a clearly cytotoxic manner. In this respect, flavonoids and phenols have been shown to possess an important antioxidant activity toward these radicals, which is principally based on the redox properties of their phenolic hydroxyl groups and the structural relationships between different parts of their chemical structure (Lillian Barros et al., 2007).

Antioxidant compounds can scavenge free radicals and increase shelf life by retarding the process of lipid per oxidation, which is one of the major

reasons for deterioration of food. The search for natural antioxidants, especially of plant origin, has notably increased in recent years. Vegetables and fruits are rich sources of antioxidants, such as vitamin A, vitamin C, vitamin E, carotenoids, polyphenolic compounds and flavonoids which prevent free radical damage, reducing risk of chronic diseases. Thus, the consumption of dietary antioxidants from these sources is beneficial in preventing cardiovascular diseases, especially atherosclerosis (Lillian Barros et al., 2007).

In response to increased popularity and greater demand for medicinal plants, a number of conservation groups are recommending that wild medicinal plants be brought into cultivation. Ethnopharmacological surveys conducted among herbal practitioners of traditional Arab medicine in Palestine and the Middle East revealed that a large number of indigenous plant species are being used as a source of herbal therapies (Nooman, et al., 2007).

A large number of medicinal plants and their purified constituents have shown beneficial therapeutic potentials. Various herbs have been reported to exhibit antioxidant activity. The majority of the antioxidant activity is due to flavones, isoflavones, flavonoids, anthocyanin, coumarin lignans, catechins and isocatechins (Aqil et al., 2006). Antioxidant-based drug formulations are used for the prevention and treatment of complex diseases like atherosclerosis , stroke, diabetes, Alzheimer's disease and cancer (Devasagayma et al., 2004).

1.4 Objectives of the study:

In Palestine (West Bank and Gaza) , the rate of CAM use among cancer patients is unknown and no study had been conducted to date with the purpose of examining this topic within the specific population of cancer patients in Palestine. Therefore the aim of the study was to define

1) The prevalence, pattern of use, and factors influencing the use of CAM by cancer patients in the Northern West Bank.
2) To discuss the demographic details of patients.
3) To identify perceived benefits from CAM use.
4) To identify sources of information recommending the use of a particular CAM.
5) To underline reasons for CAM therapy used by cancer patients.
6) To ascertain whether patients had discussed their use of CAM with their physicians or not.
7) To evaluate the anti oxidant activity of the major five plants used by cancer patients including *Arum palaestinum*, *Nigella ciliaris*, *Phoenix dactylifera*, *Matricaria aurea* , and *Citrus limon*. These Plants were tested by determination of total phenolic compounds, total flavonoid concentrations, DPPH, and carotene-Linoleic acid assays. These tests were be done in order to know if these plants were an efficient antioxidants and can be used to treat cancer by reducing number of cancer cells or killing them.

Chapter Two

Methodology

2 Methodology:

2.1 CAM use among cancer patients in Northern West Bank , Palestine

This is a cross-sectional study involving the direct administration of questionnaires to all cancer patients seen at Oncology Department, Watani Hospital, Nablus, PA, from December 2010 to June 2011.

2.1.1 Study population

To ensure a representative cross-sectional sample of the cancer outpatients, interviews were conducted on different days and times. The study included both males and females of different age groups. The method was based on the use of a semi-structured questionnaire to estimate the presence, frequency and purpose of CAM including herbal medicines and or supplements used and whether patients discuss their CAM with their medical practitioners.

Patients were informed that they are free to decline answering any question with which they were not comfortable. Physicians involved in the treatment of each patient were not present throughout the interview. The interviews were conducted by the researcher who clearly explained to participants that this was a research about their use of CAM including herbal or other forms of alternative medicine in combination with their prescribed medications. Moreover, they were assured that any information they would strictly remain confidential and would only be used for research purposes. For patients younger than 16 years of age or unable to interact, the next of kin (NOK) were interviewed.

2.1.2 Questionnaire

The questionnaire included demographic data, such as age, sex, marital status, socioeconomic status, and highest level of education attained.

Questions were asked about the type of cancer, part of the body involved, previous treatments received , and the treatment that the patient was currently obtained or cross checked from the patients files. Each patient was asked whether he or she had used any substance not recommended by the doctor to treat this cancer. Each patient was presented with a list of known CAM. The patient was then asked whether he or she had used any of them before the diagnosis of this cancer, during this cancer, or planned to use them in the future.

Each patient was also given an opportunity to mention other CAMs that were not listed , but which they had used during this illness .

Patients who used CAM at least once during the current cancer were regarded as CAM users; non-users have not used CAM at all. Those who had used CAM before in their lives but not for this current illness was also be considered non users. CAM users were asked how frequently they use CAM, how they got the information about the CAM, what useful effect they were hoping to get from CAM, and how they have actually benefited from the CAM. They were asked if they had discontinued or hoped to discontinue CAM or conventional treatment, or whether they had to use CAM and treatment concurrently. The questionnaire also asked whether there were advantages to the CAM that the patient wished were available in the conventional treatment. Finally, the patients were asked whether their

doctor knows they have been using or had used CAM, and whether they perceive any impediments to discussing their use of CAM freely with their doctor. The main themes addressed by the questionnaire are presented in (Table 2.1).

(Table: 2.1): Main Themes Addressed by the Study Questionnaire

1- Demographic details of the Patients	- Gender, age, marital status education level, area of residence (city, village, Refugee camps).
2- Disease details (obtained from patient file)	- Type of cancer breast, colon ….etc - recurrent disease - other medical problems: hypertension, diabetes mellitus, asthma,.. others - Stage of treatment before during or finished chemotherapy
3- Information about use of CAM (herbs or herbal Preparation, other CAM)	- Plant part used - Forms of use (raw, cooked, infusion, decoction, paste, juice). - Mode of preparation -Administration, dose ,period of use - Origin of herbs (local, imported)
4- Source of information	- Friends, family members, physician, pharmacist, herbalist media (TV, radio, hardcopy) others (e.g. internet, text, messages…. etc).
5- Purpose of CAM use	- Curing disease - Slow down progress of disease - Relief of symptoms - Reducing medication side effect - Strengthen the immune system
6 Outcomes	- Did the patient achieve the sought effect ? - Was CAM use discussed with the Physician.

The patients were classified into two CAM groups users and non users. The two groups were compared with respect to the demographic characteristics and other factors that influence the use or non use of CAM in cancer. The data was analyzed using SPSS statistical software version 16. The chi-square test was used to assess relations between categorical variables and to examine statistical differences between users and non–users. A two–sided P = 0.05 was considered statically significant.

2.2 Antioxidant activities

2.2.1Chemicals

β-carotene, linoleic acid, 1,1–Diphenly-2-picrylhydrazyl (DPPH), and α-tocopherol were purchased from Sigma (Sigma, Aldrich GmbH, Sternhheim, Germany). while pyrocatechole, Tween-40 Folin-ciocalteus phenol reagent (FCR), sodium carbonate, Aluminum nitrates, potassium acetate, ethanol, chloroform and other chemicals and reagents were purchased from Merck (Darmstat, Germany). All other chemicals and reagents were of analytical grade.

2.2.2 Plants Extraction

The main five plants used by cancer patients were extracted by water and ethanol as follow:-

2.2.2.1 Ethanol extract

The aerial parts of *Arum palastinum* Boiss.(Araceae) were used both fresh and dried in the shadow and grinded to pieces. 500g of fresh parts were extracted by 1000ml ethanol. 50g of dried parts were extracted by 500 ml ethanol. 20gm of dried *Marticaria aurea* Golden Cotulla (babonj) was

extracted by 100ml of ethanol. 50g fruit of *Phoenix dactylifera* (Date) and 100gm of *Citrus limon* were extracted with 100ml of ethanol. 50gm of grinded seeds of *Nigella ciliaris* was extracted with 100ml of ethanol.

2.2.2.2 Water extract

The same weights used in ethanol extract of each plants were used in water extract and the same volume but instead of ethanol water was used.

All plants incubated for 72h at room temperature with continuous stirring. All the extracts were filtered through Whatman No. 4 filter paper. Then the filtrate of ethanolic and water extracts were dried using freeze drying and rotary evaporation and stored at -20C for future use.

2.3 Tests of Antioxidant Activity

2.3.1 DPPH Assay (Free radical scavenging activity)

In DPPH, (1,1–Diphenly-2-1picrylhydazyl) a stable free radical scavenging assay with a characteristic absorption at 517 nm was used to study the radical scavenging effects of extracts. As antioxidants donate hydrogen atoms to these radicals, they lose their purple color which leads to decrease absorption. Decreased DPPH absorption is an indication of the capacity of the extracts to scavenge free radicals , independent of the enzymatic activity . In the radical form (DPPH), this molecule had an absorbance at 517nm that disappears after the acceptance of an electron or hydrogen radical from an antioxidant compound to become a stable diamagnetic molecule (Ozen et al., 2008).

The hydrogen atom or electron donation abilities of the corresponding extracts and some pure compounds were measured from the bleaching of the purple-colored methanol solution of DPPH.

One milliliters of various concentrations of the extracts in ethanol and water was added to 4 ml of 0.004% methanol solution of DPPH. After 30 minutes, incubation period at room temperature , the absorbance was read against a blank at 517nm. The percent Inhibition **I** (%) of free radical by DPPH was calculated as follows:

I (%) = (A_{blanc} -A_{sample}/A_{blank}) x 100

Where A_{blank} is the absorbance of the control reaction (containing all reagents except the test compound), and A_{sample} is the absorbance of the test compound.

2.3.2 Carotene-Linoleic acid assay

The antioxidant activity was determined by measuring the inhibition of the volatile organic compounds and the conjugated diene hydro peroxides arising from linoleic acid oxidation (Dapkeviclus et al., 1998). A stock solution of B-carotene–linoleic acid mixture was prepared by 0.5 mg B-carotene was dissolved in 1 ml of chloroform and 25ul linoleic acid and 200mg Tween 40 were added. Chloroform was completely evaporated. Then 100ml distilled water saturated with oxygen was added with vigorous shaking. 4ml of this reaction mixture were dispensed into test tubes and 200ul portions of the extracts prepared at 2mg concentrations were added. A control sample was prepared exactly as before but without adding antioxidants. The test systems were placed in a water path for 2h at 50 C.

The absorbance of each sample was read spectrophotometrically at 490 nm, immediately after sample preparation and at 15-min intervals until the end (t = 120min) of the experiment. Antioxidant activities in β-carotene-linoleic acid model were measured by the changes in the absorbance at 490 nm.

2.3.3 Determination of total phenolic compounds

Total soluble phenolic compounds in ethanolic and water extracts were determined with Folin–Ciocalteu reagent according to the method of Slnkard (Slinkard and Singleton, 1977) using pyrocatechol as a standard (. Briefly, 1ml from extract solution (2000ppm) was transferred into a volumetric flask of 50ml and made up to 46ml with distilled water. Folin–Ciocalteu reagent (1ml) was added and the contents of flask were mixed thoroughly. After 3 min 3ml of Na2CO3 (2%) was added, then the mixture was allowed to stand for 2h with intermittent shaking. The absorbance was measured at 760nm. The concentration of total phenolic compounds in the ethanolic extracts was determined as microgram of pyrocatechol equivalent by using an equation that was obtained from standard pyrocatechol calibration curve is given as:

Absorbance =0.004757μg pyrocatechol+ 0.0022(R2: 0.9997).

2.3.4 Determination of total flavonoid concentration

Flavonoid concentration was determined in both ethanolic and water extracts solutions (1ml) of the extract was diluted with 4.3 ml of 80% aqueous ethanol and to the test tubes were added 0.1ml of 10% aluminum nitrate and 0.1ml of 1M aqueous potassium acetate. After 40 min at room temperature, the absorbance was determined spectrophotometrically at 415.

Total flavonoid concentration was calculated using quercetin as standard (Turkoglu, et al 2006).

Absorbance = 0.005358µg quercetin–0.0984(R2: 0.9994).

Chapter Three
Results

3.1 CAM results

Extent of CAM use:

Of 300 patients interviewed (n=135) (45%) were identified as CAM non users and (n=165) (55%) as CAM users. A great variety of therapies were used, as categorized and detailed in (Table: 3.1). The extent of use varied according to demographic characteristics, main conventional treatment and type of cancer.

(Table: 3.1):Frequency of CAM use by the Study Population (n=300)

CAM category	No. of informants	% of CAM users
Herbs	45	15
Eating Honey	98	32.67
Eating animal foods	34	11.33
Treatment of ethereal oil	6	2
Treatment of ethereal oil	10	3.33
Traditional Folk remedy	5	1.67

***The total number was more than number of CAM users 165, because some patients reported more than one answer.**

(Table: 3.2):Most Frequently Used CAM of Herbal Preparation in Descending Order by Number of Informants

.

Scientific name family	Common name	Arabic name	No of informants	Parts used	Mode of use
Arum palaestinum **Boiss. (Araceae)**	**Palestinian Arum**	**Lufe**	**66**	**leaves**	**C,I,R**
Nigella ciliaris **DC. (Ranunculaceae)**	**Nigella, Black seeds**	**Qezha**	**53**	**seeds**	**MX , R**
Phoenix dactylifera **L (Palmae)**	**Date palm**	**Tamer**	**27**	**Fruit**	**R**
Matricaria aurea **(L) Sch. Bip.(Asteraceae)**	**Golden Cotula**	**Babunej**	**20**	**Leaves. flower**	**D,I**
Citrus limon **(L) Burm. Fil (Rutaceae)**	**Lime, Limon Tree**	**Laimoon**	**15**	**Fruit**	**RJ**
Zingiber officinale **Rose. (Zingiberaceae)**	**Ginger**	**Zanjabeel**	**12**	**Root**	**D,R,I**
Salvia fruticosa **Mill. (Lamiaceae)**	**Common Sage**	**Mariamieh**	**12**	**Leaves. stems**	**D,I**
Allium sativum **L (Liliaceae)**	**Garlic**	**Thoum**	**8**	**Root**	**R,C**
Punica granatum **L (Punicaceae)**	**Pomegranate**	**Rumman**	**8**	**Fruite**	**R,J**
Daucud carota L.	**Carrot**	**Jazar**	**7**	**Root**	**R,J,C**
Trigonella berythea Boiss,& Blanche (T,foenum - graecum)	**Fenugreek seeds**	**Helbeh**	**6**	**seeds**	**D,I**
Malvaceae	**Common mallow**	**Khobeaza**	**6**	**Leaves. tems**	**C**
Coridothymus capitatus **(L) Reichb.(Lamiaceae)**	**Capitate Thyme**	**Zatar Farsi**	**6**	**leaves**	**D,MX,I**
Anisum vulgare **L (Apiceae)**	**Anise**	**Yansoon**	**6**	**seeds**	**D,I**
Urtica pilulifera **L (Asteraceae)**	**Roman Nettle**	**Qurrias**	**5**	**Leaves. stems**	**D,J,I**
Teucrium capitatum **L (T.*polium* L) (Lamiaceae)**	**Cat Thyme**	**Jedeh subian**	**5**	**Leaves. stems**	**D,I**
Traditional Folk remedy	**Herbal mixture**	**Khaltet ashab**	**5**		**MX**
Cassia senna L.	**Senna**	**snamkeh**	**5**		**D,I**

Lactuca sativa L (Asteraceae)	**Lettuse**	**Khus**	**5**	**leaves**	**R**
Rosamarinus officinalis L(Lamiaceae)	**Rosemary**	**Hassalban**	**4**	**leaves**	**D,I**
Morchella	**Indian mushroom**	**Fitter Hindi**	**4**	**Root**	**D**
Seamus indicum L (Pedaliaceae)	**Sesame**	**semsem**	**3**	**seeds**	**MX**
Rocus Sativulus l.(Iridaceae)	**Saffron**	**Zafran**	**3**	**seeds**	**D**
Commiphora myrrha (Nees) Engl. Burseraceae	**Cum Myrrh tree**	**Halteet .murrah**	**3**	**Leaves. seeds. root**	**D,R**
Crataegus aronia (L) Bos. exDc. (Rosaceae)	**Hawthorn**	**zaroor**	**2**	**Leaves, flowers, stems**	**B,D,I,R**
Triticum aestivum L (Poaceae)	**Wheat**	**Qameh**	**2**	**seeds**	**B,C,D**
Foeniculum vulgare Miller (Apiaceae)	**Fennel**	**Shomar**	**2**	**Root**	**D,R,I**
Pyrus malus L (Rosaceae)	**Apple**	**Toffah**	**2**	**fruit**	**J,R**
Amygdalus Korschinskii Hand-Mazz (Rosaceae)	**Bitter almond**	**Louz Barri**	**2**	**Fruit,seeds**	**R**
Camellia thea Link. (Theaceae)	**Tea**	**Shi Akdar**	**1**	**leaves**	**B,D**
Allium cepa L (Liliaceae)	**Onions**	**Basal**	**1**	**Bulb, leaves**	**R**

A Total number of informants was more than 45 because, some participants reported more than one choice.

b C, cooked ; D, decoction ; I, infusion ; J, juice ; R, raw, B, boiled ; MX, mixture.

c Herbal tea (Zhurat), informants 4, mixtures of herbs, used as D, I.

d Juices (Assayer), informants 3, fruits, used as J.

