An Economic Study of the Most Important Egyptian Exports of Medicinal and Aromatic Crops

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Introduction:

Increasing the value of agricultural imports comparing with agricultural exports are the main reason for increasing the deficit of agricultural trade balance by about 78.345 billion pounds in 2014, where the value of agricultural exports were about 36.711 billion pounds, while the value of agricultural imports reached about 115.06 billion pounds in 2014, the cover proportion of agricultural exports to Agricultural imports reached about 31.9% in 2014. This shows deficit of agricultural production for providing the growing needs of the population, increasing agricultural exports lead to reduce this deficit. The medicinal and aromatic plants are considered important crops where the production value to about 1.127 billion pounds representing about 0.4% of the value of agricultural production of about 282.4 billion pounds in 2014.

The Medicinal and Aromatic Plants are considered non-traditional agricultural crops, there are about 2,000 species, and it grows wild in the Nile Valley, the east desert, west and Sinai.More than 60 species, these plants are grown for medical and industrial purposes. medicinal and aromatic oils are considered of important industries, Egypt is characterized by a competitive advantage in the production and export of these products, whether raw material or derived oils, Egypt is the first ranked in the production of (a paste jasmine), reached about 57% from the total world production which about 14 tons per annual, while fourth ranked in the total medicinal and aromatic oils exports.

Interest has increased of cultivation of medicinal and aromatic plants, to get the essential oils, intervention in the synthesis of many industrial vehicles, alternative to chemical cosmetics, herbs, therapeutic, Flavors, natural preservatives in the food industry, the pharmaceutical industry (eye drops), paints, cosmetics in shampoos manufacturing industry , creams, hair oils, fragrances, chemical industries such as the manufacture of soap, air freshener, pesticides, rose water, orange blossom water, water mint, etc., and therapeutic qualities characteristic, the pharmaceutical industry, pharmaceuticals, and in the composition of spices and various spices.

Total cultivated medicinal and aromatic plants area are reached 61.3 thousand faddan in the average (2000-2014) representing about 0.8% of the total cultivated area, which amounting about 7.9 million faddanin 2014. The crops (coriander, cumin, fennel, anise, marjoram, caraway, Eshieh, mint , jasmine, hibiscus) of the most aromatic plants crops, representing the value of exports of those crops about 8.38%, 7.43%, 14.41%, 0.08%, 16.09%, 9.68%, 11.36%, 9.6%, 2.19%, 3.62% respectively

from the average of total medicinal and aromatic plants export , which reached about 113.1 million pounds during the average period (2000-2014).

Research problem:

Although the competitiveness of Egypt in the production and export of medicinal and aromatic plants, was cultivated area of these crops around 60.089 thousand Fadden in 2014, but the total of the most important medicinal and aromatic plants quantities are decreasing from about 21.21 thousand tons in 2000 to about 2.93 thousand tons in 2014, the export value of medicinal and aromatic these plants are has decreased, from about 55.24 million pounds in 2000, to about 41.75 million pounds in 2014, these calls results leads to study the economies of Egyptian exports of medicinal and aromatic plants , and trying to find foreign markets for those important export products.

Research objectives:

This study aimed at studying the exports of the most important medicinal and aromatic plants crops, i.e(coriander, basil, cumin, fennel, anise, marjoram, caraway, wormwood, mint, jasmine, hibiscus) through the study of the following sub-goals:

1- The uses of some medicinal and aromatic plants in the field of medicine and then extraction methods.

2- The present situation of production and exports for some medicinal and aromatic crops during the period (2000-2014).

3- Estimating the stability factor of the amount of Egyptian exports of the most important medicinal and aromatic plants.

4-Toexamine the Gini Coefficient - Hirschman using Geographical distribution of Egyptian exports to the most important medicinal and aromatic crops used in the field of pharmacy and medicine to the main importing countries during the period (2000-2014).

5- Forecasting the area, production, amount and the value of the most important Egyptian exports of medicinal and aromatic crops until 2020.

Methodology and data sources:

This study is based on estimating some descriptive measures which:analysis of time series, simple regression and annual rates of growth.

Stability of the amount of Egyptian exports of medicinal plants coefficient $\dfrac{|Y_t - \hat{Y}_t|}{\hat{Y}_t} \times 100$

Where

Y_t: Refers to quantity or value of Egyptian exports from medicinal and aromatic crops.

$\hat{Y}_t$: Refers to the amount or value estimated of Egyptian exports of medicinal and aromatic crops.

Where the instability coefficient isexpress for the comparative advantage and competitiveness of the country, if the parameter value equal to zero, this means that the stability of phenomenon, and the higher is indicates that the lack of consistency

and stability, it was found that the economic stability for the amount of Egyptian exports of medicinal and aromatic crops which about 8.7% in 2000, then increased to 75.5% in 2014, an increase about 66.8% representing about 768.5% from 2000, while showing that the economic stability of the value of Egyptian exports of medicinal and aromatic crops which about 4.4% in 2000, and then increased to about 9.9% in 2014, an increase about 5.5% representing approximately 124.4% in 2000. It is therefore concluded unsteadiness and instability for the quantity and the value of Egyptian exports of medicinal and aromatic cropsduring the period (2000-2014) - table (3).

As has been estimated Gini Coefficient - Hirschman, for calculating the degree of geographic concentration for the Egyptian exports of the most important studiedcrops to the main importing countries through the following equation:

$$Cjx = 100 * \sqrt{\Sigma \ (Xsj/ \ Xi)^2}$$

Where:

C_{JX} = Geographic concentration coefficient for the quantity of Egyptian exports of the most important of medicinal and aromatic crops.

X_{SJ} Quantity of Egyptian exports of the most important medicinal and aromatic crops which directed to the country j.

X_J = Total of Egyptian exports quantity of the most important medicinal and aromatic crops.

J = the country which issued the medicinal and aromatic cropsfromi to j.

It has been estimated the forecasting by using the Box-Jenkins models (ARIMA): It is a model based on extraction the average for the variable as a model for forecasting, but stationary the data both in terms of variation, or trend, then estimating residuals (random error) by using autoregression with moving average, as in the following equation:

$$Y_{it}=\beta_0+\beta_1 Y_{it-1}+ \beta_2 \ Y_{it-2}+\text{--------------}+ \beta_\rho Y_{it-\rho}+\varepsilon_i+ \theta_1\varepsilon_{it-1}+ \theta_2\varepsilon_{it-2}+\text{----}+ \theta \ \varepsilon_{it-q}$$

Autoregressive term(AR)   **Moving Average term (MA)**

The study depended on the secondary data published in journals, pamphlets issued by the Ministry of Agriculture and land reclamation, Central Agency for Public Mobilization and Statistics, Food and Agriculture Organization (FAO), and the Arab Organization for Agricultural Development, and the use of some research, studies relevant to the present study.

Extraction Technologies for Medicinal and Aromatic Plants [1]':

Medicinal plants are the richest bio resource of drugs for traditionalsystems of medicine, modern medicines, nutraceuticals, food supplements, folk medicines, pharmaceutical intermediates and chemical entities for synthetic drugs.
Aromatic plants are a source of fragrances, flavors, cosmeceuticals, health beverages and chemical terpenes.

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(1)- **Encyclopedia medicinal plants.**
   -Extraction-Technologies-for-Medicinal-and-Aromatic-Plants.

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The Extraction:

Is active portions of plant (and animal) tissues using selective solvents through standard procedures is called the separation of medicinally.Such extraction techniques separate the soluble plant metabolites and leave behind the insoluble cellular marc.

The products so obtained from plants are relatively complex mixtures of metabolites, in liquid or semisolid state or (after removing the solvent) in dry powder form, and are intended for oral or external use.

These include classes of preparations known as decoctions, infusions, fluid extracts, tinctures, pilular (semisolid) extracts or powdered extracts

These products all contain complex mixture of many medicinal plant metabolites such as alkaloids, glycosides, terpenoids, flavonoids and lignans.

The basic parameters influencing the quality of an extract:

1. Plant parts used as starting material.
2. The solvent used in extraction.
3. The extraction technology.
4. Adherence to G.M.Ps.

General Methods of Extraction of Medicinal Plants:

1. Maceration:

In this process, the whole or coarsely powdered crude drug is placed in a stoppered container with the solvent and allowed to stand at room temperature for a period of at least 3 days with frequent agitation until the soluble matter has dissolved. The mixture then is strained, the marc (the damp solid material) is pressed, and the combined liquids are clarified by filtration or decantation after standing.

