Economic Survey of Utilizing Olive By-products (Pirine andpruning products) in Increasing Olive Trees Productiveness in Latakia Governorate

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ABSTRACT

The research problem lies in not utilizing the available fertilizer substitutes, the most abundant of which are olive trees pruning remains,which the farmers have not optimally benefited from, as well as pirine, which have become a burden on olive press owners in production regions. Therefore , this research purposes to analyze and assess the effect of utilizing pruning products and pirine in increasing olive orchards productiveness . The descriptive analytical method has been adopted , and preliminary sources obtained via implementing an experiment in Latakia district (Jannata village) in 2017 on an area (2) dunums planted with olive trees, (1) dunum used as control, (1) dunum underwent the experiment available in Tishreen University ,the Arab Center for Studies of Arid Zones and Dry Lands (ACSAD), and Ministry of Agriculture and Agrarian Reform (Directorate of Organic Production Bureau), and Latakia Agriculture Directorate.

The results of research data analysis showed that using this fertilizer realizes net profit of 36639 S.P. per dunum. Profitability coefficient relative to production costs also reached 39.8%, whereas total economic efficiency per dunum was circa 1.4.

Keywords: *economic survey, pirine, pruning products, olives*

I. INTRODUCTION:

of forage, fertilizers, and energy, by optimal The Mediterranean basin is regarded among the ideal environments for olives cultivation, in which this farming is centered in our recent time. The historical studies and archeological discoveries in Ebla and Ugarit confirmed that Syria is the original homeland for olives cultivation, dating back to six thousand years, and later, this cultivation moved to Carthage (Tunisia) with the Phoenician civilization, and from there to the rest of Mediterranean states (Arab Organization for Agricultural Development, 2013).

Olive tree provides significant inputs for the production utilization of olive oil extraction residues, in addition to pruning remains. As a result of the great increase in world population, demand on olives and olive oil increased, and attention largely centered on raising production rates, which led to a rise in the utilization of chemical additives like fertilizers and pesticides , and ignoring use of organic fertilizers in farming.

With the scientific advancement, forewarning of the dangerous impacts of these additivesstarted, and the start was in 1962 with issuing the book (Silent Spring, Carson, 1962), which drew attention to the seriousness of pesticides use, following which emergence of environmental protection groups started in numerous regions worldwide, warning against overuse of chemical fertilizers and pesticides, and requesting return to nature in food production (KupperßGegner, 2004).

Olive farming spread widely in the Syrian Arab republic in the last four decades, and it is quite natural for this spreading to be largely correlated with the economic, social and environmental importance olives possess in Syria; since it covers today 9% of total cultivated area, and about 63% of total arbored fruiting area. Its estimated fruit production between one year bearing and one alternative year is about 800 thousand tons ,which upon pressing, produces about 250 thousand tons of olive oil-cake (pirine) ,and 650 thousand m^3 of olive pressing water (pressed olives residues).

Production is expected to go up,hence the increase of the amount of by-products over the forthcoming years owing to continuous expansion in this farming, and introduction of new trees in production at anannual average of 2-3 million trees , reaching 1.3 million tons of olive fruit in 2020-2021 season, producing an estimated amount of pirine of

circa 500 thousand tons, and over one million $m^3$of pressed olives residues (Shhadeh, 2009).

It is noteworthy that pirine (olives residue) is the remaining portion of the olives paste following oil extraction, forming about 45% of pressed olives quantity, and contains 30-68% moisture, 1.8-9% oil (according to extraction system). The remaining oil is extracted using hexan to be used in soap manufacture. That is accompanied with remnant pressed olives residues called spent pomace, exclusively used as energy source (Vlyssides et al, 1999).

II. RESEARCH PROBLEM

The research problem lies in not utilizing the available and more abundant fertilizer substitutes, among which olive trees pruning residues, which have not been optimally utilized by farmers, rather, they were usually burnt or buried in soil, as well as pirine, which has become a burden to olive oil press owners in production regions, which is hard to get rid of, owing topomace oil extraction presses' being out of service in Latakia governorate. Starting from this, using those alternatives was inevitable to utilize them in increasing olive production at minimum costs ,minimizing inputs (chemical fertilizers) as much as possible, and depending on domestic resources, which is positively reflected in national economy.