CAM use by demographic characteristics

The total cancer patients interviewed was 300 patients 65 were males (20.67%) and n=235 (7 9.3%) females. The age of patients ranged from one year to 85 years old with median age 52.15. (Table: 3.3) summarizes the demographic characteristics of cancer patients interviewed. Patients had primary school education n=59 (19.9%) and Patients who lived in villages n=92 (30.7%) used CAM more than those who had higher education or lived in the city and camps. The highest percent of CAM users found in patients who were not working before and is not working now n=79 (26.33%). A large percentage of individuals of population were married n=130 (43.3%).

(**Table: 3.3**): **Scio-Demographic Data of Cancer Patients Participating in the Study**

Varible	**Using CAM**				**P value**
	Yas		**No**		
	n	**%**	**n**	**%**	
Gender (n=300)					
Male	35	11.67	27	9	0.796
Female	130	43.33	108	36	
Place of birth (n=300)					
City	85	28.33	65	21.7	0.723
Village	71	23.7	60	20	
Camp	9	3	10	3.33	
Residence (n=300)					
City	62	20.67	63	21	0.261
Village	92	30.67	63	21	
Camp	11	3.67	9	3	
Marital status (n =300)					
Single	21	7	26	8,67	0.498
Married	130	43.33	100	33.33	
Divorced	2	0.67	1	0.33	
Widowed	12	4	8	2.67	

Education (n=300)					
Primary school	59	19.67	36	12	0.096
Secondary school	36	12	20	6.67	
University	30	10	33	11	
Lamy	40	13.33	46	15.33	
Religion (n=300)					
Muslim	163	54.33	132	44	0.702
Arabic Christian	0	0	1	0.33	
Another	2	0.66	2	0.66	
Disease and working (n=300)					
No change	23	7.67	24	8	0.567
Working today less	28	9.33	17	5.67	
Stop working	28	9.33	25	8.33	
Not working before is not					
Working today	79	26.33	65	21.67	
Working more than before	0	0	1	0.33	
Another	7	2.33	3	1	

***P value was determined by chi-square**

CAM use by type of cancer and stage of treatment

Chemotherapy was mostly associated with CAM use n=149 (149%) p=<0.05. Half the study population received chemotherapy. Breast cancer patients n=81 of the study population, had the highest rate of CAM use (27%). Other types of cancer and other stages of treatment had different ratios of CAM use as shown in (Table 3.4).

(Table: 3.4): CAM Use by Type of Cancer and Stage of Treatment

	Yes		No		P value
Type of Cancer (n= 300)	n	%	n	%	
Breast	81	27	67	22.3	
Respiratory	7	2.3	3	1	
Hemaptopdetic lymphomas	5	1.67	10	3.33	
Brain neurological	0	0	5	1.6	

Colon	29	9.67	15	5	
Testis prostate	4	1.33	8	2.67	
Uterus cervix ovary vagina	8	2.67	4	1.33	
Bone	1	0.33	2	0.67	
Kidney bladder	2	0.67	1	0.33	
Thyroid	0	0	5	1,67	
Other(liver skin unknown Type)	16	5.33	8	2.67	
More than one type of cancer	2	0.66	1	0.33	
Stage of treatment (n=300)					
Before chemotherapy	1	0.33	46	15.33	‹ 0.05
During chemotherapy	149	49.67	82	27.33	
Completed chemical treatment in the half year	4	1.33	2	0.67	
Only in moderation	11	3.67	3	1	
Another	0	0	2	0.66	

CAM use in patients with recurrent disease and other medical problems:

Patients with no recurrent disease have higher rate as CAM users n=139 (46.3%) as shown in (Table 3.5). Patients with other medical problems including hypertension n=39(12%) had the highest rate as CAM users while patients with other medical problems had different ratios as shown in (Table 3.5).

(Table: 3.5):CAM Use by Patients Having Recurrent Disease and Medical Problems

Recurrent disease (n=300)	**Yes**		**No**		**P value**
No	139	46.33	122	40.66	0.199
Yes	22	7.33	10	3.33	
Don’t know	3	1	3	1	
Other medical problems n=300					
No	115	38.33	89	29.67	0.95
Hypertension	32	10.67	35	11.67	
Asthma	2	0.67	5	1.67	
Diabetes mellitus	29	9.67	27	9	
Others	9	3	4	1.33	

***The total number here was more than 300 ,because some patients reported more than one answer.**

*** Patients before chemotherapy n=46 (15.33) were considered as CAM non users.**

Discussing CAM use with Physician

Of 300 patients interviewed n=104 (34.67%) had never discussed it with any physician, only n=58 (19.33%) discussed it with physician. Most of CAM users n=118 (39.3 %) achieve the sought effect while n=38 (12.7) did not and n=14

(4.76%) of patients did not know if they achieved the sought effect or not.

Recommendations / referrals for CAM use

Friends and family members had the highest rate as referrals for CAM use n=90 (30%), n=89 (29.67) respectively but patients have other sources about CAM use these sources have different ratios as shown in(Table 3.6).

(Table: 3.6):Recommendations / Referrals for CAM use

Who recommended this remedy to you ?	Users n=165	%100
Myself	4	1.33
Friends	90	30
Family members	89	29.67
The physician, The pharmacist	9	3
The herbalist	4	1.33
Media (TV, radio, hardcopy	6	2
Other (e. g internet , advertisements , text,..etc)	12	4
Experience	40	13.33

***The total number here was more than 165, because some patients reported more than one answer.**

Pattern of herbal preparation , from where obtained and why use CAM among participants

Of the 300 participants, n=98 (32.67%) used honey and n=45 (15%) used plant-based products. and preferred to use a crude extract in the form of a herbal decoction n=74 (24.67), cooked n=64 (21.33%), raw, infusion and juice used in different percentage as shown in (Table3.7). Some patients used CAM in the form of mixtures n=71(23.67%).

The majority of CAM medicine users obtained their supply from Palestine n=164 (54.67). The highest percentage of CAM users n=140 (46.67) believed that the CAM preparations would play the role of curing disease. Other reasons included relief symptoms of the disease, slow down progress of disease, reducing medication side effects and strengthen the immune system as shown in Table 3.7).

(Table: 3.7):Pattern of Herbs Use, From Where Obtained and Why Use CAM by Cancer Patients

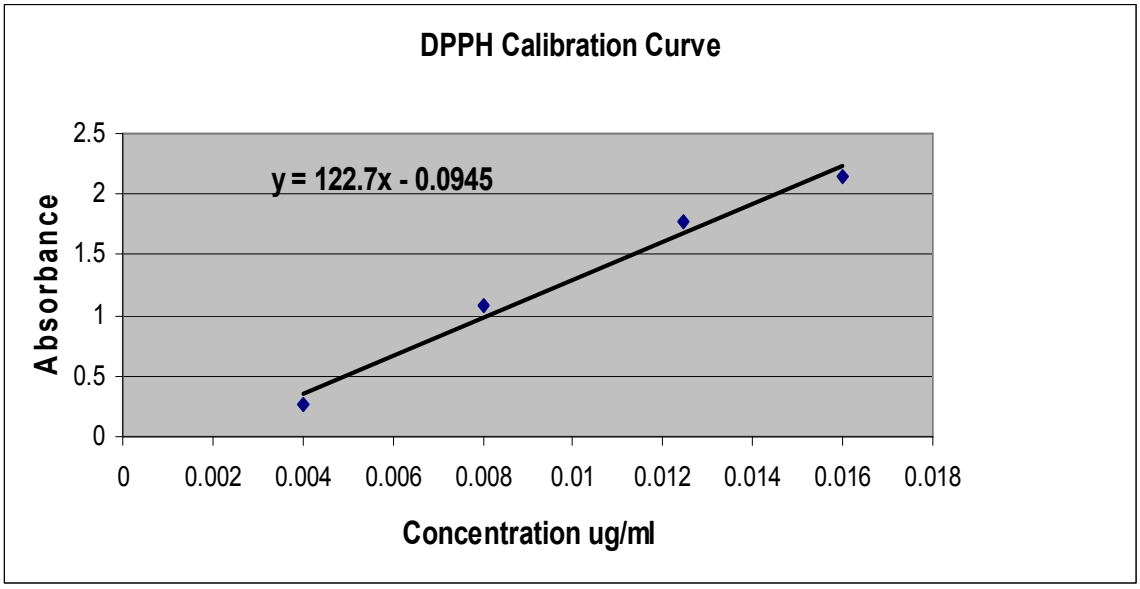
Characteristics	Number of patients	%
In which form do you use herbs ?	Total 165	
Cooked	64	21.33
Infusion	25	8.33
Decoction (extract with boiling)	74	24.67
Juice	18	6
Raw	50	16.67
Other forms	69	23
Where do you obtain this remedy ?	Total 165	
Local	164	53.67
Imported	1	0.33
Local and imported	3	1
Missing system	132	44
Why do you take this remedy ?		

Curing disease	140	46.67
Slow down progression of disease	70	23.33
Relive symptoms of disease	72	24
Reduce side effect of medication	5	1.67
Strengthen the immune system	69	23
Don't know	9	3

***The total number here was more than 165 ,because some patients reported more than one answer .**

3.2 Results of Antioxidant activity tests

3.2.1Results of DPPH assay



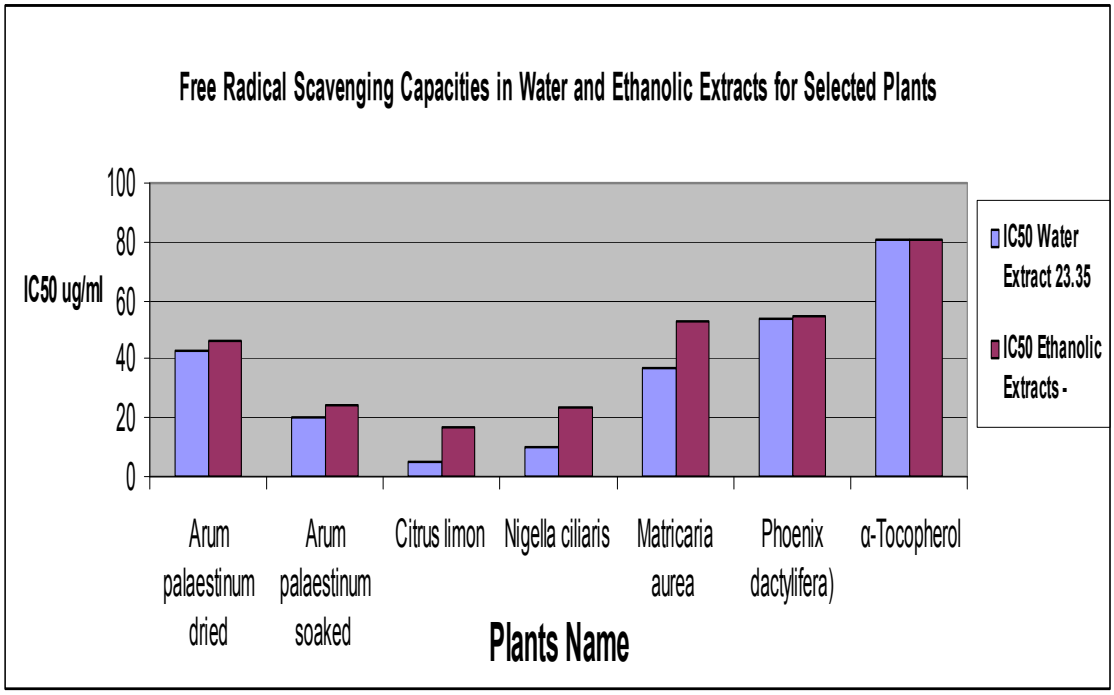
(Figure: 3.1) Calibration Curve of DPPH

The hydrogen atom or electron donation abilities of the corresponding extracts and some pure compounds were measured from the bleaching of the purple-colored methanolic solution of 1,1-Diphenly-2-picrylhydrazylhydrate (DPPH) (Burits and Bucar. 2000). This assay uses the stable radical DPPH as a reagent. In DPPH, a stable free radical scavenging assay with a characteristic absorption at517nm was used to

study the radical scavenging effects of extracts. As antioxidants donate hydrogen atoms to these radicals, they lose their purple color which leads to decrease absorption. The decrease in absorption was taken as a measure of the extent of radical scavenging. The 50% inhibition used to differentiate between antioxidant activities of different plants and compared with commonly used synthetic antioxidants α-tocopherol at the same concentration which had highest % inhibition. IC50 was calculated from the equation of DPPH calibration curve (Figure: 3.1). The IC50 for the selected plants in ethanolic and water extracts was shown in (Table: 3.8), (Figure: 3.2), and (Figure: 3.3) respectively. IC50 in ethanolic extracts was higher than water extracts.

(Table: 3.8) Free radical scavenging capacity and IC50 for Selected Plants in Ethanolic and Water Extracts.

Plants Name	IC50 Water Extract	IC50 Ethanolic Extracts
Arum palaestinum boiled	23.35	-
Arum palaestinum dried	42.46	46.53
Arum palaestinum soaked	19.938	24.26
Citrus limon	4.66	16.7
Nigella ciliaris	10.34	23.46
Matricaria aurea	37.17	52.86
Phoenix dactylifera)	53.6	54.68
α-Tocopherol	80.44	80.44



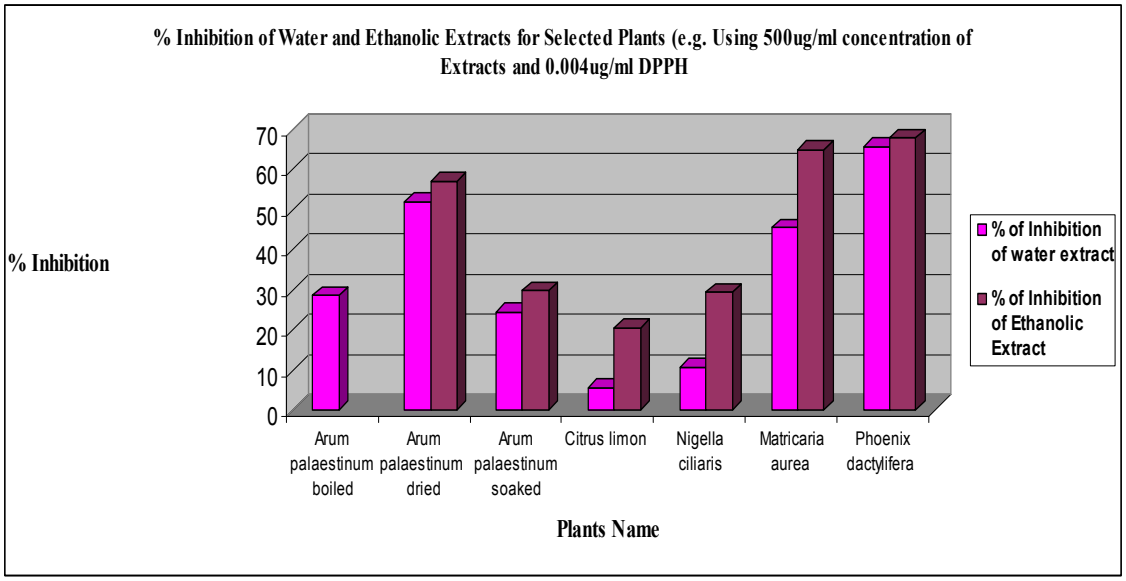
(Figure: 3.2) Free Radical Scavenging Capacities IC50 in Ethanolic and Water Extract for Selected Plants.

