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in

Di Terlizzi B. (ed.), Dragotta A. (ed.), Jamal M. (ed.).
Syrian national strategic plan for olive oil quality : final report

Bari : CIHEAM
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 73

2007
pages 111-118

Oil Mill Analysis in Syria

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SUMMARY- This paper show the results of the recognition and analysis (survey) of the olive oil production activity in the different areas in Syria in 2004 and 2005. Analyses have been conducted on 417 mills, half of those (both with centrifugal and pressure system) now working in the 8 main olive oil regions in the Country (Daraa, Aleppo, Idleb, Lattakia, Tartous, Homs, Damascus, Hama).
The data (2004 and 2005 olive oil seasons) is related to oil production, olive storing management, mill work capacity, technological degree of the plant and its management, process parameters set-up, oil storage systems.
Activity has underlined the points of strength and weakness of the sector, allowing to individualize the possible interventions (micro and macro) and some suggestions related to the improvement of the organization and management of the plant from an oil quality improvement point of view

Key words: olive oil mill, plant design, plant management

RESUME - *Cette papier résumé les résultats de l'étude et analyse de l'activité de la production de l'huile vierge d'olive dans 8 régions différentes en Syrie dans le cadre du project titulè "Assistance technique pour l'amélioration de la qualitè de l'huile d'olive en Syrie" pendant les annèes 2004 et 2005. Les analyses ont été conduites sur 417 moulins, qui constituent la moitié des existants (centrifugation et pression) dans chaque région de production de l'huile d'olive dans le Pays (Daraa, Aleppo, Idleb, Latakia, Tartous, Homs, Damas, Hama).*
Les informations (2004 et 2005 saisons de l'huile d'olive) est raconté la production, la gestion de l'approvisionnement des fruits, la capacité du travail du moulin e ses caractèristiques, sont dégré technologique, la gestion et organisation des paramètres du processus, systèmes du stockage de l'huile, gestion des sous-produits, le niveau de formation du maitre de pression.
L'activité a souligné les points de force et de faiblesse du secteur et a permis aussi l'individuation des interventions possibles (micro et macro) soit à niveau technique que financiaire et toutes suggestions qu'ont été en rapport avec l'amélioration de l'organisation et gestion de la plante dans un point de vue de l'amélioration de la qualité de l'huile.

Mots-clés: *huile molin, projet d'installation, gestion d'installation*

Introduction

Olive growing in Syria plays a very important role in the culture and tradition of Syrian society. The olive considers Syria its original home; it is known to have been planted here many thousands of years ago.

Many farmers depend on olive cultivation for their livelihood. It is estimated that 100,000 families are dependent on olive growing. The estimated production value of the 1998 crop was up to 18 billion Syrian pounds.

Olive growing in Syria is an ancient practice, known to people many thousands of years ago: in Ebla, in the north of Syria close to Idleb city, a library on tablets of baked clay was discovered dating back to 2,400 BC describing the land and the olive orchards owned by the king and queen and the nobles of the palace. The olive tree is a holy tree in all divine religions. It was mentioned in all divine books.

Olive farming and production in Syria is described as a sustainable and developing treasure and olive

oil production represents for the Country an important agricultural sector, growing in the next years: in Syria 2-2.5 million new young trees are planted every year.

The surface area occupied by olive trees, according to 2005 statistics, is 544,000 hectares and the total number of trees planted is 85,000,000, of which 55,000,000 fruiting with a yield of 950,000 tons: 200,000 tons assigned to table olive processing and the remaining to oil production which gives 170,000 tons of olive oil.

The number of mills in 2005 year was 923 (428 by centrifugation system, 495 by pressure) (Chart 1) with a total daily production capacity of 20.000 tons/24 hours. 27 of the centrifugal mills operate on olive oil extraction from husk and the oil extracted from those mills is used for soap production in addition to oil coming from the husk refinery.

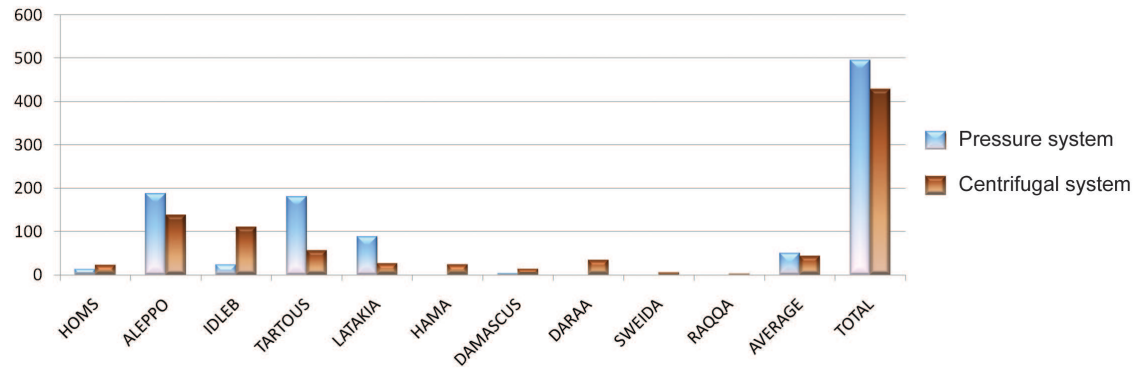

Chart 1: Mills in Syria (2005 data)