III. RESEARCH IMPORTANCE AND OBJECTIVES

This research forms an important contribution to make use of non-utilized economic sources, and naturally adds a positive value to the opportunities of their utilization. This, in turn, increases income on the individual level, like providing extra job vacancies in the processes of collection, transport, improvement and manufacture, as well as on the national level, by the added value to the agrarian sector, and savings in hard currency on alternative imports.

Therefore, it was necessary to start economic research on utilizing olive by-products (pruning products and pirine), and how to benefit from these residues in producing fertilizers necessary for organic cultivation, and to obtain a product that realizes added value to main olive products , through which it competition may be possible in local and foreign markets, which reflects an important economic, agricultural and environmental dimension.

Based upon the aforementioned, this research purposes to:

IV. MATERIALS AND METHODS:

1. The research was carried out in Latakia district (Jannata village – MurоujOmeiran 's farm) in 2017, on an area of 2 dunums arbored with olive trees (20 trees per dunum) ranging in ages between 50-60 years , one dunum as control without using fertilizer prepared from pirine and pruning products, and 1 dunum underwent the experiment of adding fertilizer prepared from pirine and pruning products. The fertilizer mix prepared from pirine and pruning products comprised the following materials:
   - 350 kg. Remnants of minced pruning product residues. (70) %.
   - 50 kg. Pressed olives-cake (pirine). (10) %.
   - 50 kg. Grasses (wheat hay). (10) %.
   - 50 kg. Soft non-fermented (cow-compost). (10) % , where those constituents were mixed together in a rectangular pit measuring (6 x 1 x 3) , this mix was moistened once per 15 days (as of October 2017 through February 2018).450 kg of fertilizer was obtained from that mix, and the trees were fertilized in March, knowing that moisture of the mix ranged between (50-60%); since its drop leads to weakening of the activity of microorganisms (BouIssa and Khalil, 1998) ; on the other hand, a rise of (75-80)% in moisture may change fermentation conditions to anaerobic (Biddlestone et al, 1987).
2. Secondary sources were collected: via the references and statistics available with the following authorities: Tishreen University – Ministry of Agriculture and Agrarian Reform – Latakia Directorate of Agriculture (Department of Organic Production) - the Arab Center for Studies of Arid Zones and Dry Lands (ACSAD) – The Arab Organization for Agrarian Development.
3. The descriptive Analytic method has been adopted in accomplishing this research, as well as economic analysis indexes as follows:
   - Total economic costs = variable costs + Fixed costs.
   - Total return = Basic return + Fixed costs.
   - Net costs = Gross costs – secondary returns.
   - Net farming income = total return – Gross costs (excluding family work and revenue on (Capital).
   - Total Margin = total return – variable costs.
   - Economic Profit= Economic return value – Gross costs.
   - Variable capital coefficient = Total return value / Gross costs
   - Variable assets circulation time = 365/ variable capital coefficient.
   - Economic Efficiency = Total return value ÷ total production costs
   - General Economic Efficiency = total product ÷ total production costs (Aloleiwi, Abdullatif, 2002).

- Total annual product= mean product quantity x mean per one kg (Khaddam, 2000).
- Achieved annual profit = total annual product – total annual costs (Ibid).
- Production cost per 1 kg = total annual costs ÷Production quantity (Ibid).

***- Realties of utilizing olive trees pruning products and pirine in Latakia Governorate*:**

Olives ranks first in terms of cultivated area in Latakia governorate, and ranked second in terms of production quantity next to citrus, where the cultivated area is (45) thousand hectares, and olive trees in the governorate are estimated to be in the amount of (10.3) million trees, each of which annually producing on average about 15-20 kg of pruning residues. This quantity is largely wasted, either in piling, to be a resort for insects and pests, and a source of olive orchards infection (Nerone in particular),or damaged by burning, which causes environmental and economic damage . Production quantity in some years amounts to over (200) thousand tons of fruit, and Latakia produces circa (50) thousand tonsof olive oil in good yield years.