The % of inhibition of the selected plants in both ethanolic and water extracts was determined by using 0.004µg/ml concentration of DPPH and 500 µg/ml for selected plants extracts. The % inhibition in ethanolic extract was higher than water. There is a large difference between %of inhibition in ethanol and water extracts for the plants except for *Phoenix dactylifera* which had the highest % of inhibition in both extracts nearly there is no difference of % of Inhibition as shown in (Table 3.9).

(Table: 3.9):% Inhibition of Water and Ethanolic Extracts for Selected Plants (e.g. Using 500µg/ml concentration of extracts and 0.004µg/ml DPPH.

Plants Name	% of Inhibition of water extract 500 **µg**/ml	% of Inhibition of Ethanolic Extract **µg**/ml
Arum palaestinum boiled	28.56	
Arum palaestinum	52	57

dried		
Arum palaestinum soaked	24.37	29.67
Citrus limon	5.62	20.4
Nigella ciliaris	10.55	29.3
Matricaria aurea	45.4	64.76
Phoenix dactylifera	65.7	67.76

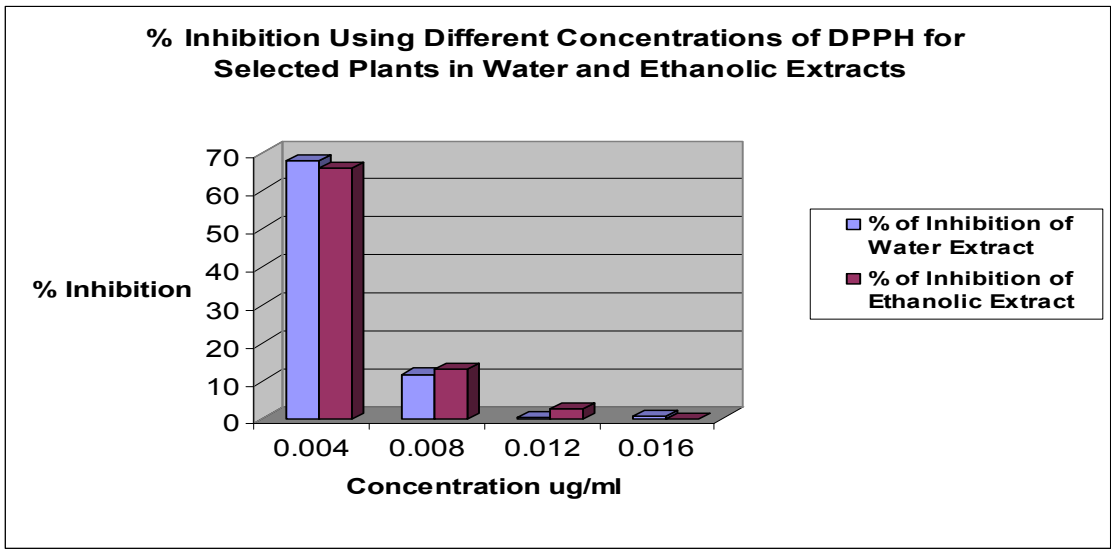


(Figure:3.3) % of Inhibition of Water and Ethanolic Extracts for Selected Plants (e.g. Using Extracts Concentration 500µg/ml and 0.004µg/ml DPPH).

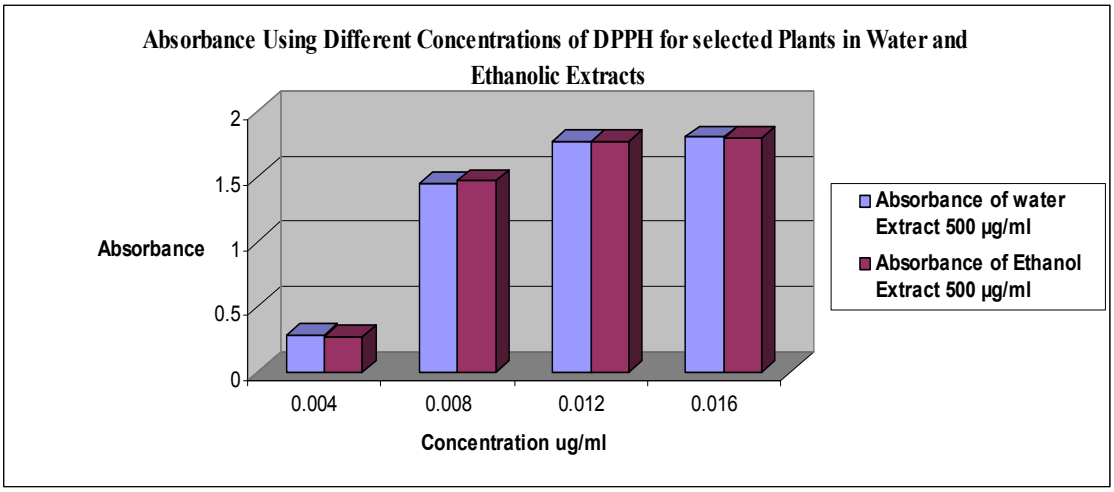
But determination of % of inhibition by using different concentrations of DPPH 0.004µg/ml, 0.008µg/ml, 0.012µg/ml, and 0.016µg/ml and one concentration of the selected plants of both extracts was 500µg/ml eg. *Phoenix dactylifera*. The result obtained was that % of inhibition decreased for all the selected plants as the concentration of DPPH increased from 0.004µg/ml to 0.016µg/ml but the absorbance increased as shown in (Table:3.10).

(Table: 3.10):Different Concentrations of DPPH and % of Inhibition of Water and Ethanolic Extracts for the Selected Plants (e.g. *Phoenix dactylifera*).

Concentration of DPPH µg/ml	Absorbance of water Extract 500 µg/ml	Absorbance of Ethanol Extract 500 µg/ml	% of Inhibition of Water Extract	% of Inhibition of Ethanolic Extract
0.004	0.287	0.270	65.71	67.74
0.008	1.444	1.465	11.8	13.06
0.012	1.765	1.765	2.596	2.812
0.016	1.801	1.797	0.787	0.778



(Figure: 3.4) % Inhibition in Water and Ethanolic Extracts for Selected Plants Using Different Concentrations of DPPH and one concentration of Extracts (e.g. *Phoenix dactylifera*).

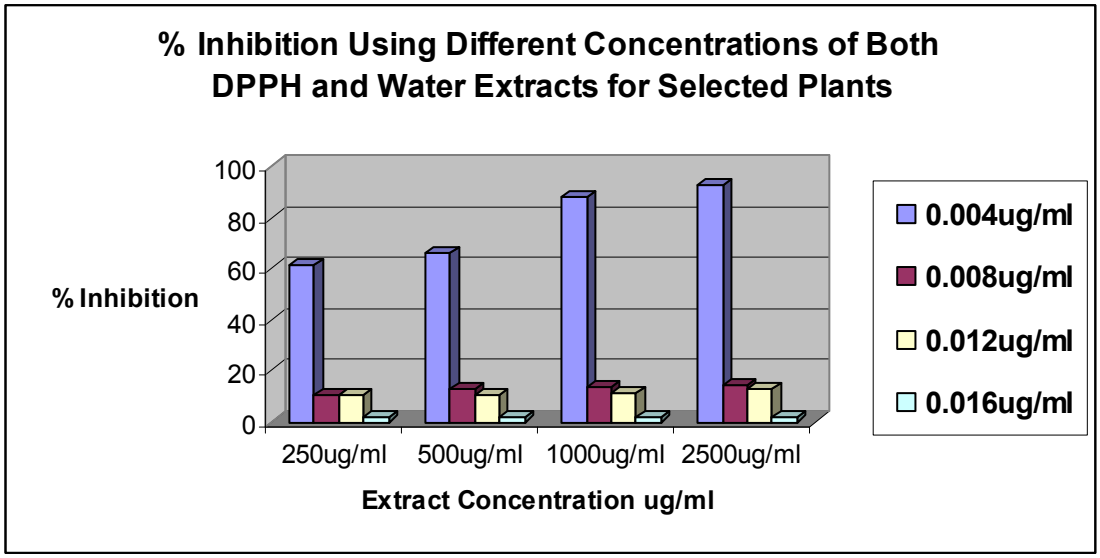


(Figure: 3.5) Absorbance Using Different Concentrations of DPPH in Ethanolic and Water Extracts(e.g. *Phoenix dactylifera*).

In opposite direction by using different concentrations of both extracts for selected plants 250µg/ml, 500µg/ml, 1000µg/ml, 2500µg/ml and different concentrations of DPPH the result obtained was as the concentration of extract increased from 250µg/ml to 2500µg/ml the % of inhibition increased in ethanolic and Water but decreased for DPPH as shown in (Table 3.11), (Table 3.12) and (Figure 3.6), (Figure 3.7) respectively.

(Table: 3.11) :% of Inhibition Using Different Concentrations of Both DPPH and Water Extracts for the Selected Plants (e.g. *Phoenix dactylifera*) .

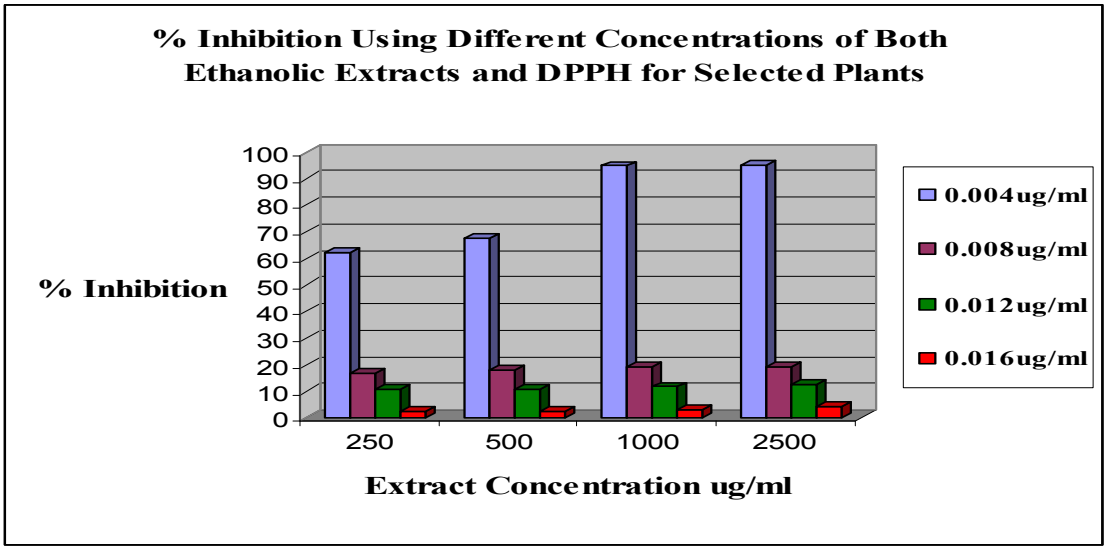
Concentration of DPPH µg/ml	250µg/ml	500µg/ml	1000µg/ml	2500µg/ml
0.004	61.53	65.71	87.697	92.35
0.008	10.85	13.06	13.9	14.27
0.012	10.506	10.787	11.405	12.867
0.016	1.816	1.818	1.883	1.978



(Figure: 3.6) % of Inhibition Using Different Concentrations of Both DPPH and Water Extracts for the Selected Plants (e.g. *Phoenix dactylifera*) .

(Table: 3.12):% of Inhibition Using Different Concentrations of Both DPPH and Ethanolic Extracts (e.g. *Phoenix dactylifera*).

Concentration of DPPH µg/ml	250µg/ml	500µg/ml	1000µg/ml	2500µg/ml
0.004	62.01	67.74	94.79	95.15
0.008	16.8	17.8	18.99	19.35
0.012	10.675	10.787	11.787	12.943
0.016	2.379	2.596	2.920	4.236



(Figure: 3.7) % of Inhibition Using Different Concentrations of Both DPPH and Ethanolic Extracts (e.g. *Phoenix dactylifera*).

DPPH is stable free radical. The mechanism of this assay was depend on donation of hydrogen atoms from extract to free radicals of DPPH which leads to decrease in absorption by loosing their purple color. As the concentration of DPPH increased the concentration of free radicals increased and addition of constant concentration of extract will lead to decrease in % inhibition of increased free radicals and opposite thing will happened when concentration of DPPH decreased the % inhibition will increased.

(Table: 3.13) : % of Inhibition Using Different Concentrations of Ethanolic Extract for Selected Plants and DPPH concentration 0.016µg/ml

Plants Name	250µg/ml	500µg/ml	1000µg/ml	2500µg/ml
Arum palaestinum dried	58	68	88	90
Arum palaestinum soaked	10.22	27.69	36.61	40.76
Citrus limon	2.597	3.812	3.73	4.522
Nigella ciliaris	2.758	3.083	3.732	7.543
Matricaria aurea	2.975	3.299	3.515	5.871
Phoenix dactylifera	2.716	2.812	3.088	4.878
α-tocopherol	91.3	92.5	96.25	97.5

(Table: 3.14):% of Inhibition Using Different Concentrations of Water Extracts for Selected Plants and DPPH concentration 0.016µg/ml.

Name of plant	250µg/ml	500µg/ml	1000µg/ml	2500µg/ml
Arum palastinum boiled	55	62	68.85	82.37
Arum palastinum dried	58	68	88	90
Arum palastinum soaked	6.003	37.43	38.34	46.15
Citrus limon	2.59	2.812	3.299	5.788
Nigella ciliaric	2.596	3.245	3.299	4.33
Marticaria aurea	2.596	3.33	3.25	5.50
Phoenix dactylifera	2.379	2.596	2.920	4.236
α-tocopherol	91.3	92.5	66.25	97.5

3.2.2 Results of Carotene-Linoleic acid Assay

Heat-induced oxidation of an aqueous emulsion system of β-carotenelinoleic acid was employed as another antioxidant test reaction. The test is based on the fact that β-carotene loses its color in the absence of antioxidant (Miller, 1971). During oxidation, an atom of hydrogen is abstracted from the active methylene group of linoleic acid located on carbon-11 between two double bonds (Frankel, 1998). The pentadienyl free radical so formed then attacks highly unsaturated β-carotene molecules in an effort to reacquire a hydrogen atom. As the β-carotene molecules lose their conjugation, the carotenoids lose their characteristic orange color. This process can be monitored spectrophotometrically at 490nm.