2. Hydrolytic maceration:

Maceration refers to the preparation of a solution by soaking plant material in vegetable oil or water. Maceration methods are based on the immersion of crude drug in bulk solvent

3. infusion:

Fresh infusions are prepared by macerating the crude drug for a short period of time with cold or boiling water. These are dilute solutions of the readily soluble constituents of crude drugs.

4. Digestion:

This is a form of maceration in which gentle heat is used during the process of extraction. It is used when moderately elevated temperature is not objectionable. The solvent efficiency of the menstruum is thereby increased.

5. Decoction:

In this process, the crude drug is boiled in a specified volume of water for a defined time; it is then cooled and strained or filtered. This procedure is suitable for extracting water-soluble, heat-stable constituents. This process is typically used in

preparation of Ayurvedic extracts called "quath" or "kawath". The starting ratio of crude drug to water is fi xed, e.g.1:4 or 1:16; the volume is then brought down to one-fourth its original volume by boiling during the extraction procedure. Then, the concentrated extract is filtered and used as such or processed further.

6. Hydrodistillation:

In order to isolate essential oils by hydro distillation, the aromatic plant material is packed in a still and a sufficient quantity of water is added and brought to a boil; alternatively, live steam is injected into the plant charge. Due to the influence of hot water and steam, the essential oil is freed from the oil glands in the plant tissue. The vapor mixture of water and oil is condensed by indirect cooling with water. From the condenser distillate flows into a separator,where oil separates automatically from the distillate water.

7. High performance liquid chromatography (HLPC):

The term liquid chromatography (LC) refers to a range of chromatographic systems, indicating liquid-solid, liquid-liquid,ion-exchange and size exclusion chromatography. Glass column chromatography is an example of classic liquid column chromatography in which the mobile phase percolates under gravity through a glass column filled with a finely divided stationary phase. Liquid chromatography has overtaken gas chromatography, as high performance liquid chromatography (HPLC) systems now provide features-Appendix (1) such as:

i) High resolving power
ii) Fast separation
iii) Continuous monitoring of column effluent
iv)Qualitative and quantitative measurements and isolation
v) Automation of analytical procedures and data handling

Estimating the trend models for the most important medicinal and aromatic plants crops:

Estimating the trend models for each of : production, quantity, and the value of medicinal and aromatic plants exports, in addition to the quantity, value and price per ton for exports of the most important medicinal and aromatic plants crops (coriander, cumin, fennel, anise, marjoram, caraway, Eshieh, mint, jasmine, Hibiscus) during the period (2000 to 2014), where the statistical evidence of the significant of the rates of change for all crops, the study shows, when the significant levels of the 0.05 tables (1,2). The area of Medicinal and Aromatic Plants are reached increasing rate about 1.08% of average total production growth of the most important medicinal and aromatic plants, about 8.19% rate, while the total amount of medicinal and aromatic plants exports, achieved decreasing the growth rate, about 3.425%, the medicinal plant exports and aromatic were about decreasing rate 1.95%, during the study period - table (1)

Coriander crop: showing that the quantity of exports decreased at a decreasing rate about 5%, the value of exports increased with an increase rate of about 9.6%, the price per ton export is increasing at an increasing rate, about 12.9%. As for the cumin: showing that the quantity of exports increased at an increasing rate about 5.8%, the value of exports is increasing at an increasing rate, about 13%, the price per

ton export is increasing at an increasing rate of, about 9.3 % of the average during period - table (1).

Tab(1): Evolution of production, area and the Egyptian exports of the most important medicinal and aromatic plants during the period (2000-2014) (Area: Thousand Fadden- production: tons -Value: million pounds)

	2000	2014	Average	Amount Change	Growth Rate	R^2	F
Medicinal and Aromatic Plants Area	53.347	60.09	61.27	0.663	1.082	0.242	4.1**
Production	108.5	395.4	257.4	21.08	8.189	0.874	90.2*
Exported Quantity	21.21	2.93	15.74	-0.539	-3.425	0.287	5.2**
Exports Value of medicinal and aromatic plants (true value)	129.1	34.4	151.8	-2.962	-1.95	0.242	4.1**

*Coefficients statistically significant at a significance level 0.01.
**Coefficients statistically significant at a significance level 0.05.

<u>**Source**</u>: collected and calculated from: Central Agency for Public Mobilization and Statistics, Bulletins of the Foreign Trade,www.capmas.gov.eg

Fennel crop: showing that the quantity of exports decreased at a decreasing rate to about 4%, the value of exports increased with an increase rate of about 9.2%, the price per ton export is increasing at an increasing rate about 7.8%. As for anise: showing that the quantity of exports is decreasing at a decreasing rate to about 13.3%, the value of exports is decreasing at a decreasing rate about 10.8%, the price per ton export is increasing at an increasing rate, about 10.6% of the average during the period - table (1).

Marjoram crop: showing that the quantity of exports decreased at a decreasing rate to about 3.9%, the value of exports is increasing at an increasing rate by about 5.1%, the price per ton export is increasing at an increasing rate about 8.3%. As for caraway, showing that the quantity of exports is increasing at an increasing rate by about 5.2%, the value of exports is increasing at an increasing rate about 10.1%, the price per ton export is increasing at a increasing rate to about 11.3% of the average during the period - table (1).

Eshieh crop: showing that the quantity of exports decreased at a decreasing rate to about 9.2%, the value of exports increased at an increasing rate to about 6.6%, the price per ton export increased at an increasing rate to about 4.1%. As for mint: showing that the quantity of exports decreased at a decreasing rate to about 4.2%, the value of exports increased at an increasing rate to about 7%, the price per ton export increased at an increasing rate of about 8%. As for jasmine showing that quantity of exports decreased at a decreasing rate to about 14%, the value of exports decreased at a decreasing rate to about 10.8%, the price per ton export increased at an increasing rate to about 15.2%. As for hibiscus: showing that the quantity of exports increased at an increasing rate to about 14.1%, the value of exports increased at an increasing rate to about 15.3%, the price per ton export increased at an increasing rate to about 3.7% of the average during the study period-table (3).

We conclude from the foregoing a decreasing, in the quantity change rates of exports for most of medicinal and aromatic plants crops, exception of (cumin, caraway, Hibiscus) during the period (2000-2014).

Tab (2): Evolution of Egyptian exports of the most important medicinal and aromatic plants during the period (2000-2014) (Quantity: tons -Value: 1000 pounds- Price: 1000 pounds/ton)