Olive production in Latakia governorate is nearest to organic production system , being rather natural, tolerant to prevailing environmental conditions, and resistant to most lesions like diseases and insects. There is also possibility of applying Integrated Pest Management System (IPM) , compatible with Organic Production System regarding some possibly infectious insects, causing damages to production quantity and quality of olive fruit, like olive fruit fly . There is actual application to olive orchards in the governorate. Besides, most agrarian service processes, particularly fertilizing, are by adding organic fertilizers.(Organic Cultivation Bureau, 2018).

About 50% of pressed olive fruit‘s weight produce a solid matter called pirine, which is fruit residues following the extracting a great percentage of oil. The quantity resultant from pressing 170 thousand tons of olive fruit is estimated to be circa (85) thousand tons of pirine annually. These residues are characterized by quite a percentage of oil approximating (6) %, i.e. yielding (5100) tons of pirine oil annually.

Pirine has multiple uses. In addition to the possibility of manufacturing organic fertilizer therefrom, it can also be utilized by transforming it into heating cubes (coal-olive husk), owing to the high energy yield it gives, estimated to be 3500 kilocalorie/kg for heating poultry farms, and protected houses .Pirine can also be used for manufacturing compressed wood boards , where a study prepared in Damascus University on possibility of manufacturing wooden boards (blockboards) from Treated pirine (i.etreated with light hydrogenated NAPHTA agent) ,have confirmed that these boards possess good physicochemical specifications, in conformity with the average values of European compressed wood specifications listed in European industrial standards (EN), it is also possible to manufacture (30) boards of compressed wood from 1 ton of drawn pirine , where the preliminary study indicates that profit rate is 100% (Hamid, 2005).

V. RESULTS AND DISCUSSION

1. Statistical Analysis of the Experiment:

Owing to homogeneity of field conditions, the experiment was prepared in a completely random system. Code (A) was assigned to each tree fertilized with the fertilizer made from pruning products and pirine ; and Code (B) was assigned to the trees which weren’t fertilized with this fertilizer, and the productivity of each tree was obtained as per table no. (1).

Table no. (1) Olives Productiveness per Field Tree

A32.5	A31.6	A30.3	A30.5	A 31.1
A30.0	A29.2	A31.3	A31.9	A29.8
A31.1	A30.7	A28.3	A27.9	A27.8
A28.7	A32.1	A29.5	A33.2	A33.4
B25.4	B23.6	B24.2	B23.9	B21.9
B22.5	B24.7	B24.2	B25.6	B23.4
B22.3	B21.8	B22.6	B26.2	B25.3
B26.6	B25.8	B26.1	B25.4	B26.3

Source: Search Results: 2018.

Analysis of variance (ANOVA) was performed using SPSS software in accordance with Table no. (2)

Tabular F	**Actual F**	**Mean Squares ms**	**Squares sum ss**	**Degrees of Freedom (d.f.)**	**Variance Sources**
-	-	-	478.35	39	O
7.4	103.1	349.59	349.59	1	T
-	-	3.39	128.76	38	E

Source: Researchresults.2018 according to SPSS software at 1% significance level

From Table (2), it is observed that calculated F value is larger than tabular F value at 1% significance level, therefore, the null hypothesis, which says there are no significant differences among olive trees productiveness averages, and emphasizes on presence of differences between the two studied coefficients is rejected, hence, the alternative hypothesis, which stipulates occurrence of

differences among averages of olive trees productiveness.

2. Calculating Olive Oil Production Costs in Latakia Governorate:

1-2 Calculating Preliminary (basic) Production Costs of agrarian processes deemed necessary to produce olive oil per dunum, without fertilizing with fertilizer prepared from pirine and pruning products.