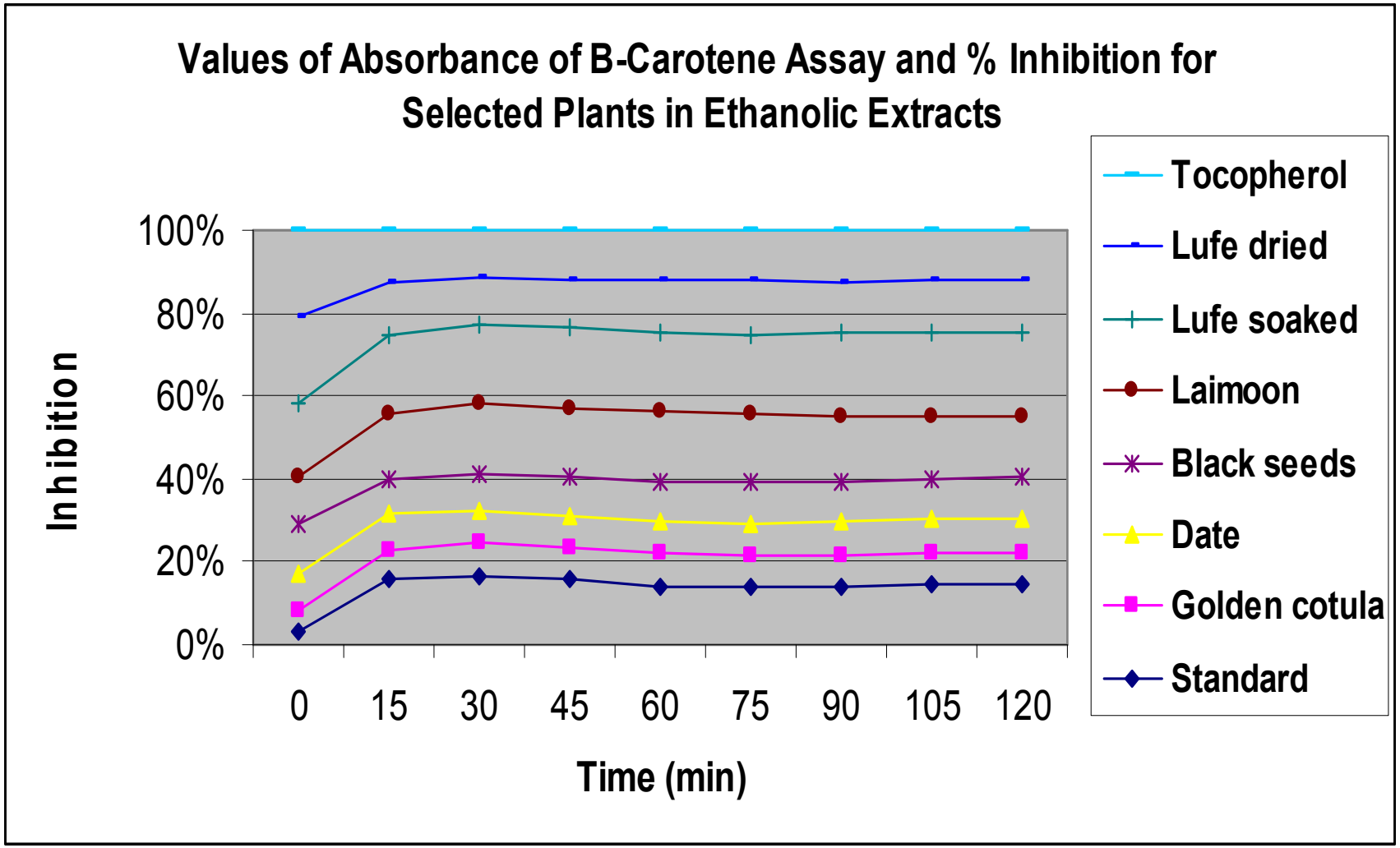
Different concentrations of water and ethanolic extracts for the selected plants were used and incubated in water bath at 50C for 2h. As the incubation period increased from 15min to 2h the absorbance of both extracts decreased. This mean B-carotene loses its color due to absence of antioxidants as shown in (Table 3.14) and (Table 3.15).

All ethanolic extracts of the selected plants revealed antioxidant efficiency compared with synthetic antioxidant α-tocopherol and the standard that contain all material of experiment except the extract this mean less B-carotene degradation of all. The highest β-carotene color degradation means least antioxidant efficiency and least B-carotene degradation means the efficient antioxidant. In ethanolic and water extracts the highest plant showed least B-carotene degradation was *Matricaria aurea* (64.67%), (59.24%) followed by *Phoenix dactylifera* (65.33%), (65.2%). The other

plants had B-carotene degradation in ethanolic and water extracts respectively were *Nigella ciliari*s (81.63%), (80.89%), *Citrus limon* (88.4%), (88.05%), *Arum palaestinum* soaked in water (87.13%), (67.72%), *Arum palaestinum* dried (88.5%), (73.26%), and *Arum palaestinum* boiled (59.35%). In water extracts B-carotene degradation was lower than those obtained in ethanolic extracts. The most efficient an antioxidant was *Matricaria aurea* followed by *Phoenix dactylifera* and *Nigella ciliaris* but the less one was *Arum palaestinum* dried as shown in (Figure 3.8), (Figure: 3.9).

(Table: 3.15):Values of Absorbance in B-carotene Assay in Ethanolic Extracts for the Selected Plants

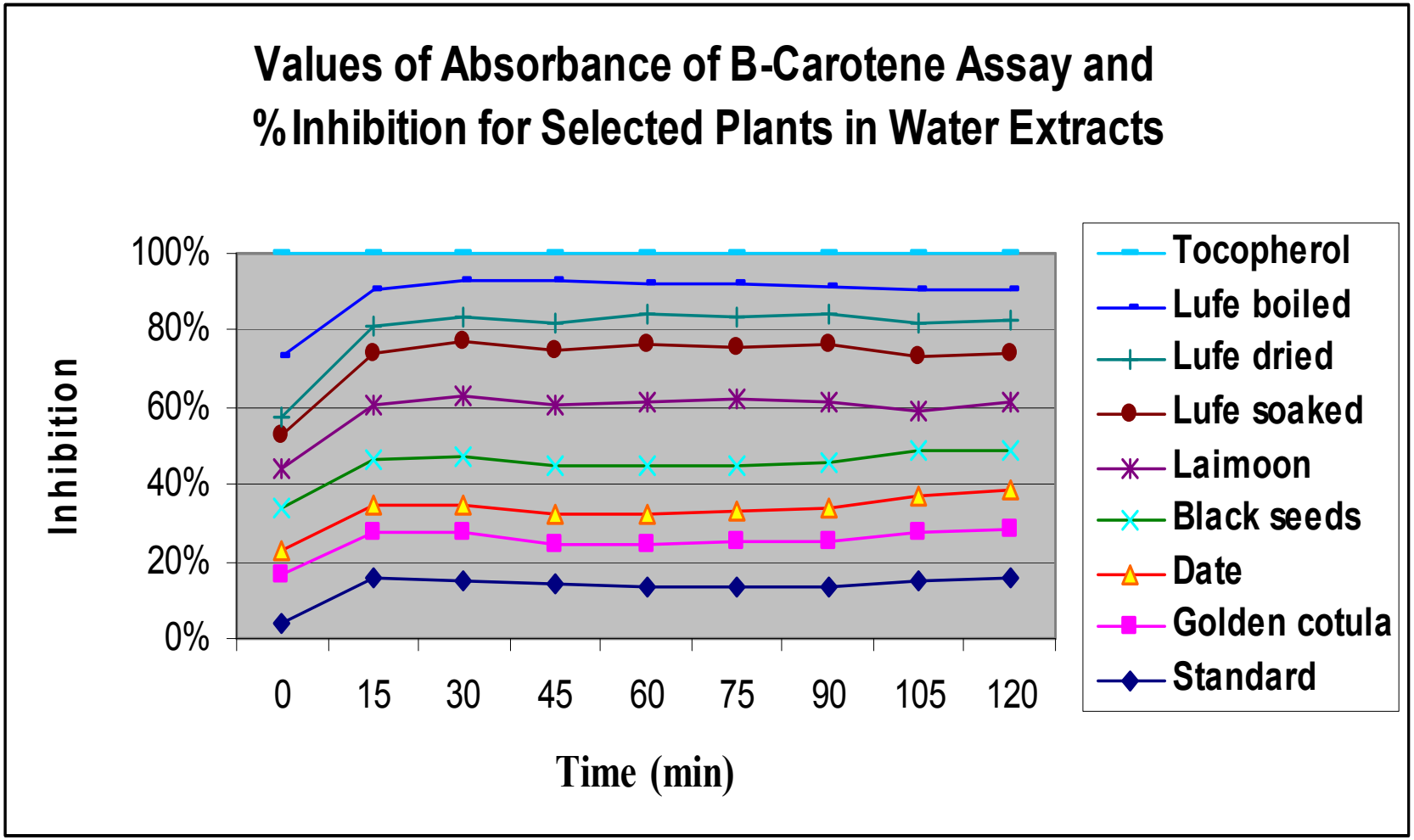
Name of Plants	0	15min	30min	45min	60min	75min	90min	105min	120min
Arum palaestinum dried	1.075	1.045	1.0375	1.0125	1.0125	1.011	0.975	0.925	0.815
Arum palaestinum soaked	1.744	1.770	1.747	1.692	1.603	1.545	1.540	1.231	0.820
Citrus limon	1.635	1.584	1.532	1.436	1.396	1.293	1.250	1.125	0.810
Nigella ciliaris	0.914	0.878	0.825	0.822	0.795	0.786	0.768	0.751	0.751
Matricaria aurea	0.765	0.722	0.686	0.623	0.615	0.606	0.600	0.595	0.595
Phoenix dactylifera	0.722	0.716	0.707	0.682	0.671	0.612	0.605	0.601	0.601
Standard	1.701	1.621	1.511	1.351	1.175	1.102	1.095	1.080	1.075
α-tocopherol	1.0625	1.0375	1.025	1.020	1.011	0.975	0.975	0.925	0.920



(Figure: 3.8) % Inhibition of B-Carotene Assay for Selected Plants in Water Extracts

(Table: 3.16):Values of Absorbance in B-carotene Assay in Water Extract for Selected Plants

Plants Name	0min	15min	30min	45min	60min	75min	90min	105min	120min
Arum palaestinum boiled	0.776	0.741	0.96	0.993	0.711	0.681	0.617	0.610	0.546
Arum palaestinum dried	0.776	0.749	0.722	0.711	0.686	0.681	0.680	0.676	0.674
Arum palaestinum soaked	0.744	0.741	0.708	0.672	0.672	0.657	0.647	0.640	0.623
Citrus limon	1.608	1.524	1.443	1.352	1.349	1.127	1.17	1.007	0.805
*Nigella ciliari*s	1.628	1.617	1.584	1.512	1.444	1.415	1.320	1.268	0.745
Matricaria aurea	1.574	1.504	1.368	1.246	1.106	0.975	0.965	0.950	0.545
Phoenix dactylifera	0.756	0.726	0.701	0.698	0.688	0.673	0.668	0.658	0.640
Standard	1.701	1.621	1.511	1.351	1.175	1.102	1.095	1.080	1.075
α-tocopherol	1.063	1.037	1.025	1.0125	1.011	0.975	0.945	0.925	0.920

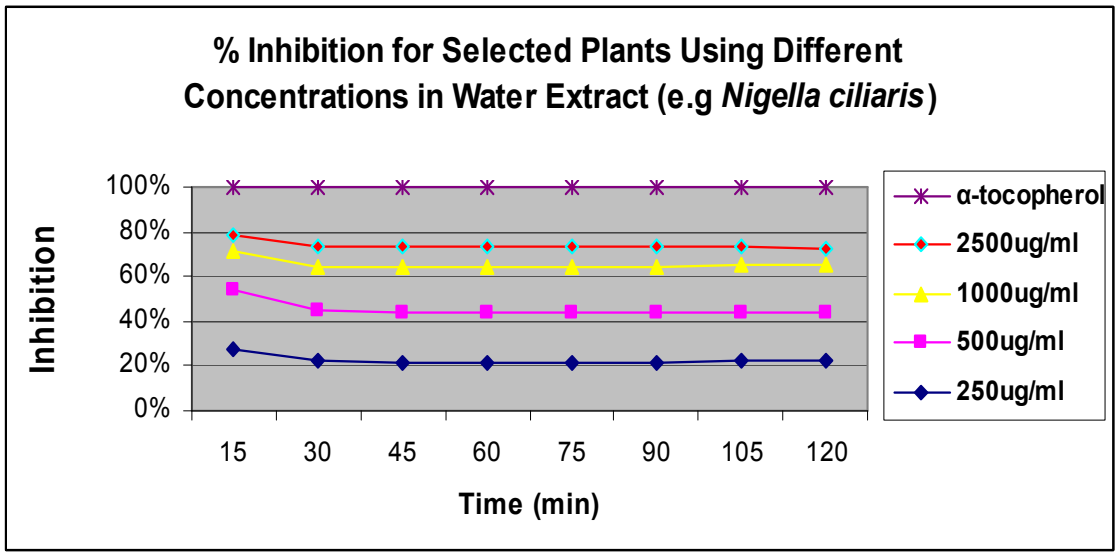


(Figure: 3.9) % Inhibition of B-Carotene Assay for Selected Plants in Water Extracts

Using Different concentrations of both extracts 250µg/mlµg/ml, 1000µg/ml, and 2500µg/ml and the incubation period in water bath at 50C increased from 15min to 2h the absorbance decreased and % inhibition increased as shown in (Table 3:17), (Table 3:18) and (Figure 3.10), (Figure 3.11).

(Table: 3.17):Values of Absorbance of Carotene-Linoleic Assay Using Different concentrations µg/ml of Water Extracts for the Selected Plants (e.g. *Nigella ciliaris*).

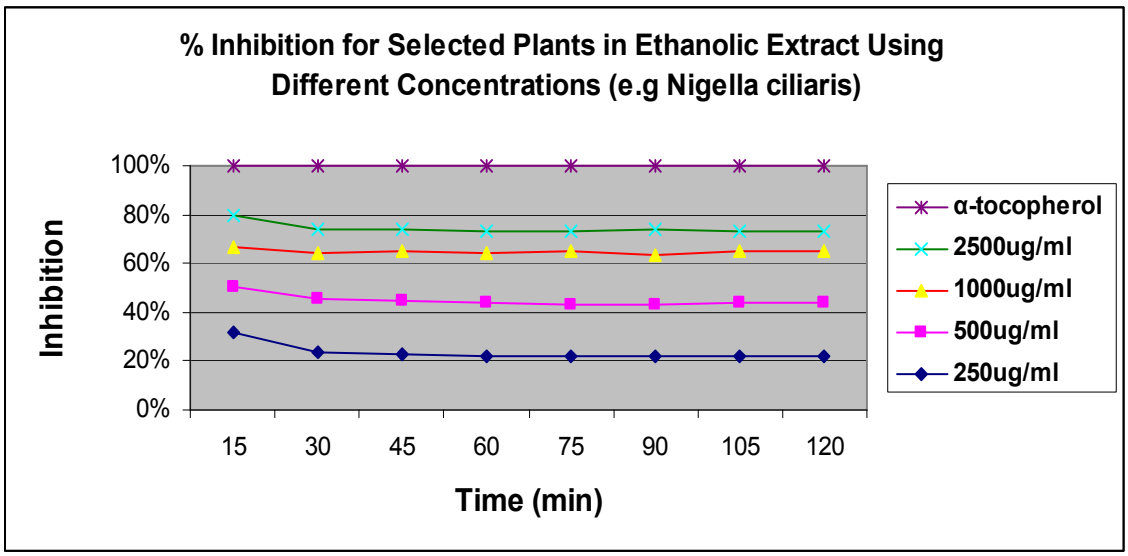
Concentration µg/ml	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min
250	0.914	0.878	0.82	0.822	0.795	0.786	0.768	0.751
500	0.886	0.883	0.824	0.815	0.800	0.790	0.755	0.753
1000	0.796	0.785	0.785	0.784	0.762	0.748	0.715	0.710
2500	0.367	0.360	0.337	0.335	0.315	0.300	0.286	0.264
α-tocopherol	1.037	1.025	1.012	1.011	0.975	0.965	0.925	0.920



(Figure: 3.10): % Inhibition and Absorbance for Selected Plants Using Different Concentrations of Water Extracts (*e.g Nigella ciliaris*).

(Table: 3.18):Values of Absorbance of Carotene- Assay Using Different Concentrations of Ethanolic Extracts for Selected Plants (e.g. *Nigella ciliaris*).