plant		2000	2014	Average	Equations	Growth Rate	R^2	F
Coriander	quantity	3199	900	1544	$\hat{Y}$ = 2157.3 -76.71 T (-2.69)*	5-	0.358	7.3**
	value	5986	10990	9744	$\hat{Y}$ = 2233.1 +938.8 T (4.89)*	9.6	0.648	23.9*
	price per ton	1.87	12.21	7.15	$\hat{Y}$ = 0.224 +0.921 T (8.66)*	12.9	0.852	75.0*
Cummins	quantity	1110	550	783	$\hat{Y}$ = 411.6 +45.46 T (2.03)**	5.8	0.241	4.1**
	value	3708	12565	10065	$\hat{Y}$ = 440.1 +1313.1 T (4.07)*	13	0.56	16.6*
	price per ton	3.34	22.85	12.49	$\hat{Y}$ = 3.22 +1.158 T (9.87)*	9.3	0.882	97.4*
Fennel	quantity	2296	215	2271	$\hat{Y}$ = 2771.1 -90.057 T (-2.11)**	4-	0.253	4.4**
	value	9046	2757	18356	$\hat{Y}$ = 7723.1 +1695.8 T (4.76)*	9.2	0.635	22.6*
	price per ton	3.94	12.82	8.41	$\hat{Y}$ = 3.128 +0.66 T (28.76)*	7.8	0.985	827.1*
Anise	quantity	194	40	101	$\hat{Y}$ = 209.2 -13.49 T (-3.16)*	13.3-	0.435	10.0*
	value	747	534	528	$\hat{Y}$ = 997.9 -57.04 T (-2.12)**	10.8-	0.258	4.5**
	price per ton	3.85	13.35		$\hat{Y}$ = 1.439 +0.414 T (2.1)**	10.6	0.254	4.4**
Marjoram	quantity	4092	165	2757	$\hat{Y}$ = 3616.8 -107.5 T (-2.63)**	3.9-	0.347	6.9**
	value	11837	1968	18900	$\hat{Y}$ = 11342 +961.4 T (2.62)**	5.1	0.346	6.9**
	price per ton	2.89	11.93	7.33	$\hat{Y}$ = 2.484 +0.605 T (15.59)*	8.3	0.949	243.1*
Caraway	quantity	1937	13	2300	$\hat{Y}$ = 1576.5 +118.6 T (2.80)*	5.2	0.377	7.9**
	value	4539	161	16478	$\hat{Y}$ = 3173.6 +1663.1 T (2.14)**	10.1	0.261	4.6**
	price per ton	2.34	12.38	6.99	$\hat{Y}$ = 0.683 +0.788 T (14.36)*	11.3	0.941	206.3*
Eshieh	quantity	2772	71	1875	$\hat{Y}$ = 3256.7 -172.7 T (-5.44)*	9.2-	0.695	29.6*
	value	9895	599	15050	$\hat{Y}$ = 23632 -989.4 T (-2.1)**	6.6-	0.253	4.4**
	price per ton	3.57	8.44	8.27	$\hat{Y}$ = 5.529 +0.343 T (3.23)*	4.1	0.445	10.4*
Mint	quantity	1280	209	1674	$\hat{Y}$ = 2201.6 -70.06 T (-2.44)**	4.2-	0.313	5.9**
	value	3345	1825	11977	$\hat{Y}$ = 5304.6 +834 T (2.52)**	7	0.329	6.4**
	price per ton	2.61	8.73	7.03	$\hat{Y}$ = 2.535 +0.562 T (9.29)*	8	0.869	86.4*
Jasmine	quantity	4180	85	1752	$\hat{Y}$ = 3715.6 -245.5 T (-2.71)*	14-	0.361	7.3**
	the value	4909	1249	2908	$\hat{Y}$ = 5419.3 -313.9 T (-4.36)*	10.8-	0.594	19.0*
	price per ton	1.17	14.69	4.43	$\hat{Y}$ = 0.971 +0.675 T (3.33)*	15.2	0.461	11.1*
Hibiscus	quantity	150	680	680	$\hat{Y}$ = 87.86 +95.93 T (2.56)**	14.1	0.336	6.6**
	value	1228	9099	9099	$\hat{Y}$ = 2006 +1388.2 T (2.67)*	15.3	0.355	7.1**
	price per ton	8.19	13.39	11.99	$\hat{Y}$ = 8.46 +0.441 T (2.6)*	3.7	0.342	6.8**

*Coefficients statistically significant at a significance level 0.01.

**Coefficients statistically significant at a significance level 0.05.

<u>**Source**</u>: collected and calculated from: Central Agency for Public Mobilization and Statistics, Bulletins of the Foreign Trade,<u>www.capmas.gov.eg</u>

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Tab (3): Instability index for quantity and Value of the medicinal and aromatic plants exports during the period (2000-2014)

	2000	2014	Average	Amount Change	Growth Rate	R^2	F
Instability index for the quantity of medicinal and aromatic plants exports	8.7	75.5	13.0	2.46	18.92	0.31	5.7[**]
Instability index for the value of medicinal and aromatic plants exports	4.4	9.9	9.6	0.149	1.55	0.02	0.002

Source: collected and calculated from table no.(2).

The Geographic Distribution to Egyptian exports for the important medicinal and aromatic crops used in the field of pharmacy and medicine to the main importing countries through the average period (2008-2014)

Geographic distribution to Egyptian exports of the important medicinal and aromatic plants, used in the field of pharmacy and medicine (basil, marjoram, eshieh) for the purposes of Pharmacy or the purposes of Medicine, divided tonon-formatted for retail sale andformatted for retail sale for the main importing countries through the average period (2000-2014):

1- Geographic Distribution for Egyptian Exports of Basil Plant for the Purposes of Pharmacy to the Main Importing Countries during the period (2008-2014)

The total amount of basil for the purposes of Pharmacy exported are reached about 33.74thousandtons, with value about 431.55 million pounds, shows that the United States is first ranked, about 18.55 thousand tons representing 55%, followed by Germany is about 3.36 thousand tons representing about 9.96%, Canada about 1.60 thousand tons representing 4.73%, followed by France, Russia, Poland, Italy, brazil, representing respectively 3.58%, 2.72%, 2.47%, 1.99%, 1.81% from the average total basil amount for the purposes of Pharmacy during the average period (2008- 2014) -table (4).

Table (4): Geographic Distribution for Egyptian Exports of Basil for the Pharmacy Purposes to the Main Importing Countries during the period (2008-2014) (value by true prices using wholesale price index 2010=100: million pound- Quantity: thousand tons)

	Value million pounds	Quantity thousand tons	%	Price 1000 pounds / ton
United States of America	248.59	18.55	54.99	13.40
Germany	38.06	3.36	9.96	11.33
Canada	19.54	1.60	4.73	12.25
France	15.88	1.21	3.58	13.15
United Russia	8.92	0.92	2.72	9.70
Poland	8.37	0.83	2.47	10.06
Italia	7.07	0.67	1.99	10.55
Brazil	5.60	0.61	1.81	9.16
Total	**431.55**	**33.74**	**100**	**12.79**

Source: collected and calculated from: Central Agency for Public Mobilization and Statistics www.capmas.gov.eg

The average export price of basil plant for the purposes of Pharmacy is about 12.79 thousand pounds / ton, ranging from a minimum 8.02 thousand pounds / ton, and a maximum of 13.4 thousand pounds / ton during the study period.

2- Geographic Distribution for Egyptian Exports of Basil non-formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014)

The total amount of basil was non-formatted for retail sale for the purposes of exporting medicine, are reached about 314 tons, with value about 3.75 million pounds, shows that the United States is first ranked in importing countries, about 120 tons representing about 38.22%, followed by France is about 43 tons representing about 13.69%; Italy about 40 tons representing about 12.74%, followed by Turkey, Morocco, Ireland, Brazil, Spain, representing approximately 4.78%,3.82%,3.82%, 3.50%,3.18%respectively, of the average total basil amount of non-formatted for retail sale for the purposes of Medicine during the average period(2008-2014)-table (5).

Table (5): Geographic Distribution for Egyptian Exports of Basil non-formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014) (value by true prices using wholesale price index 2010=100: million pound- Quantity: thousand tons)

	Value million pounds	Quantity thousand tons	%	Price 1000 pounds / ton
United States of America	1.71	0.12	38.22	14.28
France	0.29	0.04	13.69	6.81
Italy	0.46	0.04	12.74	11.56
Turkey	0.17	0.02	4.78	11.10
Morocco	0.12	0.01	3.82	9.63
Ireland	0.21	0.01	3.82	17.79
Brazil	0.11	0.01	3.50	9.97
Spain	0.10	0.01	3.18	10.38
Total	**3.75**	**0.31**	**100**	**11.94**

Source: collected and calculated from: Central Agency for Public Mobilization and Statistics
www.capmas.gov.eg

The average export price of plant basil non-formatted for retail sale for the purposes of Medicine is about 11.94 thousand pounds / ton, ranging from a minimum of 5.72 thousand pounds / tons to a maximum about 17.79 thousand pounds / ton during the study period.

3- Geographic Distribution for Egyptian Exports of Basil formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014)

The total amount of basil unprepared for retail sale for the medicine purposes for exporting are reached amounted about 2.27thousandtons, with value about 26.17 million pounds, shows that the United States is first ranked in importing countries, about 1260 tons representing approximately 55.45%, followed by Brazil, about 95 tons representing about 4.19%, Germany about 86 tons representing about 3.79%, followed by France, Russia, United Kingdom, Italy, Turkey, represented respectively about 3.66%, 3.13%, 2.91%,2.78%, 2.78% of average total basil amount unprepared for retail sale for the medicine purposes during the average period (2008-2014) - table(6).

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The average export plant of basil unprepared for retail sale price for the Medicine purposes is about 11.54 thousand pounds / ton, ranging from a minimum of 4.6 thousand pounds / tons to a maximum of 14.2 thousand pounds / ton during the study period.