Mathematical calculations for olive oil costs and wages based upon (217)prices, and production costs for farming processes and production requirements as per Table no. (3)

Expense Nature	Cost Items per dunum	Year:2017
Agrarian Processes	Tillage 2	3000
	Harrowing and Weeding	1600
	Breeding and Pruning	6000
	Weeds and Disease Control	2550
	Organic and Chemical Fertilizing	2611
	Collection and Sorting	25000
	Loading and Transport	2800
1	**Total Wages of Agrarian Processes**	**43561**
Production Requisites	Organic Fertilizers Value	3675
	Chemical fertilizers Value	6000
	Control Materials' Value	5000
	Refills Value	4340
2	**Total Values of Agricultural Materials**	**15015**
3	Costs of Production Process (1+2)	58576
4	Petty Expenses 5% of Total 3	2929
5	Capital Interest 9% of Total 2	1352
6	Sum of 3+4+5	62857
7	Gross costs for Pre-investment Years	19443
8	Fruiting Year's share of Foundation Costs	607
9	Sum of 6+8	63464
10	Land's rental	22770
	Total Preliminary Costs	**86243**

Source: field investigation and Ministry of Agriculture's Statistic 2017

From Table (3), we find that total agrarian processes costs totaled 43561 S.P., where the collectionand sorting process constituted the largest cost estimated at about 25000 S.P., at a percentage of 57.3%, whereas production requisites costs totaled circa 15015 S.P., and cost of organic and chemical fertilizing was 9675 S.P., at a percentage of 64.4%.

2-2- Calculating the economic return from olive oil production per dunum without fertilizing using fertilizer prepared from pirine and pruning products.

One dunum yields an average production equivalent to 500 kg olives, i.e. equivalent to about 125 kg olive oil.

Production value per dunum = Production quantity (dunum) x price of 1 kg olive oil =

125 x 800 =100000 S.P.

Net profit value = total net product – Gross costs.

Gross costs = variable costs + Fixed costs.

Variable costs= total value of cost of agrarian processes + total agrarian requisites' value.

Fixed costs = land's rental + capital interest + petty expenses.

So, Gross costs = (43561 + 15015) + (22770 + 1352 + 2929) = 85627 S.P.

Hence, net profit value = 100000 – 85627 = 14373 S.P.

3- Calculating economic analysis indexes for olive oil production without fertilizing using fertilizer prepared from pirine and pruning products:

*** profit per one dunum (S.P./dunum/year) = total product (S.P./dunum/year) - Gross costs with capital (S.P./dunum/year)**

= 100000-86881 = 13119 (S.P./dunum/year).

* Variable assets circulation rate = total product (S.P./dunum/year)/ variable costs value (S.P./dunum/year).

= 100000/58576=1.70

Total Economic Efficiency = total product/Gross costs

* Total margin (S.P./dunum/year) = total product (S.P./dunum/year) – variable costs (S.P./dunum/year)

= 100000-58576=41424 S.P.

* Net farm income per dunum (S.P./dunum/year) = average total product (S.P./dunum/year) – production costs without capital interest = 100000-85627-1352=13021 S.P.

*** Profitability Coefficient:**

- Profitability Coefficient relative to production costs = (realized annual profit/preliminary production costs) x 100

= (14373/86243) x 100=16.66%

1-3 Calculating Preliminary (basic) production costs of necessary agrarian processes for olive oil production per dunum using fertilizer prepared from pirine and pruning products.

Production costs of agrarian processes and production requisites were estimated according to Table (4).

Expense Nature	Cost Items per dunum	Year:2017

Agrarian Processes	Tillage 2	3000
	Harrowing and Weeding	1600
	Breeding and Pruning	6000
	Weeds and Disease Control	2550
	Fertilizer made from Pirine and Pruning Products	2611
	Collection and Sorting	25000
	Loading and Transport	2800
	Pit Preparation Wages	5000
1	**Total Wages of Agrarian Processes**	**48561**
Production Requisites	Fertilizer made from Pirine and Pruning Products	6100
	Control Materials' Value	5000
	Refills Value	4340
2	**Total Values of Agricultural Materials**	**15440**
3	Costs of Production Process (1+2)	**64001**
4	Petty Expenses 5% of Total 3	3200
5	Capital Interest 9% of Total 2	1390
6	Sum of 3+4+5	68591
7	Gross costs for Pre-investment Years	19443
8	Fruiting Year's share of Foundation Costs	607
9	Sum of 6+8	69198
10	Land's rental	22770
	Total Preliminary Costs	**91968**

Source: Field investigation and Ministry of Agriculture's Statistic 2017

From Table (4), we find that total agrarian processes costs totaled 48561 S.P., and costs of preparing the pit required for fermenting the fertilizer prepared from pirine and pruning products totaled about 5000 S.P., production requisites costs , on the other hand, constituted about 15440 S.P., and costof prepared fertilizer were 6100 S.P. (1750 S.P.of which are cost of 50 kg pirine,3750 S.P. cost of 50 kg hay, 600 S.P. cost of 50 kg non-fermented bovine fertilizer).