Concentration µg/ml	15 min	30 min	45 min	60 min	75 min	90 min	105 min	120 min
250	1.628	0.914	0.878	0.827	0.795	0.606	0.778	0.751
500	0.948	0.886	0.873	0.824	0.790	0.81	0.755	0.753
1000	0.845	0.742	0.762	0.796	0.784	0.815	0.748	0.726
2500	0.663	0.367	0.360	0.337	0.31	0.813	0.286	0.264
α-tocopherol	1.0375	1.025	1.0125	1.0110	0.975	0.965	0.925	0.920

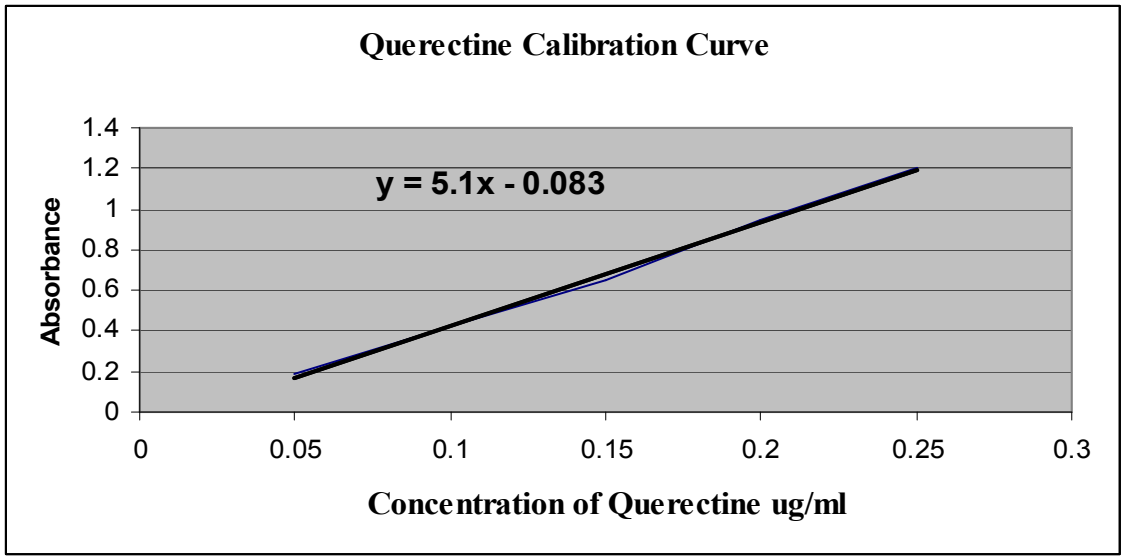


(Figure: 3.11) % Inhibition for Selected Plants Using Different Concentrations of Ethanolic Extracts (e.g. *Nigella ciliaris*).

3.2.3 Results of Determination of Total flavonoid

Total flavonoid concentration was calculated using quercetin as standard (Park et al.,1997).

Absorbance =5.1µg quercetin–0.083

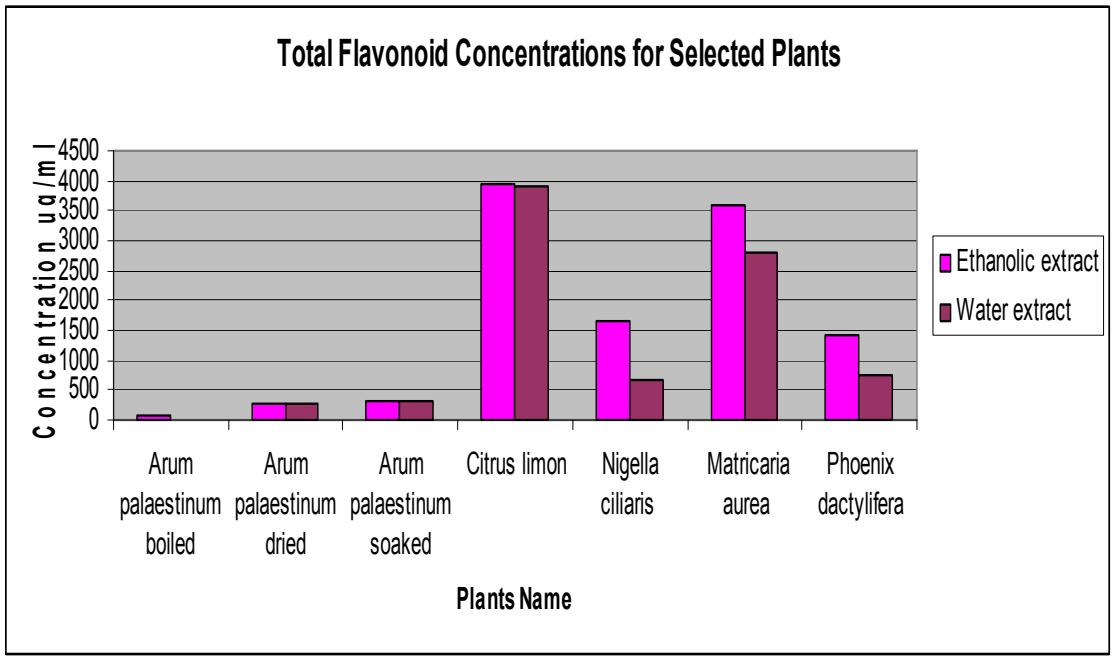


(Figure: 3.12) Querectine Calibration Curve.

Total flavonoid concentrations were calculated for both ethanolic and water extracts according to the equation above. *Citrus limon* had the highest concentration of flavonoid (3905.2µg/mg),(3946µg/mg) in ethanolic and water extracts respectively followed by *Matricaria aurea* (3573.7mg/ml), (2818.9mg/ml), and *Nigella ciliaris* **(**1676.5mg/ml), (666.7mg/ml)**.** *Arum palaestinum* revealed the least flavonoid concentrations especially *Arum palaestinum* boiled in water (70mg/ml). The other plants contain flavonoid concentrations as shown in (Table 3:19) and (Figure: 3.13).

(Table: 3.19) :Total Flavonoid Concentration in Ethanolic and Water Extracts for Selected Plants

No.	Name of plant	Ethanolic extract µg/ml	Water extract µg/ml
1	*Arum palaestinum* boiled	70	-
2	*Arum palaestinum* dried	274	280
3	*Arum palaestinum* soaked	325.15	299.5
4	*Citrus limon*	3946	3905
5	*Nigella ciliaris*	1676.5	666.7
6	*Matricaria aurea*	3573.7	2818.9
7	*Phoenix dactylifera*	1406.2	763.6



(Figure: 3.13) Total Flavonoid Concentrations for Selected Plants in Ethanolic and Water Extracts.

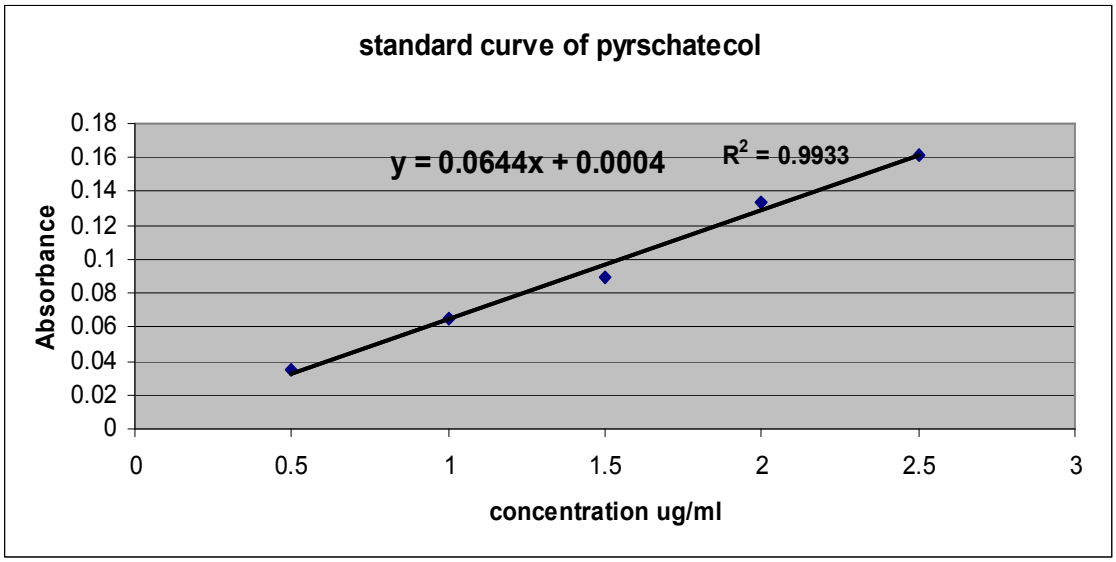
3.2.4 Determination of total phenolic compounds

Total soluble phenolics in the ethanolic and water extracts were determined with Folin-Ciocalteu reagent according to the method of Slinkard using pyrocatechol as a standard (Slinkard and Singleton, 1977). The concentration of total phenolic compounds in the ethanolic extracts was determined as microgram of pyrocatechol equivalent by using an equation that was obtained from standard pyrocatechol calibration curve is given as:

Absorbance = 0.0644 µg pyrocatechol + 0.0004(R2: 0.9933).

The results obtained that *Citrus limon* had the highest concentration of total phenolic compounds (5.93mg/ml), (4.88mg/ml) of ethanolic and water extracts respectively followed by *Nigella ciliaris* (5.95mg/ml), (4.65mg/ml). The other plants had total phenolic compounds concentration as shown in table (Table 3.20) and (Figure 3.15).

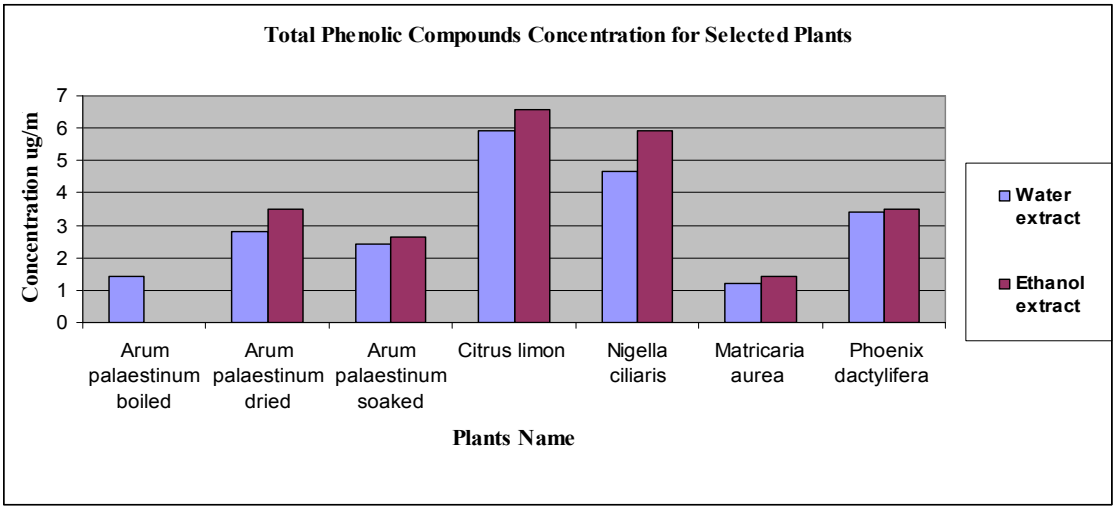
Calibration Curve of Pyrochatecol



(Figure 3:14) Pyrocatecol Standard Curve.

(Table: 3.20):Total phenolic compounds Concentration for selected plants in Ethanolic and Water Extracts.

No.	Name of Plants	Water extract µg/ml	Ethanol extract µg/ml
1	*Arum palaestinum* boiled	1.43	
2	*Arum palaestinum* dried	2.8	3.5
3	*Arum palaestinum* soaked	2.43	2.654
4	*Citrus limon*	5.93	6.58
5	*Nigella ciliaris*	4.65	5.94
6	*Matricaria aurea*	1.21	1.43
7	*Phoenix dactylifera*	3.43	3.49



(Figure 3:15) Total Phenolic Compounds Concentrations in Ethanolic and Water extracts for Selected Plants.

.

Chapter Four
Discussion

4 Discussion

CAM is widely used among cancer patients throughout the world. This study is the first attempt to identify and quantify the prevalence of the CAM use by a sample of cancer patients in Northern West bank at Al-wattani hospital in Palestine. To determine demographic characteristics, to identify any perceived benefits, sources of information recommending the use of particular CAM therapy and whether patients had discussed their use of CAM with their physicians. The prevalence of CAM use among all cancer patients varies widely according to demographic characteristics, type of cancer and chemotherapy treatment.While patients before chemotherapy were CAM non users. The extent of CAM use among 300 cancer patients 165(55%) were identified as CAM users and 135 (45%) as CAM non users and this ratio was high compared to neighboring countries such as Israel (17%) (Hana et al., 2005), Jordan (35.5%) identified as CAM users (Afifi et al., 2010), and the Western region of Turkey (42.3%) (Tarhan et al., 2009). The most commonly used forms of CAM among cancer patients in Northern West Bank, were honey 98 (32.67%) followed by herbal preparation 45(15%) mostly *Arum palaestinum*, *Nigella ciliaris*, *Phoenix dactylifera*, *Matricaria aurea*, *Citrus limon*. But the other CAM methods used by cancer patients were animal products especially honey 98 (32.67%), camel milk 32(10.67%), prayers and reading Quran 10 (3.33%), Oil treatments 6(2%) and traditional folk remedy prepared by herbalist 5 (1.66%). In Jordan the highest percent of CAM used were honey, olive oil, black seeds and dates and the highest stress reducing

CAM techniques included reading Quran, and praying (Akhu and Alkasaweneh, 2012). In Turkey most of CAM used were honey, herbs such as garlic, apple, Viscum album, and tar oils so the most common being herbal products. Stinging nettle (*Urticadioica)* was the most commonly herbal product, and nutritional support (Tarhan et al., 2009) so there is no difference between our results and that obtained from Jordan and Turkey .Our results were different from that obtained from study in Israel by Hana et al who found that chemical or biological pharmacologic remedies were the most popular treatment used by (41.3%) of all CAM users.

In Israel herbs extracts were used by third of identified CAM users and other forms of CAM such as Homeopathy (20.7%), specific life style, dietary regimes or folk medicines (13%), spiritual mined–body therapies used for alleviating emotional stress and to improve general feelings and quality of life. Such forms of CAM have not been used by Palestinian, Jordanian and Turkesh cancer patients. The differences in the rate of CAM methods used and types of CAM use between these studies may be attributed to differences in definition of CAM, the research methodology used, cultural, geographical or socioeconomic variables, education, all of which can influence an individuals decision whether to use CAM or not.

Based on the popularity of herbal medicine among Palestinians in treatment of a large number of diseases, it was expected that the percentage of herbal medicines uses will be high among patients with cancer (95.6%). This is because of easy acceptability, lower costs and social acceptability in the use of medicinal herbs in Palestine, as well as the long history and

experience of traditional use of these herbs encourage patients to believe in their healing effects.

The majority of CAM herbal remedies used by cancer patients were obtained locally form Palestine 164 (54.67%). This also highlights the availability and acceptability of herbal therapies among the population.

The majority of CAM users resident in village or city appeared to be associated with a higher percentage of using CAM. Approximately 92(30.67%) and 62 (20.67%) of cancer patients were residing in village and city. These results were similar to those obtained from Jordan where (89.9 %)of the patients live in urban areas (Akhu and Alkasaweneh, 2012) . Similarly CAM users with primary education levels 59(19.67%) and patients not educated 40(13.33%)were associated with higher CAM use . These results differ in Jordan where(26.8%) of 123 participants had some college education (Akhu and Alkasaweneh, 2012). On the other hands, in Israel Patients with university education used significantly more CAM (30.3%) than those with only high school or elementary education (15%) and (4.5%) respectively (Hana et al., 2005).