Table (6): Geographic Distribution for Egyptian Exports of Basil formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014) (value by true prices using wholesale price index 2010=100: million pound- Quantity: thousand tons)

	Value million pounds	Quantity thousand tons	%	Price 1000 pounds / ton
United States of America	17.85	1.26	55.45	14.20
Brazil	0.85	0.10	4.19	8.95
Germany	0.75	0.09	3.79	8.74
France	0.64	0.08	3.66	7.69
United Russia	0.73	0.07	3.13	10.30
United kingdom	0.64	0.07	2.91	9.73
Italy	0.74	0.06	2.78	11.71
Turkey	0.60	0.06	2.78	9.59
Total	**26.17**	**2.27**	**100**	**11.54**

Source: collected and calculated from: Central Agency for Public Mobilization and Statistics
www.capmas.gov.eg

4- Geographic Distribution for Egyptian Exports of Marjoram for the Pharmacy Purposes to the Main Importing Countries during the period (2008-2014)

The total amount Marjoram for the purposes of Pharmacy for exportingare reached about 18.03 thousand tons, with value about 248.67 million pounds, shows that Poland is first ranked about 4.14 thousand tons, representing about 22.98%, followed by Germany 4.0 thousand tons representing about 22.16%, United States about 3.59 thousand tons, representing about 19.88%, followed by Italy, the Netherlands, France, Belgium, Russia, representing approximately 4.41%, 2.64%, 2.59%, 2.5%, 2.0% respectively of the total average amount of marjoram for the Pharmacy purposes during the average period (2008-2014) -table (7).

The average export price of marjoram for the Pharmacy purposes is about 13.79 thousand pounds / ton, ranging from a minimum 8.91 thousand pounds / tons, to a maximum of 13.79 thousand pounds / ton during the study period.

Table (7): Geographic Distribution for Egyptian Exports of Marjoram for the Pharmacy Purposes to the Main Importing Countries during the period (2008-2014) (value by true prices using wholesale price index 2010=100: million pound- Quantity: thousand tons)

	Value million pounds	Quantity thousand tons	%	Price 1000 pounds / ton
Poland	47.99	4.14	22.98	11.58
Germany	53.28	4.00	22.16	13.33
United States America	58.89	3.59	19.88	16.43
Italy	11.21	0.80	4.41	14.08
Holland	9.15	0.48	2.64	19.23
France	8.41	0.47	2.59	18.01
Belgium	6.45	0.45	2.50	14.34
United Russia	4.53	0.36	2.00	12.60
Total	**248.67**	**18.03**	**100**	**13.79**

Source: collected and calculated from: Central Agency for Public Mobilization and Statistics
www.capmas.gov.eg

5- Geographic Distribution for Egyptian Exports of Marjoram non-formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014)

The total amount Marjoram non-formatted for retail sale of the medicine purposes of exporting are reached about 190 tons, with value about 3.26 million pounds, shows that the United States is first ranked about 58 tons representing about 31.35%, followed by France 21 tons representing 11.35%, Italy about 19 tons representing 10.27%, followed by Tunisia, Germany, Libya, Morocco, Israel, representing approximately 9.73%, 7.03%, 4.32%, 3.78%, 3.24% of average total amount Marjoram non-formatted for retail sale of the Medicine purposes during the average period (2008- 2014) -table (8).

The average export price for non- formatted marjoram for retail sale of the Medicine purposes is about 17.61 thousand pounds / ton, ranging from a minimum 9.72 thousand pounds / tons, to a maximum of 23.62 thousand pounds / ton during the study period.

Table (8): Geographic Distribution for Egyptian Exports of Marjoram non-formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014) (value by true prices using wholesale price index 2010=100: million pound- Quantity: thousand tons)

	Value million pounds	Quantity thousand tons	%	Price 1000 pounds / ton
United States of America	1.03	0.06	31.35	17.76
France	0.21	0.02	11.35	9.89
Italy	0.37	0.02	10.27	19.38
Tunisia	0.43	0.02	9.73	23.62
Germany	0.25	0.01	7.03	19.21
Libya	0.16	0.01	4.32	19.96
Morocco	0.14	0.01	3.78	20.01
Israel	0.09	0.01	3.24	15.34
Toal	3.26	0.19	100	17.61

Source: collected and calculated from: Central Agency for Public Mobilization and Statistics
        www.capmas.gov.eg

6-Geographic Distribution for Egyptian Exports of Marjoram formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014)

The total amount of exporting Marjoram formatted for retail sale for the medicine purposes are reached about 910 tons, with value about 13.38 million pounds, show that Germany is the first ranked about 232 tons representing approximately 25.61%, followed by Saudi Arabia 128 tons representing 14.13%, United States about 122 tons representing 13.47 %, followed by France, Poland, Belgium, Brazil, Italy, representing about 7.40%, 6.18%, 4.86%, 3.97%, 3.20% of average total amount Marjoram formatted for retail sale for the medicine purposes during the period (2008-2014) - table (9).

The average export price for the formatted Marjoram for retail sale for the Medicine purposes is about 14.77 thousand pounds / ton, ranging from a minimum of 8.69 thousand pounds / tons, to a maximum of 18.66 thousand pounds / ton during the study period.

Table (9): Geographic Distribution for Egyptian Exports of Marjoram formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014) (value by true prices using wholesale price index 2010=100: million pound- Quantity: thousand tons)

	Value million pounds	Quantity thousand tons	%	Price 1000 pounds / ton
Germany	3.53	0.23	25.61	15.20
Saudi Arabia	2.39	0.13	14.13	18.66
United States America	2.10	0.12	13.47	17.22
France	0.57	0.07	7.40	8.54
Poland	0.67	0.06	6.18	12.05
Belgium	0.59	0.04	4.86	13.38
Brazil	0.44	0.04	3.97	12.16
Italy	0.45	0.03	3.20	15.67
Total	**13.38**	**0.91**	**100**	**14.77**

Source: collected and calculated from: Central Agency for Public Mobilization and Statistics
www.capmas.gov.eg

7- Geographic Distribution for Egyptian Exports of Eshieh for the Pharmacy Purposes to the Main Importing Countries during the period (2008-2014)

The total amount of exporting Eshieh for the Pharmacy purposes are reached about 5.33 thousandtons, with value about 83.65 million pounds, shows that Germany is the first ranked about 1574 tons representing approximately 29.52%, followed by Latvia 762 tons representing 14.29%, Netherlands 568 tons representing 10.65%, followed by United States, Venezuela, Ukraine, Spain, Morocco, representing approximately 6.04%, 5.18%, 5.03%, 4.5%, 3.19% respectively of the average total quantity of Eshieh for the pharmacy purposes during the average period (2008-2014)- table(10).

The average export price of Eshieh for the Pharmacy purposes is about 15.31 thousand pounds / ton, ranging from a minimum about 6.52 thousand pounds / tons, to a maximum of 24.15 thousand pounds / ton during the study period.

Table (10): Geographic Distribution for Egyptian Exports of Eshieh for the Pharmacy Purposes to the Main Importing Countries during the period (2008-2014) (value by true prices using wholesale price index 2010=100: million pound- Quantity: thousand tons)

	Value million pounds	Quantity thousand tons	%	Price 1000 pounds / ton
Germany	25.94	1.57	29.52	16.48
Republic of Latvia	9.38	0.76	14.29	12.31
Holland	7.48	0.57	10.65	13.16
United States America	7.68	0.32	6.04	23.86
Venezuela	6.67	0.28	5.18	24.15
Republic of Ukraine	2.36	0.27	5.03	8.82
Spain	2.88	0.24	4.50	12.02
Morocco	1.09	0.17	3.19	6.40
Total	**81.65**	**5.33**	**100**	**15.31**

Source: collected and calculated from: Central Agency for Public Mobilization and Statistics
www.capmas.gov.eg

8-Geographic Distribution for Egyptian Exports of Eshieh non-formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014)

The total amount of exporting of **Eshieh**was non-formatted for retail sale for the medicine purposes are reached about 173 tons, with value about 2.67 million

pounds, shows that the Russian Federation was ranked about 43 tons representing approximately 24.86%, followed by Spain 31 tons representing 17.92%, Latvia 27 tons representing 15.61% ,followed by Jordan, Italy, Israel, Greece, Ukraine, representing approximately 9.25%, 9.25%, 5.20%, 4.62%, 4.05% of average total quantity of **Eshieh**non-formatted for retail sale for the Medicine purposes during the average period (2008-2014) –table (11).