2-3 –Calculating the economic return from olive oil production per dunum using fertilizer prepared from pirine and pruning products.

One dunum yielded an average production of about 650 kg olives i.e. equivalent to about 160 kg olive oil.

Dunum production value = production quantity (dunum) x price of 1 kg olive oil =

160x800 =128000 S.P.

Net profit value = net gross product – Gross costs.

Gross costs =variable costs + Fixed costs

Variable costs= total value of agrarian processes wages+ total value of farming requisites.

Fixed costs= land rental + capital + capital interest + petty expenses.

Hence, Gross costs = 48561 + 15440) + (22770+ 1390 + 91361 S.P., andhence net profit

Value= 128000 – 91361-61.

3-3 calculating the economic return from olive oil production per dunum using fertilizer prepared from pirine and pruning products.

One dunum yielded average production of about 650 kg olives i.e. equivalent of 160 kg olive oil.

Production value per dunum = Production quantity (dunum) x price of 1 kg olive oil

= 160 x 800 = 128000 S.P.

Net profit value = net gross product – Gross costs

Gross costs = variable costs + fixed costs

Variable costs = total agrarian processes value + total agrarian requisites value

Fixed costs = land rental + capital interest+ petty expenses

Hence, gross costs = (48561 +15440) + (22770 + 1390+3200) = 91361 S.P.

Thus, net profit value = 128000 – 91361=36639 S.P.

3 -3 Calculating economic analysis indexes of olive oil production using fertilizer made from pirine and pruning products: (S.P./dunum/year).

*** Profit per dunum (S.P./dunum/year)= gross product (S.P./dunum/year)- gross costs with capital (S.P./dunum/year).**

= 128000-91361=36639 (S.P./dunum/year)

* Variable assets circulation rate = Gross product (S.P./dunum/year) / variable costs value (S.P./dunum/year)

= 128000/64001 = 1.9

* Total economic efficiency = gross product /gross costs

= 128000/91361= 1.4

* Total margin (S.P./dunum/year)= gross product (S.P./dunum/year) - variable costs (S.P./dunum/year)

= 128000 – 64001 = 63999 S.P.

* Net farm income per dunum (S.P./dunum/year)= average gross product (S.P./dunum/year) – gross costs without capital interest

= 128000 – 91361 – 1390 = 35249 S.P.

Profitability Coefficient relative to production costs = (realized annual profit /preliminary production costs) x 100 = (36639/91968) x 100 = 39.8 %.

CONCLUSIONS AND SUGGESTIONS:

a) Conclusions:

- Utilizing fertilizer prepared from pirine and pruning products in fertilizing olive trees is extremely important owing to the high production profitability.
- Using this fertilizer in olives cultivation realizes net profit per dunum of 36639 S.P.
- Studying the economic analysis indexes for utilizing the prepared fertilizer in fertilizing olive trees revealed that:
- The total margin totaled about 63999 S.P.
- Net farm income per dunum totaled circa 35249 S.P.
- Variable assets circulation rate per dunum totaled about 1.9.
- Total economic efficiency per dunum totaled about 1.4.
- Profitability coefficient relative to production costs totaled 39.8%.

b) Suggestions:

1) Encouraging olive farmers inLatakia governorate to use fertilizer prepared from pirine and pruning products in fertilizing their lands after effectiveness of this fertilizer have been revealed in increasing production per unit area.
2) Necessity for adherence to the recommended ratios when forming the fertilizer mix, and to observe stirring and wetting it.
3) Shifting part of olive tree orchards in Latakia governorate to the organic production system, and introducing a press for pressing organic fruit and getting highly valued organic olive oil.
4) Directing investment towards erecting factories for extracting pirine oil, which may be utilized in nutrition following treatment, or in soap making.

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