In our study family members 89(29.67%) and friends 90(30%) were the majority of patients to CAM treatments. Similarly as In Jordan recommendation of a friend (41.8%) was the main factor that promoted patients to use CAM (Afifi et al., 2010) and in Turkey(36.4%) used CAM on friends advice (Azru et al., 2009) and in Israel (41%) (Hana, et al., 2005) .

Most patients used CAM for more than one purpose. Curing disease 140(46.67%) had the highest percentage, slow down progress of disease, relief symptoms, reducing medication side effects and strengthen the immune system had (23.33%),(24%), (1.67%), and (23%) receptively. In turkey also patients used CAM to mitigate effects of the disease, to prevent recurrent of disease, to increase percent of blood values, and to feel psychologically relieved (Azru et al., 2009) . In Israel two-thirds of patients reported using CAM to strengthen the immune system, or to alleviate side effects of conventional therapies, to improve general well-being and reduce anxiety, or to relieve pain (Hana et al., 2005).

Most of CAM users in this study were females 130(43.33%) and significantly associated with breast cancer 81(27%) and stage of treatment during chemotherapy 149(49.67%) P=‹ 0,05. These results were similar to those obtained in Turkey where 49.1% female and (23.6%) of patients had breast cancer (Azru et al.,2009) and in Israel (23%) of CAM users had breast cancer (Hana et al., 2005). However no significant association was found in this study between gender and receiving CAM P=0.796, education P=0.096, place of birth P=0.7233, place of residence P=0.264, marital status P=0.096, and working P=0.567. The other types of cancer found were in descending order colon, (liver, skin, unknown type), uterus, hemaptopedetic lymphomas, respiratory, testis, prostate, kidney, bladder, and bone with percentage ranged (0.33%-9.67%).

An alarming result was that (34,67%) of patients who used CAM did not tell or discuss their doctors about their use of CAM mainly because the

doctors did not believe in CAMs treatment , and they feared that the doctor would tell them to stop it. Similarly in Israel 51 % of patients had never discussed it with any physician (Hana et al., 2005), and in Turkey 60% patients choose not to share their CAM practice with doctor and a nurse (Azru et al., 2009).

The majority of CAM users 118 (34.67%) achieve the sought effects of using CAM. In Israel (62%) reported subjective benefits (Hana et al., 2005).

Antioxidant activity Tests

In recent years, more interest has been paid to protect foods and human beings against oxidative damage caused by free radicals like hydroxyl, peroxyl, and superoxide radicals. One possible solution is to explore the potential antioxidant and anticancer properties of plant extracts or isolated products of plant origin (Namiki, 1990). It is well known that many polyphenolic compounds, such as phenolic acids, flavonoids, anthocyanidins, and tannins, which possess remarkable antioxidant and anticancer activities, are rich in plant materials. Some studies have shown the positive correlation of the increased dietary intake of natural antioxidants with the reduced coronary heart disease and cancer mortality, as well as with longer life expectancy (Halliwell, 2007: Rios et al., 2009). Moreover, many polyphenolic compounds have shown many health-benefiting bioactive properties, such as antioxidant, anticancer, antiviral, anti-inflammatory activities, and an ability to inhibit human platelet aggregation (Fan et al., 2001: Shen et al 2009).

The ethanolic and water extracts were subjected to screening for their possible antioxidant activity for the selected plants. Four complementary test systems, namely DPPH free radical scavenging, carotene-linoleic acid systems, total phenolic compounds, and total flavonoid concentrations were used for the analysis.

The photometric methods based on color reaction of phenolic compounds with Folin-ciocaleteu reagents is largely used for determination of total polyphenols content because of its simplicity stability and reliability (Singleton, Ross, 1965). It is based on discoloration reaction between nitrogen electron (from DPPH) and hydrogen atom of hydroxyl group (from antioxidant substance) (Brand-williams et al., 1995).

DPPH a stable free radical with a characteristic absorption at 517 nm, was used to study the radical scavenging effects of extracts. As the antioxidants donate protons of these radicals, the absorption decrease. It was found that percent of inhibition values increased with increasing concentrations of the extracts from 250µg/ml to 2500µg/ml but decreased as the concentrations of DPPH increased from 0.0004µg/ml to 0.016µg/ml. The (IC50) 50% represents the amount of antioxidant sample, which inhibits 50% of the initial concentration of DPPH was used to compare the antioxidants activities(AOA) for different materials compared with commonly used synthetic antioxidants such as α-tocopherol at the same concentration. In our study IC50 for selected plants in water and ethanolic extracts was calculated from DPPH calibration curve. All the selected plants revealed free radical scavenging capacity in ethanolic and water extracts but in

different ratios. Ethanolic extracts had IC50 more than water extracts for all the selected plants. Our results were compatible with results obtained from a study in Jordan for some plants used for treatment of diabetes (Al-mustafa and Al- Thunibat, 2008) who found that *Matricaria aurea* and *Arum palaestinum* were revealed free radical scavenging capacity when using DPPH assay and there is a difference between ethanolic and water extracts within the same species (ethanolic extract was higher than water extracts). There is another study of Phenolic Contents and Antioxidant Activity of Various Date Palm Fruits from Saudi Arabia in three kinds of dates namely Khalas, Sukkari, and Ajwa by Ebtesam et al., 2011who found that *Phoenix dactylifera* had total antioxidant activity and capacity in water extracts less than in ethanolic extracts. *Nigella ciliari*s had radical scavenging activity in water extract higher than in methanol extract (Asma et al., 2012).

Carotene-Linoleic acid assay which was heat-induced oxidation of an aqueous emulsion system of β-carotene linoleic acid was employed as another antioxidant test reaction. The test was based on the fact that β-carotene loses its orange color in the absence of antioxidant (Miller, 1971) and this process can be monitored spectrophotometrically at 490nm and the antioxidative capacities of the extracts were compared with synthetic α-tocopherol and the standard. All ethanolic and water extracts of the selected plants revealed higher antioxidant efficiency of antioxidants activity when compared to α-tocopherol which gave the highest β-carotene color degradation (98.6%) (least antioxidant efficiency) and standard the less B-

carotene degredation (14.79%) more efficient antioxidant activity. In ethanolic extracts B-carotene degradation was higher than water extracts. These results were compatible with a study of *Nigella ciliari*s seeds by Asma et al., 2012 who found that in water extract it had (26.02%) and in methanol extract (47.91%). Ethanolic extract had higher B-carotene degradation than water extract.

Phenols and polyphenols, existing ubiquitously in nature, are commonly used as food additives and folk medicine in many countries. Interest in phenols and polyphenols has increased because many of them exhibit a broad spectrum of biological activities including anti-inflammatory, antiviral and antibacterial, as well as anticancer effects (Rajesh et al., 2003). These activities are associated, to a great extent, to their antioxidant properties, though different mechanisms may be involved. Phenols are important components of plants. They were reported to eliminate radicals due to their hydroxyl group (Hatano et al.,1989), and the hydroxyl group of phenols was contributed directly to antioxidant effect of the system (Duh et al.,1999). Polyphenolic compounds have an important role in stabilizing lipid oxidation and are associated with antioxidant activity (Yen et al., 1993; Gulicin, et al., 2003). It is suggested that polyphenolic compounds have inhibitory effects on mutagenesis and carcinogenesis in humans, when up to 1.0g is ingested daily from a diet rich in fruits and vegetables (Tanaka, et al.,1998). Phenolic compounds have antioxidant properties because of their ability to scavenge free radicals and active oxygen species such as singlet oxygen, free radicals, and hydroxyl radicals (Hall and

Cuppett, 1997). The results obtained in our study that all selected plants contain total phenolic compounds concentration but in different ratios and in ethanolic extracts more than in water extracts except for *Phoenix dactylifera* there is nearly no difference. *Citrus limon* had the highest total phenolic compounds concentration in both extracts. These results were compatible with others obtained from a study of lemon peels kinetics and antioxidant capacity (Diankov et al., 2011) who found that water extracts contain approximately four times less polyphenols than ethanolic extracts. This mean ethanolic extracts revealed total polyphenols content higher than water extracts. Another study in Jordan revealed that *Aum palaestinum* and *Matricaria aurea* were had total phenolic compounds concentration in ethanolic extract higher than water extract (Al-mustafa and Al-Thunibat, 2008). Several studies have reported the activity of *Phoenix dactylifera* fruits from Algeria, (Mansouri et al., 2005), Oman (Al-Farsi et al., 2005). There is a study by (Ebtesam, et al., 2011) about total phenols in three kinds of dates namely Khalas, Sukkari, and Ajwa. These studies reported that palm date fruit *Phoenix dactylifera* might be a good source of flavonoid and polyphenolic compounds which are active components of antioxidant activity (Sawaya et al., 1983). Also, It was found that palm date *Phoenix dactylifera* has a potent ability to suppress free radicals using different methods (Al-Farsi, et al., 2005).Their antioxidant shows that the concentration of total polyphenols depends on date variety and extraction solvent. Total polyphenols in Ajaw water extract was the highest compared to sukkari and khalas extracts. However, polyphenols in the water extract

was higher compared to the alcohol extract . There is correlation between the antioxidant capacity and phenolic contents due to difference of the method used in preparing the sample, Moreover, soil and climatic differences could have affect polyphenols content in dates (Sawaya et al., 1983). The concentration of total polyphenols were determined by Folin-ciocaltue method, could be affected by protein, ascorbic acid and reducing sugars especially fructose (Scalbert and Williamson, 2000; Gheldof and Engeseth, 2002). Therefore, It was found also that the dark variety of date (Ajwa) had the highest concentration of polyphenols, whereas the light variety (Khalas) contained the lowest concentration (Scalbert and Williamson, 2000). The antioxidant activity of *Nigella ciliar*is was studied in polyphenolic profile and antioxidant activities of nigella seeds extracts in vitro and in vivo (Meziti et al., 2012). It had total Phenolic concentration in water extract less than in methanol extract.

In contrast to phenols, the total flavonoid compound concentration was measured by quercetin calibration curve. Like phenol compounds, the contribution of flavonoids to antioxidant activity is known. It has been reported that 118-biapigenin and hypericine which have the structure of biflavonoid have a very high antioxidan effect. This effect was proposed to stem from hydroxyl groups in the structure of the flavonoids (Cakir et al., 2003).

The efficiency of those as antioxidants may be attributed to the presence of many different chemical compounds such as phenolics and flavonoids. The total phenolic amounts were calculated using pyrocatechol equivalent and

total flavonoids were calculated using quercetin equivalent. The presence of phenolic antioxidant can hinder the extent of b-carotene degradation by neutralizing the linoleate free radical and any other free radicals formed within the system. Hence, this forms the basis by which plants extracts can be screened for their antioxidant potential. In our study the selected plants contain total flavonoid concentrations in ethanolic extract was higher than water extracts. *Citrus limon* had the highest total flavonoid concentrations in both extracts and in ethanolic extract more than in water. These results were compatible with a study of Extraction on natural antioxidants from lemon peels kinetics and antioxidant capacity (Diankov, et al., 2011) who found *Citrus limon* rich in flavonoid concentrations and in ethanolic extracts more than in water extracts. Flavanoids have prevention role in cancer therapy via the effect on signal transduction in cell proliferation (Azevedo et al., 1996; Fotis et al., 1997). It has also been reported that antioxidant can inhibit proliferation of cancer cells (Rebecca et al., 1998). There is another study revealed that *Nigella ciliaris* had total flavonoid concentrations in water extract less than in methanol extracts (Meziti, et al., 2012).

Plants that contain essential oil, flavanoids and polyphenols are reported to have many biological properties; they possess powerful antioxidative components (Burits & Bucar, 2000; Sheyilesh & Padikkala, 2000). The main compound of *Nigella ciliari*s oil is 85% fatty acid, which can inhibit the membrane lipid peroxidation (Houghton et al., 1995). In our study *Nigella ciliari*s the second contain phenolic compoubnds concentration

(5.94µg/ml), (4.65µg/ml) in ethanolic and water extracts respectively and the third in total flavonoid concentrations (1676.5µg/ml), (666.7µg/ml) and it had IC50 (1.34µg/ml), (23.46µg/ml). *Nigella ciliari*s had antioxidant activity in ethanolic extracts more than water extracts. Studies on the effect of ethanol extract of *Nigella ciliari*s on tumor growth were studied. It was found that when 1g/kg body weight of extract was administrated orally and the cell proliferation was noted and compared with control group. The result found was that the viable tumor cell number was found significantly inhibited ($p < 0.001$) in treated groups. The percentage of dead tumor cells were also increased in the treated groups compared with the controls; especially more pronounced effects at 8th days (Daoud et al. 2004).

Changes in cell morphology, vacuolated cytoplasm, changes in staining intensity, cell membrane blebbing and smaller cell size) were also much reduced in treated mice when compared to control animals (Daoud et al. 2004)

The results from treated animals showed a decrease in viable cell count, an increase in the life span of Ehrlich ascites tumor (EAT) bearing mice and an increase in the glutathione peroxidation of heart tissue. The results of the present study suggest that the ethanol extract of *Nigella ciliaris* seeds can generate antioxidants, possess antitumor activity, and ameliorate and prolong the life span of mice bearing Ehrlich ascites tumor (EAT).

Usually the natural antioxidants don't cause allergic reactions, therefore they are suitable for formation of hypo allergic cosmetics. The main uses of citrus in food industries include fresh juice or citrus- based drinks Citrus

represent a rich source of natural flavonoid and high concentration of phenolic compounds. The use of lemon as source of natural antioxidant was studied by Spiegle-Roy, and Goldscmidt, 1996, who found that Citrus contain several flavonoid compounds (e.g. flavanoes, flavanone glycosides and polymethoxylated flavones) which are unique to citrus, and relatively rare in other plants (Manthey, and Gohmann, 2011). It is evident that lemon exhibit even higher total polyphenols content and total flavonoid concentrations. This makes lemon a promising and cheap source for natural antioxidant for food and cosmetic industries.

Extreme variations in antioxidant activity and total phenols were found between tested extracts. Total phenolic compounds concentration was contributed to the antioxidant activity of these plant extracts. The large variation in plant antioxidant activity may result from differences in total phenolic compounds concentration. Such observation agreed with several previous findings (Velioglu *et al*., 1998; Zheng and Wang, 2001; Sun *et al*., 2002; Cai *et al*., 2004). Moreover, Singleton and Rossi (1965) noticed that various phenolic compounds have different responses to Folin-Ciocalteau assay. The molar response of this method is roughly proportional to the number of phenolic hydroxyl groups in a given substrate, but the reducing capacity is enhanced when two phenolic hydroxyl groups are oriented in ortho or para-position. Since these structural features of phenolic compounds are responsible for antioxidant activity (Katalinic *et al*., 2006). Thus, polyphenols measurements in extracts may be related to their antioxidant activities.

Using DPPH some plants showed large difference in their antioxidant activity values, whereas others showed little differences. This may be due to variation in types of phenolic compounds, that differ significantly in their reactivity towards DPPH (Katalinic *et al*., 2006). Moreover, Campos and Lissi (1996) found a difference in reaction kinetics between phenols and DPPH over a similar range of concentrations. They established that the reactions of phenols with radical cation are usually different from compound to compound in DPPH assay.

Ethanol extracts were significantly higher in phenolic contents and antioxidant activity than aqueous extracts. However, it was found that ethanolic plant extracts are the most effective scavenger of DPPH radical (Miliauskasa *et al*., 2004; Lapornik *et al*. 2005) and higher values of total polyphenols and antioxidant activity of plant by-products ethanol extracts versus water extracts to the fact that ethanol is less polar solvents than water. Hence, it was suggested that methanol is more efficient solvent for cell walls and seeds degradation, that have unpolar character causing the release of polyphenols from cells. In other literature (Moure *et al*., 2001), the decaying of polyphenols in water extract was ascribed to high temperature, though in our work all samples were extracted at room temperature. Other explanation for such decrease is ascribed to the activity of polyphenol oxidase, which degrade polyphenols in water extracts, but neutralized in methanol medium (Zhang and Wang, 2001). In present study, the decrease in antioxidant activity among the aqueous extracts was in accordance with the amount of plant phenolic contents. This verifies that

the amount of phenolic compounds was responsible for their antioxidant activities. Therefore, the differences between antioxidant activities of ethanol and aqueous extracts might reflect differences in polyphenolic contents of these extracts.