The average export price of plant **Eshieh**non-formatted retail for the Medicine purposes is about 15.43 thousand pounds / ton, ranging from a minimum of 4.97 thousand pounds / tons, to a maximum of 21.55 thousand pounds / ton during the study period.

Table (11): Geographic Distribution for Egyptian Exports of Eshieh non-formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014) (value by true prices using wholesale price index 2010=100: million pound- Quantity: thousand tons)

	Value million pounds	Quantity thousand tons	%	Price 1000 pounds / ton
United Russia	0.39	0.043	24.86	9.07
Spain	0.55	0.031	17.92	17.60
Republic of Latvia	0.41	0.027	15.61	15.16
Jordan	0.34	0.016	9.25	21.55
Italy	0.31	0.016	9.25	19.53
Israel	0.16	0.009	5.20	17.41
Greece	0.16	0.008	4.62	20.45
Republic of Ukraine	0.08	0.007	4.05	10.77
Total	**2.67**	**0.173**	**100**	**15.43**

Source: **collected and calculated from: Central Agency for Public Mobilization and Statistics**
www.capmas.gov.eg

9- Geographic Distribution for Egyptian Exports of Eshieh formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014)

Total amount of exporting **Eshieh**unprepared for retail sale for the medicine purposes are reached about 1.766 thousand tons ,with value about 16.78 million pounds, shows that Germany is the first rankedabout 0.57 thousand tons representing 32.28%, followed by Spain about 0.277 thousand tons representing 15.69%, Jordan 0.155 thousand tons representing 8.78%, followed by Venezuela, Netherlands, Italy, Russia, United States representing about respectively 7.13%, 5.15%, 3.91%, 3.79%, 3.40% of average total quantity of **Eshieh**unprepared for retail sale for the medicine purposes during the average period (2008-2014)-table (12).

The average export price **Eshieh**unprepared for retail sale for the Medicine purposes is about 9.5 thousand pounds / ton, ranging from a minimum 6.07 thousand pounds / tons, to a maximum of 15.66 thousand pounds / ton during the study period.

From the review of the geographical distribution of Egyptian exports from the most important medicinal and aromatic plants, whether for the purposes of Pharmacy or for the Medicine, the two non-formatted for sale and formatted for retail sale for the purposes of Medicine to the main importing countries through the period average (2008-2014) that: the export price to be used for the purposes of Pharmacy, exceeds the purposes of Medicine, in each of basil, Eshieh except the Marjoram , it has been

shown that the price of a ton export from non-formatted Marjoram for retail sale for the Medicine purposes, more than that for the purposes of Pharmacy, and this calls for needing to direct focus to cultivate those plants for sale for the purposes of Pharmacy.

Table (12): Geographic Distribution for Egyptian Exports of Eshieh formatted retail for the Medicine Purposes to the Main Importing Countries during the period (2008-2014) (value by true prices using wholesale price index 2010=100: million pound- Quantity: thousand tons)

	Value million pounds	Quantity thousand tons	%	Price 1000 pounds / ton
Germany	4.53	0.570	32.28	7.95
Spain	2.47	0.277	15.69	8.91
Jordan	1.53	0.155	8.78	9.88
Venezuela	0.99	0.126	7.13	7.85
Holland	0.73	0.091	5.15	8.05
Italy	1.02	0.069	3.91	14.79
United Russia	1.05	0.067	3.79	15.66
United States of America	0.56	0.060	3.40	9.35
Total	**16.78**	**1.766**	**100**	**9.50**

Source: collected and calculated from: Central Agency for Public Mobilization and Statistics
www.capmas.gov.eg

The Geographic Concentration of Egyptian Exports to the most important medicinal and aromatic plants used in the field of pharmacy and medicine to the main importing countries through the average for the period (2008-2014)

This part of this study deals the geographical concentration of Egyptian exports to the most important medicinal and aromatic plants used in the field of pharmacy and medicine, which include (basil, marjoram, **Eshieh**), both for the Pharmacy purposes or for the Medicine purposes, whereit divided the uninitialized for retail, formatted for retail sale for the main of importing countries during the period (2008-2014):

1- Geographical concentration of Egyptian exports of basil for the Pharmacy purposes to the main importing countries during the period (2008-2014)

Showing the Geographical Concentration of Egyptian exports from the basil, for the Pharmacy purposes, to United States, Germany, Canada, and France about 54.75%, 10.09%, 4.7%, 3.38% respectively, while about 2.82%, 2.48%, 1.88% , 1.92% for Russian Federation, Poland, Brazil, Italy, respectively, through the average period (2008-2014) - table (13).

2-Geographical concentration of Egyptian exports of non- formatted basil for retail sale for the Medicine purposes to the main importing countries during the period (2008-2014)

Showing the geographic Concentration of Egyptian exports from the basil non-formatted for selling by retail for the medicine purposes to United States, France, Italy, Turkey about 34.72%, 21.42%, 10.74%, 7.15% respectively, while about 2.11 %, 2.05%, 2%, 1.84% for Morocco, Ireland, Brazil, Spain, respectively, during average period (2008-2014) - table (13).

3-The geographic concentration of Egyptian exports of basil, unprepared for retail sale for the purposes of Medicine, to the main importing countries during the period (2008-2014)

Showing the geographic Concentration of Egyptian exports of basil, formatted for selling by retail for the Medicine purposes, to each of United States, France, Brazil, Netherlands about 58.79%, 6.6%, 3.87%, 3.85% respectively, while reached about 3.44%, 3.26%, 2.58%, 2.45% for Turkey, Germany, United Kingdom, Italy, respectively, during average period (2008-2014) - table (13).

4-The geographic concentration of Egyptian exports of marjoram for the Pharmacy purposes to the main importing countries during the period (2008-2014)

Showing the geographic Concentration of Egyptian exports of marjoram for the Pharmacy purposes, to each of Poland, Germany, USA, Italy about 23.05%, 22.2%, 20.07%, 4.37% respectively, while reached about 2.59%, 2.58%, 2.45 %, 1.95% for France, Holland, Belgium, Russia, respectively, during average period (2008-2014) - table (13).

5-The geographic concentration of Egyptian exports of non Marjoram formatted for retail sale for the purposes of Medicine to the main importing countries during the period (2008-2014)

Showing the geographic Concentration of Egyptian exports of marjoram, non-formatted for selling by retail for the Medicine purposes, to each of United States, Israel, Germany, France about 20.87%, 15.79%, 14.44%, 13.9% respectively, while reached about 7.71%, 4.66%, 1.99%, 1.78% for Tunisia, Italy, Libya, Morocco, respectively, during average period (2008-2014) - table (13).

6-The geographic concentration of Egyptian exports of marjoram unprepared for retail sale for the purposes of Medicine to the main importing countries during the period (2008-2014)

Showing the geographic Concentration of Egyptian exports of marjoram, formatted for selling by retail for the medicine purposes, to each of Germany, USA, Poland, France about 29.48%, 14.39%, 10.63%, 6.84% respectively, while reached about 6.25%, 4.75%, 3.71%, 3.42% for Belgium, Italy, Brazil, Spain, respectively, during average period (2008-2014) - table (13).

7-The geographic concentration of Egyptian exports of Eshiehfor the Pharmacy purposes to the main importing countries during average period (2008-2014)

Showing the geographic concentration of Egyptian exports of **Eshieh**for the Pharmacy purposes, to each of Germany, the Republic of Latvia, Netherlands, United States about 28.79%, 14.8%, 9.93%, 6.43% respectively, while reached about 6%, 5.8%, 4.34%, 2.87% for Venezuela, Ukraine, Spain, Morocco respectively, during average period (2008-2014) - table (13).

8-The geographic concentration of Egyptian exports of Eshiehnon-formatted for retail sale for the Medicine purposes to the main importing countries during average period (2008-2014)

Showing the geographic concentration of Egyptian exports of **Eshieh** non-formatted for selling by retail for the Medicine purposes, to each of Spain, Russia,

Jordan, the Republic of Latvia about 27.58% 0.25%, 19.27%, 6.96% respectively, while reached about 4.2%, 4.11%, 2.3%, 1.81% for Greece, Italy, Israel, Ukraine respectively, during average period (2008-2014) - table (13).

9-The geographic concentration of Egyptian exports of Eshieh formatted for retail sale for the Medicine purposes to the main importing countries during average period (2008-2014)

Showing the geographic concentration of Egyptian exports of **Eshieh** formatted for selling by retail for the Medicine purposes, to each of Spain, Germany, Jordan, Italy about 23.36%, 18.82%, 10.79%, 5.81% respectively, while reached about 2.69%, 2.45%, 2.42%, 1.53% for Netherlands, United States of America and Venezuela respectively, during average period (2008-2014) - table (13).

A review of the results of concentration geographical Egyptian exports from the most important medicinal and aromatic plants, whether for the Pharmacy purposes or Medicine purposes, non-formatted for sale and formatted for retail sale, to the main importing countries during the average period (2008 -2014): for the basil plant, showing a concentration geographic for Egyptian exports from the basil for the Pharmacy purposes, to each of United States, Germany, Canada, France, about 72.9%, and the other of the countries about 27.1%, having a concentration geographic exports from the basil, non-formatted for retail sale, for the Medicine purposes, to each of United States, France, Italy, Turkey, about 74%, and the other of the countries about 26%, having a concentration geographic exports from the basil, formatted for retail sale, for the Medicine purposes, to each of United States, France, Brazil, Netherlands about 73.1%, and the other of the countries about 26.9%.

Table (13): Hirschman's Gini coefficient for Geographical Concentration of Egyptian Exports of the Most Important Medicinal and Aromatic Plants to the Main Importing Countries during average period (2008-2014)

Basil for the purposes of Pharmacy		Basil non-formatted for retail sale for the purposes of medicine		Basil unprepared for retail sale for the purposes of medicine		Marjoram for the purposes of Pharmacy		Marjoram non-formatted for retail sale for the purposes of Medicine		Marjoram unprepared for retail sale for the purposes of medicine		Eshieh for the purposes of Pharmacy		Eshieh non-formatted for retail sale for the purposes of Medicine		Eshieh unprepared for retail sale for the purposes of Medicine	
America	54.75	America	34.72	America	58.79	Poland	23.1	America	20.87	Germany	29.48	Germany	28.79	Russia	25.00	Germany	18.82
Germany	10.09	Italy	10.74	France	6.60	Germany	22.20	Italy	4.66	Saudi	10.63	Latvia	14.80	Latvia	6.96	Venezuela	2.42
Canada	4.70	France	21.42	Russia	2.43	America	20.1	France	13.90	America	14.39	Belgium	1.80	Italy	4.11	Spain	23.36
France	3.38	Morocco	2.11	Brazil	3.87	Italy	4.37	Tunisia	7.71	Tunisia	1.24	Holland	9.93	Spain	27.58	Greece	1.13
Russia	2.82	Ireland	2.05	Germany	3.26	Holland	2.58	Libya	1.99	France	6.25	Morocco	2.87	Israel	2.30	Jordan	10.79
Poland	2.48	Brazil	2.00	U.K	2.58	France	2.59	Morocco	1.78	Poland	6.84	Venezuela	6.00	Jordan	19.27	Holland	2.69
Brazil	1.88	Spain	1.84	Italy	2.45	Belgium	2.45	Germany	14.44	Russia	2.19	Ukraine	5.80	Ukraine	1.81	Argentina	0.69
Italy	1.92	U. K	1.77	Taiwan	0.67	Saudi	1.16	Israel	15.79	Brazil	3.42	America	6.43	Argentina	1.57	Italy	5.81

Source: collected and calculated from: Central Agency for Public Mobilization and Statistics, Bulletins of the Foreign Trade, www.capmas.gov.eg

For the marjoram, showing a concentration geographic exports from the plant marjoram, for the Pharmacy purposes, to each of Poland, Germany, USA, Italy, about 69.7%, and the other of the countries about 30.3%, having a concentration geographic exports from the Marjoram, non-formatted for sale Retail, for the Medicine purposes, to each of United States, Israel, Germany, France, about 65%, and the other of the countries about 35%, having a concentration geographic exports from the plant Marjoram, formatted for retail sale, for the Medicine purposes, to each of Germany, United States of America, Poland, France, about 61.3%, and the other of the countries about 38.7%

For the plant **Eshieh** , showing a concentration geographic exports from the **Eshieh**, for the Pharmacy purposes, to each of Germany, the Republic of Latvia, Netherlands, United States, about 60%, and the rest of the states, about 40%, having a concentration geographic exports from the **Eshieh**, non-formatted retail, for the Medicine purposes, to each of Spain, Russia, Jordan, Republic of Latvia, about 78.8%, and the other of the countries about 21.2%, having a concentration geographic exports from the **Eshieh** , formatted for retail sale, for the Medicine purposes, to each of Spain, Germany, Jordan, Italy, about 58.8%, and the other of the countries about 41.2%.

Forecasting an area, production, amount and the value of medicinal and aromatic crops exports in Egypt until 2020 using Box-Jenkins model

This part is designed for forecasting the area, production, quantity and the value of medicinal and aromatic plants exports in Egypt until 2020, by selecting the best methods used in the forecasting by using Box Jenkins model "Autoregressive Integrated Moving Average "(ARIMA), so we can identify the potential changes in the coming years, which is useful in the production policies, and helping to achieve food security in Egypt. Where comprises forecasting model, arranged Autoregressive[AR (P)],Moving Average[MA (q)], and the differences (d) - as shown in table No. (14).

Through the examination of models that have been estimation from the area, production, the amount and value of medicinal and aromatic plants exports in Egypt, it turns out that models respectively ARIMA (2,0,2), (2,1,1), (0,0,2) (2.1.2) more convenient, by the results of the tests described in the table (14), and by taking a residuals of the estimated model, which shows that the autocorrelation coefficient, and the partial correlation, the shape of autocorrelation for these residuals are all situated within a period 95% confidence interval, this means that the autocorrelation between the limits of random limit was not significant, therefore the model is appropriate.

Table (14) Standards and Tests to choose the Best Forecasting Models

Variable	Model	Measures – statistical tests	
		RMSE*	U.Theil Inequality Coefficient
Medicinal and Aromatic Plants space	(2,0,2)	3.91	0.032
Production of medicinal and aromatic plants	(2,1,1)	38.46	0.065
The amount of medicinal and aromatic plants exports	(0,0,2)	2.73	0.086
The value of medicinal and aromatic plants exports	(2,1,2)	38.18	0.152

RMSE*Root Mean Square Error:

U- Thiel test used to test the extent of matching the estimated values with the actual values and the extent of simulated with the reality of the data, where:

h: reflect the length of the chain   u: between (0 ≤ u ≤ 1), and there is a complete forecasting when u = 0

<u>Source</u>: **collected and calculated from the table data (1) in research by using program E- views 6.**

It is clear from the forecasting results for area of medicinal and aromatic plants in Egypt, in the table No.(15), it will reach about 61.6 thousand acres in 2018, where he will remain relatively stable until 2020, an increasing about 2.5% from 2014,

while the medicinal and aromatic production, will reach about 421.7 thousand tons in 2018, and then will increasing about 432.9 thousand tons in 2020, an increase of about 9.5% from 2014, while the quantity exported from the medicinal and aromatic plants, will amount to about 15.7 thousand tons in 2018, where he will remain fixed relatively until 2020, an increasing about 50.9% from 2013, also shows that the medicinal and aromatic plants exports value will amount about 185.3 million pounds in 2018, and then will increase about 208.7 million pounds in 2020 an increasing about 67.8% from 2013.

The results showed that the ARIMA model (2,0,2), is the best models for forecasting an area of medicinal and aromatic plants in Egypt, and the model ARIMA (2,1,1), is the best models for forecasting the production of medicinal and aromatic plants, while showing that the model ARIMA (0,0,2), is the best models for forecasting the amount of medicinal and aromatic plants exports, and the model ARIMA (2.1.2), is the best models for forecasting the value of medicinal and aromatic plants exports, and the results showed the efficiency of these models, and estimated parameters in the forecasting process, based on the analysis of residuals (error).The results were closer to reality

Table (15) Results the best forecasting for dynamic models by using Box-Jenkins model

Year	Area of medicinal and aromatic plants	production	exports quantity of medicinal and aromatic plants	exports value of medicinal and aromatic plants
2018	61.6	421.7	15.7	185.3
2019	61.6	422.3	15.7	196.7
2020	61.6	432.9	15.7	208.7

Source: **collected and calculated from the table data (1) in research by using program E- views 6.**

Summary And Recommendations

The paper aims to study stake of exports of the most important medicinal and aromatic crops, which include (coriander, cumin, fennel, anise, marjoram, caraway, Eshieh, mint, jasmine, hibiscus) through: studying the present for some medicinal and aromatic crops, estimating the Egyptian exports quantity, from the most important medicinal and aromatic crops, studying thengeographical distribution of Egyptian exports, which using in pharmacy, medicine field for the main importing countries, estimating the Gini coefficient – Hirschman criteria to calculate the degree of geographic concentration to the Egyptian exports from the most important medicinal and aromatic crops which using in pharmacy,medicine field to the main importing countries during the period (2008-2014), and forecasting with production ,area, quantity and value of the most important Egyptian exports of medicinal and aromatic crops until 2020.