Conclusion

In Palestine , CAM use in patients with cancer in Northern Palestine was previously unknown. Our study confirms that the prevalence of CAM use in patients with cancer tends to be common in females more than males and it is significantly associated by breast cancer and stage of treatment during chemotherapy but there is no association by age, marital status, demographic characteristics, place of residence or level of education. Herbs and animal products were the most common forms of CAM. A majority of the patients who used CAM did no discuss or inform to their doctors, primarily because the doctors did not believe about CAM, or feared to tell them to stop it.

The main five plants used by cancer patients and tested for antioxidant activity were *Citrus limon*, *Nigella ciliari*s, *Matricaria aurea*, *Phoenix dactylifera* and *Arum palaestinum*, *Citrus limon* had the highest concentration of total phenolic compounds and total flavonoid concentrations of water and ethanolic extracts. *Nigella ciliaris* the second in total phenolic compounds and the third in flavonoid concentration so it is an effecient as antioxidant and also, *Phoenix dactylifera* good source of total flavonoid concentrations and total phenolic compounds concentration. *Arum palaestinum* and *Matricaria aurea* also revealed antioxidant activities but in low ratios compared with other plants tested. All the selected plants can be used as natural antioxidants and *Nigella ciliari*s had antitumor activity. The present study indicated that the use of these plants

in Palestine either in traditional medicine or as edible plants is justified since they are promising sources of natural antioxidants.

Recommendations

The trend of increasing CAM use by cancer patients should be recognized as a public call to health policymakers to demand higher academic standard in teaching, training, qualifying and licensing of CAM caregivers, to enable integrative medicine to incorporated in oncology as it is in other medicinal disciplines.

A predicting module of CAM user patients was built that may help physicians to initiate conservations with their patients on CAM use.

Expanding physicians knowledge on CAM methods will encourage them to provide additional advice, promote the use of beneficial therapies, and inform patients about potentially harmful methods.

Doing more scientific laboratory researches for antioxidant activities and antitumor activities for these plants in order to prepare natural medicines that contain antioxidant and antitumor activities for cancer patients that relief or reduce chemical treatment.

References

1) Afifi FU, Wazaify M, Jabr M, Treish E (2010) **The use of herbal preparations as complementary and alternative medicine (CAM) in a sample of patients with cancer in Jordan**. ***Department of pharmaceutical Science. Faculty of pharmacy***. The University of Jordan Queen Rania Al-Abdallah street. Amman 11942.Jordan.

2) Akhu-Zaheya L.M, Alkasawneh EM. (2012**). Use of CAM among sample of cancer patients in Jordan. Adult Health Department**. ***Jordan University of Science and Technology***, Irbid 22110, Jordan.

3) Alaa Darweesh (2009). **Risk factors of breast cancer among Palestinian women in North West Bank. Public health Department**. ***Faculty of Graduate Studies An-najah National University***.

4) Al-Farsi M., C. Alasalvar, A. Morris, M. Baron and F. Shahidi (2005). **"Comparison of Antioxidant Activity, Antho-cyanins, Carotenoids, and Phenolics of Three Native Fresh and Sun-Dried Date (*Phoenix dactylifera* L.) Varie-ties Grown in Oman**," ***Journal of Agriculture and Food Chemistry***, Vol. 53, No. 11, pp. 7592-7599. doi:10.1021/jf050579q.

5) Ali-Shtayeh, M.S., Jamous, Rana M. (2008). **Traditional Arabic Palestinian Herbal Medicine, TAPHM**. ***Til, Nablus, Palestine, Biodiversity and Environmental Research Center, BERC.***

6) Ali-Shtayeh, M. S., Yaniv, Z., & Mahajna, J. (2000). **Ethnobotanical survey in the Palestinian area**: **A classification of the healing**

potential of medicinal plants. ***Journal of Ethnopharmacology*** 73:221-232.

7) Ali-Shtayeh, M. S., & Jamous, Rana M. (2006**). Ethnobotany of Palestinian herbal medicine in the northern West Bank and Gaza Strip: review and comprehensive field study**. ***Biodiversity and Environmental Sciences Studies Series*** 4: 1-122.

8) Al-Mustafa Ahmed H. and Osama Y. Al-Thunibat, 2008. **Antioxidants activity of some Jordanian plants used traditionaly for treatment of diabetes**. ***Pakistan Journal of biological Sciences*** 1;11(3)351-8 .

9) Aqil F , Ahmed I. , Mehmood Z (2006). **Antioxidant and free radical scavenging properties of twelve traditionally used Indian medicinal plants** . ***Turk J Biol*** 30; 177-183.

10) Arzu Tuna Malak1, gül Karayurt2, Emel Demir1, Aylin Sami Yümer1(2009).**Complementary and Alternative Medicine in Cancer Patients Analysis of Influencing Factors in Turkey.** ***Asian pacific Journal of cancer prevention*** 10(6);1083-7

11) Azaz-Livshits, T., Muszkat, M., Levy, M., (2002). **Use of complementary and alternative medicine in patients admitted to internal medicine wards**. ***International Journal of Clinical Pharmacology & Therapeutics*** 40 (12), 539–547.

12) Azevedo DE, W. F., Dieckmann, H. J. M., Gahmen, U. S., Worland, P. J., Sausville, E. and KIM, S. H.(1996). **Structural basis for apecifity of flavanoid inhibitor of human CDK2, a cell cycle kinase**. ***Peoc. Natl. Acad. Sci***. USA93:2735-2740.

13) Ben-Arye E, Bar-Sela G, Frenkel M, Kuten A, Hermoni D (2006). **Is a bio-psycho-social-spiritual approach relevant to cancer treatment? A study of patients and oncology staff members on issues of complementary medicine and spirituality**. ***Supportive Care in Cancer*** 14(2):147-152.

14) Bernstein B. J., Grasso T(2001). **Prevalence of complementary and alternative medicine use in cancer patients**. ***Oncology (Williston Park)***;15:1267-72.

15) Brand-William W., M. E. Cuvelier, C. Bereset (1995). **Use of a free radical method to evaluate antioxidan activity**, ***Food, Technol***., 22, 25-30.

16) Burits M., Bucar F. (2000). **Antioxidant activity of Nigella sativa essential oil**. ***Phytother. Res***., 14, 323–328.

17) Cai, Y., Q. Luo, M. Sun and H. Cork, (2004). **Antioxidant activity and phenolic compounds of 112 traditional Chinese medicinal plants associated with anticancer**. ***Life sci***.,74: 2157-2184.

18) Cakir A, mavi, Yidirnim A, Duru ME, Harmandar M, azaz C (2003). **Isolation and characterizaeion of antioxidant phenolic compounds from aerial parts of Hypericum hyssopifolium L. by activity guided fractionation. J. Ethnopharmacol. Jul 83(1);73-83.**

19) **Campos**, ***A.M. and E.A. Lissi***,(1996). Kinetics of the reaction between 2,2-azinobis (3.ethylbenzothiazoline)-6-sulfonic acid (ABTS) derived radical cation and phenols. Int. J. Chem. Kinetics, 29: 219-224.

20) Daoud Musa1*, Nihat Dilsiz1, Hatice Gumushan1, Gulruh Ulakoglu2 & Muharrem . 2004 Bitiren3 . Antitumor activity of an ethanol extract of Nigella sativa seeds Biologia, Bratislava. 59/6;735-740..

21) Devasagayam TPA, Tilak JC, Boloor KK et al., (2004). **Review: free radical and antioxidants in human health**. ***Cur Stat Fut Pros JAPI*** 53:794-804.

22) Diankov S., M. karsheva, L. Hinkov (2001), **Extraction of natural Antioxidants from lemon peels**. ***Kinetics and antioxidant capacity***. Journal of the University of Chemical Technology and Metallurgy, 46,3 ,315-3219.

23) DiGianni, L. M. E.,Winer, E. P.(2002).**Complementary and alternative medicine use among women with breast cancer**.***J Clin Oncol*** 20: 34S-38S.

24) Duh PD (1998): **Anioxidant activity of burdock (*Arctium Iapa Linne*)**:its scavenging effect on free radical and active oxygen .***J Am Oil Chem Soc*** 75:455-465 .

25) Duh PD, Tu YY, Yen GC (1999). **Antioxidant activity of water extrac of ham jyir Chyrsanthemum morifolium Ramat)** ***Lebensmittel-Wissenschaft und Technologie*** 32: 269-277.

26) Ebtesam Abdullah Saleh, Manal Said Tawfk Hamza Mohammed Abu-Taeboush (2011). **Phenolic contents and antioxidant activity of various date palm (phoenix dactylifera L.)**. ***Fruits, from Saudi Arabia***. Food and Nutrition Sciences 2,1134-1141.

27) Edzard Ernst, MD, ph D, FME d Sci, FSB, FRCP (Edin). Aug (2010). **Patient information**: ***Complementary and Alternative Medicine treatments (CAM) for cancer*** Beyond the Basics). Oncology palliative Care clinical Instruction of Medicine Harvard Medicine School.

28) Emmanuel R Ezeome and Agenes N Anarado. (2007) . **Use of complementary and alternative medicine by cancer patients at the University of Nigeria Teaching Hospital** , ***Enugu , Nigeria***. BMC Complementary and Alternative Medicine 7;28.

29) Fan G.-J., B. H. Han, Y.-H. Kang, and M. K. Park (2001). **"Evaluation of inhibitory potentials of chinese medicinal plants on platelet-activating factor (PAF) receptor binding," Natural Product Sciences, vol**. 7, no. 2, pp. 33–37.

30) Fotis, T., Pepper, M.S., Aktas, E., Breut, S., Rasku, S., Adlercreutz, H., Wahala, K., Montesano, E. and Schweigerer, L. (1997). Flavanoids dietaey-deriverd cancer Res, 57: 2916-2921.

31) Frankel E. N. (1998). **Hydroperoxide formation**. In Lipid oxidation. Dundee:***The Oily Press***. (23-41)

32) Gheldof N. and N. J. Engeseth (2002). **"Antioxidant Capacity of Honeys from Various Floral Sources Based on the De-termination of Oxygen Radical Absorbance Capacity and Inhibition of *in Vitro* Lipoprotein Oxidation in Human Serum Samples,"** ***Journal of Agriculture and Food Che- mistry,*** Vol. 50, No. 10, pp. 3050-3055.

33) Gulcin I, buyukokuroglu ME, Oktay M, Kufrevioolu OI (2003) **Antioxidant and analgesic activities of turpentine of Pinus nigra Arn**. ***Subsp. Pallsiana (Lamb.) Holmboe. J. Ethnophar.*** 86: 1-58.

34) Hana, G. Bar-Sela G. Zhana, D. Mashiach, T. Robinson, E., (2005). **The use of complementary and alternative therapies by cancer patients in Northern of Israel**. Isr Med Assoc J. Apr, 6(4);248-7.

35) Hall CA, Cuppett SL (1997): **Structure-activities of natural antioxidant**s. In: Antioxidant Methodology: Pn Vivo and In Vitro Concepts (Auroma OI, Cuppett SL, eds.) ***AOCS Press***, Champaign, IL, pp. 141-170.

36) Hatann I, Edamatsu R, Mori A, Fujita Y, Yasuhara E (1989). **Effect of interaction of tannins with co-existing substances**. VI. Effects of tannins and related polyphenols on superoxide anion eadical and on DPPH eadical. ***Chemical and pharma. Bull***. 7: 016-2021.

37) Houghton, P. J., Zarka, R., Delas Heras & Hoult, J. R. (1995). **Fixed oil of Nigella sativa and derived thymoquinone inhibit eicosanoid generation in leukocytes and membrane lipit peroxidation.** ***Planta Med***. 61: 33–36.

38) Halliwell B. (2007). **"Dietary polyphenols: good, bad, or indifferent for your health?"** ***Cardiovascular Research***, vol. 73, no. 2, pp. 341–347.

39) Halliwell B, Gutteridge JMC (1984). **Lipid Peroxidation, Oxygen Radicals,Cell Damage,and Antioxidant Therapy**. ***Tle Lancet***.323 (8391):1396-1397.

40) Halliwell B (1991). **Active oxygen species in living systems**: ***source, biochemistry, and role in human disease***, Am J Med 91(Suppl 3C):14-22 .

41) Katalinic, V., M. Milos, T. Kulisic and M. Jukic,(2006). **Screening of 70 medicinal plant extracts for antioxidant capacity and phenols**. ***Food Chem***., 94: 550-557.

42) Lapornik, B., M. Prosek and G. A. Wondra, (2005). **Comparison of extracts prepared from plant by-products using different solvents and extraction time *J. Food Eng***., 71: 214-222.

43) Lillian Barros, Paula Baptista, Isabel C.F.R. Ferreira (2007). **Effect of Lactarius piperatus fruiting body maturity stage on antioxidant activity measured by several biochemical assays**. ***Food and chemical Toxicology*** 45(2007) 1731-1737.

44) Lu Foo LY (1995). **Phenolic antioxidant component of evening primrose** . In Nutrition,Lipids , Health and Disease (Ong ASH,Niki E, Packer L, eds.). ***American Oil Chemists Society Press***, Chapaign, IL,pp, 86-95 .

45) Mansouri A., G. Embarek, E. Kokkalou and P. Kefalas, (2005) **"Phenolic Profile and Antioxidant Activity of the Alge-rian Ripe Date Palm Fruit** (*Phoenix dactylifera*),",***Food Chemistry***, Vol. 89, No. 3, pp. 411-420.

46) Manthey J. A., K., Grohamnn (2011). **Phenols in citrus peel by products**: concentration of hydroxycinnamates and polymethoxylated flavones in citrus peel molsses, ***J. Agric. Food chem***. 49, 7, 3268-73.

47) Matthews, Alicia K., Sellergren, Sarah A., Huo, Dezheng, List, Marcy, & Fleming, Gini (2007). **Complementary and alternative medicine use among breast cancer survivors**. ***The Journal of Alternative and Complementary Medicine*** 13: 555-562.

48) Mau JL, Lin HC. Song SF (2002). **Antioxidant properties of several specialty ,mushrooms** .***Food Research Intern***.35;519-526.

49) Meziti Asma, Hicham Meziti, Kaouther Boudiaf, Benbubelra Mustapha Hemama Bouriche, (2012). **Polyphenolic profile and antioxidant activities of Nigella Sativa seeds extracts in vitro and in vivo**. ***World Acadamy of Science, Engineering and Technology*** 64.

50) Miliauskasa G. Ven skutonisa PR. Beekb van TA. (2004). **Screening of radical scavenging activity of some medical and aromatic plant extracts**. ***Food chem***.. 85: 231-237.

51) Miller H. E. (1971***). A simplified method for the evaluation of antioxidants, J. Am. Oil Chem. Soc***. ,48 , 92-97

52) Moure A., J. M. Crnz, D. Franco, J. Mannel Dominguez, J. C. Parajo, (2001) **Natural antioxidants from residual sources,** ***Food chem***., 72, 2, 145-171.

53) Namiki M.(1990). **"Antioxidants/antimutagens in food,"** ***Critical Reviews in Food Science and Nutrition***, vol. 29, no. 4, pp. 273–300.

54) Niveen M.E., Abdullatif H, et al. (2008**). Mortality Patterns in the West Bank, Palestinian Territories**, 1999-2003. ***Prev Chronic Dis***,(4)55-39.

55) Nooman A. Khalaf, Asshok K Shakya , Atif AL-Othman , Zaha EL-Agbar, Husni Farah (2007). **Antioxidant Activity of Some Common Plants**. Tutk. J. Biol 32;51-55.