The results have shown decreasing in the rates of change for the quantity of exports for most of medicinal and aromatic crops with the exception of (cumin, caraway and hibiscus).

The results have shown estimating stability in the quantity and value of Egyptian exports of medicinal and aromatic cropsduring the period (2000-2014),

unsteadiness and instability to the quantity and value of Egyptian exports of medicinal and aromatic crops during the study period.

The results have also shown of the geographical distribution, for Egyptian exports of the most important medicinal and aromatic crops, whether for the Pharmacy purposes or Medicine purposes, non-formatted for sale and formatted for retail sale for the Medicine purposes, to the main importing countries during the period (2008-2014): the Export price for pharmacy purposes exceeds the Medicine purposes in each of basil and Eshieh, with the exception of marjoram, it has been shown that the export ton price for the Marjoram, non-formatted for retail sale for the Medicine purposes more than the Pharmacy purposes, and this calls for needing to focus on directing for the cultivation of those crops for sale for the Pharmacy purposes.

The results have shown estimating the Gini Coefficient - Hirschman, to calculate the degree of geographical concentration from the Egyptian exports to the most important medicinal and aromatic crops, which using in the pharmacy, medicine field to the main importing countries during the period (2000-2014): For basil it has been shown the presence of geographic concentration for the Egyptian exports from basil for the Pharmacy purposes to both countries of United States, Germany, Canada, France to about 72.9%, while the countries represented about 27.1%, presence of geographic concentration from the basil exports non-formatted for retail sale for medicine the purposes to both countries United States of America, France, Italy, Turkey to about 74%, while the countries represented about 26%, presence of geographic concentration for the basil exports formatted for retail sale for the medicine purposes to both countries United States, France, Brazil, Netherlands was about 73.1%, while the other countries represented 26.9%.

As for the Marjoram having geographic concentration for exports from the marjoram for the Pharmacy purposes to each of Poland, Germany, United States, Italy has been shown was about 69.7%, while the other countries represented about 30.3%, presence of geographic concentration for exports from Marjoram non-formatted for retail sale for the medicine purposes to both of United States, Israel, Germany, France to about 65%, while the other countries represented about 35%, presence of geographic concentration for exports from Marjoram formatted for retail sale for the medicine purposes to each of Germany, USA, Poland, France to about 61.3%, while the other countries represented 38.7%.

As for the Eshieh having geographic concentration for exports from the Eshieh for the Pharmacy purposes to each of Germany, the Republic of Latvia, Netherlands, United States has turned out was around 60%, while the other countries represented about 40%, having geographic concentration for exports from Eshieh non-formatted for retail sale for the medicine purposes to each of Spain, Russia, Jordan, Republic of Latvia to about 78.8%, while the other countries represented about 21.2%, the presence of concentration geographic for exports from Eshieh formatted for retail sale for the medicine purposes to each of Spain, Germany, Jordan, Italy about 58.8%, while the other countries represented 41.2%.

An Economic Study of the Most Important Egyptian Exports of Medicinal and Aromatic Crops

While the results of the estimation of forecasting an area, production, quantity, and the exports value of medicinal and aromatic crops exports and others, in Egypt using Box-Jenkins methodology during the period (2017-2020) is expected to occur:

1- The relative stability in the cultivated area of medicinal and aromatic crops in Egypt amounted to about 61.6 thousand acres in 2020.

2- Increasing in the production of the medicinal and aromatic crops in 2020 by about 9.5% from 2014.

3- The relative stability in the amount of medicinal and aromatic crops in Egypt's exports amounted to about 15.7 thousand tons in 2020.

4- Increasing the export value for the medicinal and aromatic crops in 2020 of about 67.8% from 2013.

In light of the results obtained, the search is recommended that:

1- Education to the farmers to grow the export medicinal and aromatic plants, leading to increased production and stabilization of the quantity and value of exports of those crops, where it was found unsteadiness and instability to the quantity and value of Egyptian exports of those crops.

2- Needing for the necessary attention to cultivation of medicinal and aromatic crops for Pharmacy purposes, where it was found that the price of a ton of export for use the Pharmacy purposes of exceeds similar for the Medicine purposes.

3- The opening of new markets, especially in the Arab countries of medicinal and aromatic plants, which show a geographic concentration of most of Egypt's exports of medicinal and aromatic crops in the European Union and United States markets.

4- Needing to develop a proposed policy for the vertical and horizontal expansion in the cultivation and production of medicinal and aromatic crops which show a relative stability in the cultivated medicinal and aromatic plants area in Egypt by 2020.

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An Economic Study of the Most Important Egyptian Exports of Medicinal and Aromatic Crops

Appendix (1): Pharmaceutical uses of some Medicinal plants:

	key actions	Traditional and current uses:
sweet basil:	indigestion Easing flatulence &stomach cramps. Relieve nausea and vomiting Sedative action Increase breast milk Antibacterial action	Kill intestinal worm. Depression, anexiety and insomnia. Epilepsy, migraine and whooping cough. Externally act as insect repellant.
Holy basil:	Lowers blood suger level. Antispasmodic. Analgesic. Lowers blood pressure. Reduces fever. Anti inflammatory.	Tonic and improves vitality. Prevents infection and controls high fever. Reduces stress and adaptogenic. Stabilize blood suger so used in diabites. Treatment of ashthma&cough & bronchitis. Helps cankar sores to heal.
Levant Wormwood:	santonin (toxic to roundworm) volatile oils	Expel worms. Tonic and stimulant effect on digestion. Loss of appetite.
Mugwort:	Volatile oils. Flavonoids. Coumarinderevatives. Triterpenes.	Digestive and tonic herb. Improves appetite, digestive function and absorption. Elimination of worms. Reduces menstrual bleeding.
Sweet marjorm:	Stimulant. Antispasmodic prop. Relieve anexiety , headache and insomnia.	Gastro intestinal flatulance and colic. C.N.S anexioletec action. General tonic.
Caraway:	antispasmodic carminative sweeten the breath improve appetit expectorant	Digestive problems. Anti spamsodic. Bronchitis and in cough remedies.
Coriander:	flatulance bloating cramps rheumatic pain	Digestive problems Anti spamsodic Relief nervous tension Relief rheumatic pain Aphrodesiac
Cumin	flatulance bloating digestive process	Improve digestion Relaxes the gut Certain types of tumers
Fennel:	relieve bloating stomach pain stimulate appetite anti inflammatory	Digestive system Kidney stones Urinary antiseptic Mild expectorant Increase breast milk production Conjunctivities
Jasmine	calming and sedative effect soothing effect	Antidepressant and relaxing Relieve tension Externally Soothing dry and sensetive skin
Hibiscus:	Laxative effect. Relaxing effect on the uterine musculature. Antispasmodic Ant hypertension	Gastrointestinal spasm, constipation. Stimulate appetite. Gastroenteritis. Capillary fragility, varicose veins and hemorrhoids. C.N.S anexity and insomnia.
Anise:	stimulate of sexual drive stimulate breast milk production	G.I.T indigestion, reduce gas and bloating. Relieve infant and children colic. Counteracting menstrual pain Respiratory tract: whooping cough, bronchitis and asthma.
Peppermint	carminative relieve muscle spasm increase sweating stimulate secretion of bile antiseptic	

Source: collected from :

1- Encyclopedia of medicinal plants, www.encyclopedia.com.

2- Extraction technology for medicinal and aromatic plants.

3-medicinal plants classification, biosynthesis and pharmacology.