56) Ozen T, Kinaliogu K (2008). **Determination of antioxidant activity of various extracts of Parmelia saxatitis ,** ***Biologia (section Botany)***63: 1-6.

57) Paltile, O., Avitzur, M., Peretz., T., et al. (2001). **Determinants of the use of complementary therapies by patients with cancer**.***J Clin Oncol*** 19:2439-48.

58) Park YK, Koo MH, IK egaki M, contado JL (1997). **Comparison of the flavonoid aglycons contents of APis mellifera propelis from various regions of Brazil**. ***A quiras de Biologiae technoc***. 40 (1): 97-106.

59) Pud, D., Kaner, E., Morag, A., Ben-Ami, S., & Yaffe, A. (2005). **Use of complementary and alternative medicine among cancer patients in Israel**. ***European Journal of Oncology Nursing*** 9, 124–130.

60) Rajesh D, Stenzel R, Howard S (2003). **Perillyl alcohol as a radio-/chemosensitizer in malignant glioma**. ***J Biol Chem*** 278: 35968-78.

61) Raveh, R. (1997). **The influence of uncertainty on referral to complementary medicine among cancer patients**. ***Oncol Nurs*** 1:18 21.

62) Rebecca, C., Daniel, B., YU, S., Susan, C. K., Robert, J. C. & Jason, D. M.(1998).**Antioxidants reduce cyclooxygenase-2 expression, prostaglandine production and proliferation in colorectal cells**. ***Cancer Res.*** 58: 2323–2327.

63) Rees, R. W., Feigel, I., Vickers, A., Zollman, C., McGurk, R., & Smith, C. (2000). **Prevalence of complementary therapy use by women**

with breast cancer. ***A population-based survey. Eur J Cancer*** 36: 1359-1364.

64) Richardson M. A., Sanders T., Palmer J. L., Greisinger A, Singletary S. E. **Complementary/alternative medicine use in a comprehensive cancer center and the implications for oncology**. ***J Clin Oncol*** 2000;18:2505-14.

65) Richardson, M. A. (1999) **T., Reesearch of comlementary and alternative medicine therapies in oncology: promising but challenging**. ***J Clin Oncol*** 17:2505-14.

66) Rios A. D. O., L. M. G. Antunes, and M. D. L. P. Bianchi (2009), **"Bixin and lycopene modulation of free radical generation induced by cisplatin-DNA interaction**," ***Food Chemistry***, vol. 113, no. 4, pp. 1113–1118.

67) Sawaya W. N., W. M. Safi, L. T. Black, A. S. Mashadi and M. M. Al-Muhammad (1983). **"Physical and Chemical Char-acterization of the Major Date Varieties Grown in Saudi Arabia II. Sugars, Tannins, Vitamins A and C," *Date Palm Journal***, Vol. 2, No. 2, pp. 183-196.

68) Scalbert A. and Williamson G (2000). **Ditery Intake and Bioavailability of polyphenols** . ***Journal of nutrition*** Vol. 130, No. 8, pp, 2073S-2085S.

69) Schernhammer, E. S., Haidinger, G., Waldho, T., & Vutuc, C. (2009). **Attitudes About the Use of Complementary and Alternative**

Medicine in Cancer Treatment. ***The Journal of Alternative and Complementary Medicine*** 15: 1115–1120.

70) Shen, Yue, Michael A. Strauss, Nicholas P. Ross, Psotrick B. Hall, Yen- Ting Lin, Gordon T. Richard, Donald P. Schneider, David H. Weinterg, Andrew J. Connolly, Xiaohui Fan, Joseph F. Hennawi, Francesco Shankar, Daniel E. Vanden Berk, Neta A. Bahcall and Robert J. Brunner(2009). **Quasar Clustering from SDSS DR5: Dependence of physical properities. PrinctonUniversity Observatory**, ***Princeton, NJ*** 08544, USA APJ, 697, 1656,

71) Sheyiesh, B.S., and Padikkala, J. (2000). **In vitro cytotoxic and antitumor property of Emi;ia sonchifolia (L.) DC in mice**. **J. Ethnopharmacol**.73:495-500.

72) Singleton V. L., J. A. Rossi (1965). **Colormetry of total phenolics with phosphomolibdic-phosphotungstic acid reagent**, A**. *j. Ecology Viticulture***, 16, 144-158.

73) Slinkard K, Singleton VL (1977). **Total phenol analyses: automation and comparison with manual methods**. ***American J. Enolo. Viticul***. 28: 49-55.

74) Sparber, A., & Wootton J. C. (2000). **Surveys of complementary and alternative medicine: part II**. Use of alternative and complementary cancer therapies. ***J Alternative Complement med*** 2000, 7:281-287.

75) Spiegel-roy P., E. E. Goldschmidt (1996). **Biology of Citrus**, ***Cambridge University press, Uk***, 13, 32-33, 39-43, 88-93, 108-109.

76) Sun, J., Y.F. Chu, X. Wu and R.H. Liu, (2002). **Antioxidant and antiproliferative activities of common fruits**. ***J. Agric. Food Chem***., 50: 7449-7454.

77) Tanaka M, Kuei CW, Nagashima Y, Taguchi T (1998). **Application of antioxidative maillard reaction products from histidine and glucose to sardine products**. ***Nippon Suisan Gakkaishil***, 54: 1409-1414.

78) The American Cancer Society (2000). **Guide to complementary and alternative cancer methods (Chapter 2)**. In: K. Bruss, Ed. ***Description of complementary and alternative methods***. USA, ix:3-7.

79) Tarhan O, Alacacioglu A, Somali I, Sipahi H, Zencir M, Oztop I, Dirioz M, Yilmaz U (2009). **Complementary-alternative medicine among cancer patients in the western region of Turkey**. ***J BUON 14***(2):265-269

80) Turkoglu A , Kivracan N , Durumme , Gezer K and Turkogluh (2006) . **Antioxidant and antimicrobial activities of Morchella conica Pers** . ***African journal of biotechnology*** Vol.5 (11), pp.1146-1150 ,2 June.

81) Vaidya D. B., Devasagayam P. A., (2007). **Current status of herbal drugs India**: **An overview, *J. Clin. Biochem. Nutr***. , 41, 1–11.

82) Velioglu, Y.S., G. Mazza, L. Gao and B.D. Oomah, (1998). **Antioxidant activity and total phenolics in selected fruits, vegetables and grain products**. ***J. Agric. Food Chem***., 46: 4113-4117.

83) Wade, C., Chao, M, Kronenberg, F., et al. (2008). **Medical pluralism among American women**: **Results of a national survey**. ***J Women Health*** 17:829–840.

84) Wootton JC, Sparber A. (2001). **Surveys of complementary and alternative medicine: part I**. General trends and demographic groups. ***J Altern Complement Med*** 7:195-208.

85) Yagi K (1997): **Lipid peroxides and human disease**. ***Chem PhysLipids*** 45:337-341.

86) Yildirim YK, Fadiloğlu C, Uyar M (2006) Complementary therapies in palliative cancer care. Agri 18(1):26-32. Whelan DM, SL, Ferlay J, eds . (2002) . **International Agency for Research on Cancer (WHO)**. In . Parkin . Cancer Incidence in Five Continents, vol. 155. Lyon , France: ***IARC Scientific Publications*** , 2002 .

87) Yen GC, Duh PD, Tsai CL (1993**). Relationship between antioxidant activity and maturity of peanut hulls. *J. Agricul. Food Chem***. 41: 67-70.

88) Zheng, W. and Wang, 2001. **Antioxidant activity and phenolic compounds in delected herbs**, ***J. Agric. Food Chem***., 49:5165-5170.

جامعة النجاح الوطنية

كلية الدراسات العليا

استخدام الطب المكمل والبديل لدى مرضى السرطان في شمال الضفة الغربية _ فلسطين

إعداد

آمنه "محمد عادل" صدقي حماده

إشراف

أ.د محمد سليم علي اشتيه

قدمت هذه الأطروحة استكمالا لمتطلبات درجة الماجستير في العلوم الحياتية، كلية الدراسات العليا، جامعه النجاح الوطنية، نابلس- فلسطين

2012

استخدام الطب المكمل أو البديل ،CAM، لدى مرضى السرطان في شمال الضفة الغربية- فلسطين

إعداد

آمنه "محمد عادل" صدقي حمادة

إشراف

أ.د محمد سليم علي اشتيه

ملخص

الدراسات السابقة: إن استخدام الطب المكمل والبديل (CAM) لدى مرضى السرطان هو أمر شائع جدا ويتفاوت استخدامه ما بين الشعوب في العالم. وارتفعت نسبة استخدامه بين الناس خلال العقد الماضي في جميع أنحاء العالم. وقد أجريت هذه الدراسة لمعرفة وتحديد مدى انتشار، ونمط الاستعمال، والعوامل المؤثرة على استخدام للطب المكمل والبديل(CAM) لدى مرضى السرطان في شمال الضفة الغربية.

الأهداف: إن الأهداف هي لتقييم مدى استخدام الطب المكمل والبديل (CAM) بين مرضى السرطان في شمال الضفة الغربية، فلسطين واخذ أكثر خمس نباتات استخداما لدى مرضى السرطان واختبارها من حيث النشاط المضاد للأكسدة لها لمعرفة ما إذا كانت هذه النباتات تصلح لعلاج السرطان إما بمنع انتشاره أو تقليل عدد الخلايا السرطانية أو قتلها كما يقول المرضى.

الطرق المستخدمة: هذه دراسة مقطعية تشريحية تنطوي على الاستخدام المباشر للاستبيان ومقابلة جميع مرضى السرطان في قسم الأورام، في المستشفى الوطني، نابلس، خلال الفترة الزمنية، من كانون الأول 2010حتى حزيران2011. وسيتم اختبار خمسة من أكثر النباتات استخداما بالنسبة لفعاليتها كمضادات للأكسدة وذلك عن طريق تحديد تركيز المركبات الفينولية الكلية Total phenolic compounds concentration) وتحديد تراكيز الفلافونويد Total) flavonoid Concentration)، واستخدام 1,1 ثنائي فينيل-2-1بيكريل هيدرازايل(DPPH)، و B-كاروتين-حامض اللينولييك(B-Carotene-Linoleic acid assay).

النتائج: أجريت مقابلات مع (300) من المرضى الذين يعانون من السرطان 65 (21.67%) من الذكور و 235 (78.33%) من الإناث تتراوح أعمارهم من عام إلى 85عام. ويعتبر سرطان الثدي 81 (27%)، والقولون 29 (9.67%)، والكبد والجلد 16 (5.33%) هي الأكثر انتشارا بين المرضى. وقد استخدم 165 (55%) من المرضى الطب المكمل والبديل في وقت ما خلال مرضهم الحالي بالسرطان و135 (45%) من المرضى لم يستخدموا قط أي نوع منه. وكانت الإناث الأكثر استخداما من الذكور. لا يتأثر استخدام الطب المكمل والبديل بمستوى التعليم، الحالة الاجتماعية، الديانة، ومكان الولادة والسكن ولكنه مرتبط أكثر بسرطان الثدي ومرحلة العلاج الكيماوي. وأكثر الأنواع المستخدمة من قبل المرضى هي، الأعشاب 153(92.73%), المنتجات الحيوانية 132 (44%) وخاصة العسل 98 (32.67)، الصلاة وقراءة القرآن 10 (3.33%)، معالجة بالزيوت الاثيريه 6 (2%) والعلاج الشعبي التقليدي 5 (1.67%). إن معظم المرضى118 (39.33%) حصلوا على الفوائد المرجوة من استخدامهم للطب المكمل والبديل و 38 (12.67%) لم يحصلوا على أي فائدة.وغالبيتهم 104 (34.67%) لم يناقشوا استخدامهم للطب المكمل والبديل مع أطبائهم، في الغالب لاعتقادهم إن الأطباء لا يصدقوا ولا يؤمنوا في الطب المكمل والبديل في العلاج وخوفا من منعهم من الاستخدام. وكان الأصدقاء 90 (30%) وأفراد الأسرة 89 (29.67%) هم الأكثر نصحا وتشجيعا للاستخدام . ومعظم المستخدمون له ذكروا أنهم يستخدمونه لاعتقادهم أنه يدعم جهاز المناعة ويقويه، ويعالج المرض، ويبطئ تقدم المرض ويخفف الأعراض ويقلل الآثار الجانبية للدواء. وجد إن أكثر النباتات الخمس المستخدمة من قبل مرضى السرطان هي اللوف .(lufe) (*Arum.palastinum*)، و*Nigella ciliaris* ، التي تعرف بالبذور السوداء أو حبة البركة أو القزحه، و*phoenix dactylifera* التمر، *Marticaria aurea* البابونج ، والليمون*Citrus Limon*. تم اختبارها من قبل الأنشطة المضادة للاكسده باستخدام تراكيز مختلفة من المستخلصات الكحولية والمائيه للنباتات المختارة (250µg/ml)، (500µg/ml)، (1000µg/ml) ، و(2500µg/ml) واستخدام تراكيز مختلفة من(DPPH) 1-1 ثنائي الفينيل- 2-1 بيكريل هيدرازيل DPPH (0.004µg/ml) ، (µg /ml 0.008) ، (0/012µg/ml) (0.016µg/ml) الذي استخدم لكبح وتثبيط الجزيئات الحرة

وحسبت باستخدامIC50 ومقارنتها مع المركب الصناعي ألفا توكوفيرول الذي يمتلك نسبة تثبيط 100% وكانت النتيجة كلما زاد التركيز للمستخلص زادت نسبة الكبح أو التثبيط وفي المستخلصات الكحولية(inhibition %) أعلى من المستخلصات المائية في كافة الاختبارات والعكس صحيح بزيادة تركيز1-1 ثنائي الفينيل-2-1 بيكريل هيدرازيل DPPH وكان التمر الأعلى تثبيط للجزيئات الحرة بينما الليمون كان الاعلى في تركيز الفلافونويد Total flavonoid (concentrations) وتحديد تراكيز المركبات الفينوليه في المستخلصات الكحولية والمائية وباقي النباتات تحتوي على نسب مختلفة ولكن اقلها اللوف ولكن البابونج الأعلى في تحطيم ألبيتا كاروتين .

الاستنتاجات:

إن دراستنا تؤكد انتشار واستخدام الطب المكمل والبديل CAM لدى المرضى الذين يعانون من السرطان في شمال الضفة، فلسطين وجدنا إن استخدامه مرتبط بشكل كبير مع سرطان الثدي ومرحلة العلاج الكيميائي واستخدامه أكثر شيوعا بين الإناث من الذكور. وإن معظم المرضى الذين استخدموا الطب المكمل أو البديل حصلوا على الفائدة المرجوة والتي يبغونها. إن الغالبية العظمى من المرضى لم يناقشوا استخدامهم للطب المكمل والبديل مع الأطباء وذلك لأن الأطباء لا يؤمنوا به في العلاج.وكان الأصدقاء وأفراد العائلة هم الأكثر نصحا وتشجيعا للمرضى لكي يستخدموا الطب المكمل والبديل. وكان معظم المستخدمين له ذكروا أنهم يستخدمونه لاعتقادهم أنه يدعم جهاز المناعة ويقويه، ويعالج المرض، ويبطئ تقدم المرض ويخفف الأعراض الجانبية للعلاج والدواء. إن أكثر النباتات استخداما لدى المرضى هي التمر، القزحه ، البابونج، الليمون، واللوف. وهذه النباتات اختبرت فعاليتها كمضادة للاكسده باستخدام 1-1 ثنائي الفينيل-2-1 بيكريل هيدرازيل (DPPH) و بيتا-كاروتين،وتحديد تراكيز الفلافونويد، وتحديد التركيز الكلي للمركبات الفينوليه. ثبت إن التمر والليمون والبابونج والقزحه هي الأعلى فعاليه كمضادة للاكسده بينما اللوف بأشكاله مجففا أو مغليا أو منقوعا بالماء هو الأقل فعاليه. وهذه النباتات لها ما يبرر استخدامها من قبل مرضى السرطان