الملخص :

يستهدف هذا البحث دراسة صادرات أهم محاصيل النباتات الطبية والعطرية والتي تشمل كــل مــن (الكسبرة، الكمون، الشمر، اليانسون، الكراوية، الشيح، النعناع، الياسمين، الكركدية) من خلال دراسة الوضع الراهن لبعض محاصيل النباتات الطبية والعطرية، تقدير معامل الاستقرار لكمية الصادرات المصرية من أهم النباتات الطبية والعطرية، دراسة التوزيع الجغرافي للصادرات المصرية لأهم النباتـــات الطبيــة والعطريـــة المستخدمة في مجال الصيدلة والطب لأهم الدول المستوردة، تقدير معامل جيني – هيرشمان لحساب درجة التركز الجغرافي للصادرات المصرية لأهم النباتات الطبية والعطرية المستخدمة في مجال الصيدلة والطـب إلى أهم الدول المستوردة خلال متوسط الفترة (٢٠٠٨ – ٢٠١٤)، والتنبؤ بمساحة وإنتاج وكمية وقيمة أهـم الصادرات المصرية من النباتات الطبية والعطرية حتى عام ٢٠٢٠.

وقد أوضحت نتائج تقدير معادلات الاتجاه العام الزمني للصادرات المصرية من محاصيــل النباتــات الطبية والعطرية خلال الفترة (٢٠٠ – ٢٠١٤) حدوث تناقص في معدلات التغير لكمية الــصادرات لمعظم محاصيل النباتات الطبية والعطرية فيما عدا (الكمون، الكراوية، الكركدية).

وقد أوضحت نتائج تقدير عدم الاستقرار لكمية وقيمة الصادرات المــصرية مــن النباتــات الطبيــة والعطرية خلال متوسط الفترة (٢٠٠٠ – ٢٠١٤) عدم الثبات وعدم الاستقرار لكميــة وقيمــة الــصادرات المصرية من النباتات الطبية والعطرية خلال فترة الدراسة.

وقد أوضحت نتائج دراسة التوزيع الجغرافي للصادرات المصرية من أهم النباتات الطبية والعطريــة سواء لأغراض الصيدلة أو لأغراض الطب بنوعية الغير مهيأ للبيع والمهيأ للبيع بالتجزئة لأغـراض الطـب لأهم الدول المستوردة لها خلال متوسط الفترة (٢٠٠٨ – ٢٠١٤) أن : سعر التصدير للإستخدام لأغــراض الصيدلة يفوق مثيلة لأغراض الطب في كل من الريحان والشيح، فيما عدا البردقوش فقد تبين أن سعر طـن التصدير لنبات البردقوش الغير مهيأ للبيع بالتجزئة لأغراض الطب يفوق مثيلة لأغــراض الــصيدلة، وهـذا يدعو إلى ضرورة توجيه الاهتمام اللازم لزراعة تلك النباتات للبيع لأغراض الصيدلة.

وقد أوضحت نتائج تقدير معامل جيني – هيرشمان لحساب درجة التركـــز الجغرافـــي للــصادرات المصرية لأهم النباتات الطبية والعطرية المستخدمة في مجال الصيدلة والطب إلى أهم الدول المستوردة خلال الفترة (٢٠٠٠ – ٢٠١٤) : بالنسبة لنبات الريحان فقد تبين وجود تركز جغرافي للصادرات المـصرية مـن نبات الريحان لأغراض الصيدلة إلى كل من أسواق الدول الولايات المتحدة الأمريكية، ألمانياً، كنـداً، فرنسا بلغ حوالي ٧٢,٩%، في حين مثلت باقي الدول حوالي ٢٧,١%، ووجود تركز جغرافي للصادرات من نبات الريحان الغير مهيأ للبيع بالتجزئة لأغراض الطب إلى كل من أسواق الدول الولايـات المتحـدة الأمريكيـة، فرنسا، البرازيل، هولندا بلغ حوالي ٧٣,١٥%، في حين مثلت باقي الدول حوالي ٢٦,٩%.

أما بالنسبة لنبات البردقوش فقد تبين وجود تركز جغرافي للصادرات من نبات البردقوش لأغــراض الصيدلة إلى كل من أسواق الدول بولنداً، ألمانياً، الولايات المتحدة الأمريكية، إيطاليا بلغ حوالي ٦٩,٧%، في حين مثلت باقي الدول حوالي ٣٠,٣%، ووجود تركز جغرافي للصادرات من نبات البردقوش الغيــر مهيــأ

للبيع بالتجزئة لأغراض الطلب إلي كل من أسواق الدول الولايات المتحدة الأمريكية، إسرائيل، ألمانياً فرنسا بلغ حوالي ٦٥%، في حين مثلت باقي الدول حوالي ٣٥%، ووجود تركز جغرافي للـصادرات مـن نبـات البردقوش المهيأ للبيع بالتجزئة لأغراض الطب إلي كل من أسواق الدول ألمانياً، الولايات المتحدة الأمريكية، بولندا، فرنسا بلغ حوالي ٦١,٣%، في حين مثلت باقي الدول حوالي ٣٨,٧%.

أما بالنسبة لنبات الشيح فقد تبين وجود تركز جغرافي للصادرات من نبات الشيح لأغراض الـصيدلة إلي كل من أسواق الدول ألمانياً، جمهورية لاتفيا، هولندا، الولايات المتحدة الأمريكية بلغ حوالي ٦٠%، فـي حين مثلت باقي الدول حوالي ٤٠%، وجود تركز جغرافي للصادرات من نبات الشيح المهيأ للبيع بالتجزئـة لأغراض الطب إلي كل من أسواق الدول أسبانيا، روسيا، الأردن، جمهورية لاتفيا بلغ حوالي ٧٨,٨%، فـي حين مثلت باقي الدول حوالي ٢١,٢%، ووجود تركز جغرافي للصادرات من نبـات الـشيح المهيـأ للبيـع بالتجزئة لأغراض الطب إلي كل من أسواق الدول أسبانيا، ألمانياً، الأردن، إيطاليا بلغ حوالي ٥٨,٨%، فـي حين مثلت باقي الدول حوالي ٤١,٢%.

في حين أوضحت نتائج التقدير القياسي للتنبؤ بمساحة وإنتاج وكمية وقيمة صادرات النباتات الطبيـة والعطرية في مصر باستخدام منهجية بوكس – جينكيز Box – Jenkins خـلال الفتـرة (٢٠١٧ – ٢٠٢٠) أنه من المتوقع حدوث :

١– ثبات نسبي في المساحة المزروعة بالنباتات الطبية والعطرية في مصر بلغت حوالي ٦١,٦ ألـف فـدان عام ٢٠٢٠.

٢– زيادة إنتاج النباتات الطبية والعطرية عام ٢٠٢٠ بحوالي ٩,٥% من عام ٢٠١٤.

٣– ثبات نسبي في كمية صادرات النباتات الطبية والعطرية في مصر بلغت ١٥,٧ ألف طن عام ٢٠٢٠.

٤– زيادة قيمة صادرات النباتات الطبية والعطرية عام ٢٠٢٠ بحوالي ٦٧,٨% من عام ٢٠١٣.

وفي ضوء النتائج المتحصل عليها فإن البحث يوصي بضرورة :

١– توعية المزارعين ا النباتات الطبية والعطرية والتصديرية، مما يؤدي لزيادة الإنتاج وحـدوث إسـتقرار لكمية وقيمة الصادرات من تلك المحاصيل، حيث تبين عدم الثبات وعـدم الاسـتقرار لكميـة وقيمـة الصادرات المصرية من تلك المحاصيل.

٢– ضرورة توجيه الاهتمام اللازم لزراعة النباتات الطبية والعطرية للبيع لأغراض الصيدلة، حيث تبـين أن سعر طن التصدير للاستخدام لأغراض الصيدلة يفوق مثيلة لأغراض الطب.

٣– فتح أسواق جديدة خاصة في الدول العربية للنباتات الطبية والعطرية، حيث تبين وجود تركـز جغرافـي لمعظم الصادرات المصرية من النباتات الطبية والعطرية في أسـواق الاتحـاد الأوروبـي والولايـات المتحدة الأمريكية.

٤– ضرورة وضع سياسات مقترحة للتوسع الرأسي والأفقي في زراعة وإنتاج النباتات الطبيـة والعطريـة حيث تبين ثبات نسبي في المساحة المزروعة بالنباتات الطبية والعطرية في مصر بحلول عام ٢٠٢٠.