Nowadays, Syria has a surplus of olive oil that has reached 40,000 tons and is expected to mount in the next three years as a result of the expansion programs in planting and the number of young trees reaching the fruiting stage.

So, many interests are focused on the improvement of the quality of the olive oil in Syria to meet the export demand and competition in quality and proper packaging, organizing and improving the entire production chain, focusing on the improvement of the quality introducing new technologies or optimizing the current.

Project activities

Surveys and problems analysis

The project activities starts with a survey of the mills in every major olive producing region in Syria (Lattakia, Tartous, Idleb, Aleppo, Homs, Daraa, Damascus, Hama) to know the extent of the problems that face the plant engineering and management and the level of the olive oil extraction process.

The following chart and figures show the graphics of some of the analyses done. Particularly, olive receipt management, process parameters set-up and plant management and oil storage systems are introduced.

By a general point of view, analyses underline that each of the Regions introduces different points of strength and weakness in the division. Nevertheless, in none of them are all the management and processes parameters lined up on a level considerable enough for a “quality” chain.

Table 1: Mills surveyed in different olive growing areas

Region	Total mills	Surveyed mills	%
Lattakia	114	24	21.05
Tartous	237	229	96.62
Homs	35	20	57.14
Idleb	124	72	58.64
Aleppo	325	41	12.61
Daraa	33	33	100,00
Damascus	16	12	75.00
Hama	23	16	69.56
Raqqa	2	0	0.00
Sweidaa	5	0	0.00

Accordingly olive harvesting, receipt and storing management (Chart 2 & Fig. 1), in the different areas showed a different degree of attention to the quality of the initial product, frequently a symptom of a greater attention to the quantity of the production rather than to the its quality.

Particularly harvesting, normally by hand, sometimes from the soil, needs some adequate technical equipment, as nets with pneumatic comb or low power shakers, to be ready for the right time to harvest, to separate in the field bad from good olives (the second will be picked from the nets, the first will be left on the ground and processed separately), to improve work capacity in manpower. Also olive transport and its storage before crushing methods need to be improved to assure the maintenance of the quality of the olives: suggested technical equipment are plastic boxes and suggested managing act is minimum resting time before crushing normally reached with an adequate sizing of the extraction plant

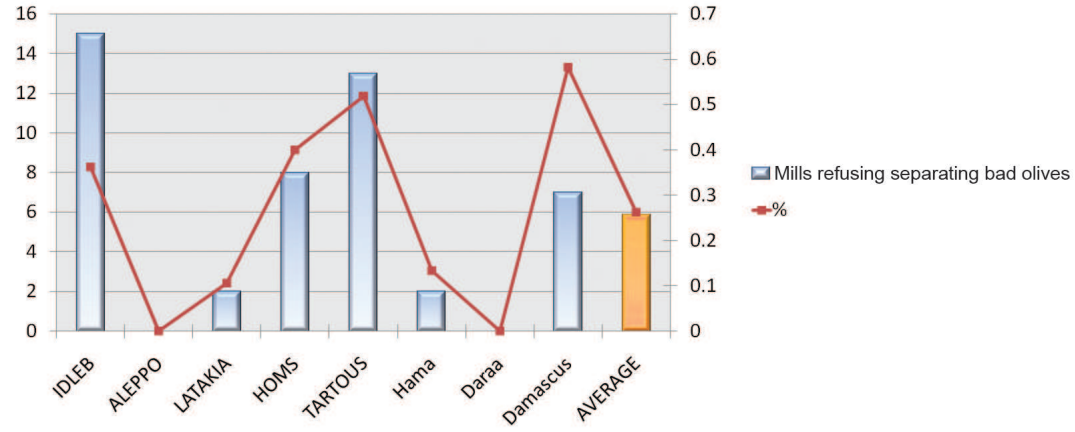

Chart 2: Olive reception management

Figure 1: Different harvesting and storing methods

Despite its importance, the management of the production process, both in terms of process parameters, as paste temperatures and volume of added water (Chart 3 & Fig. 2), and attention to the cleaning of the machinery and the food safety (Chart 4 & Fig. 3), are given little attention. It is here underlined on the problem list.

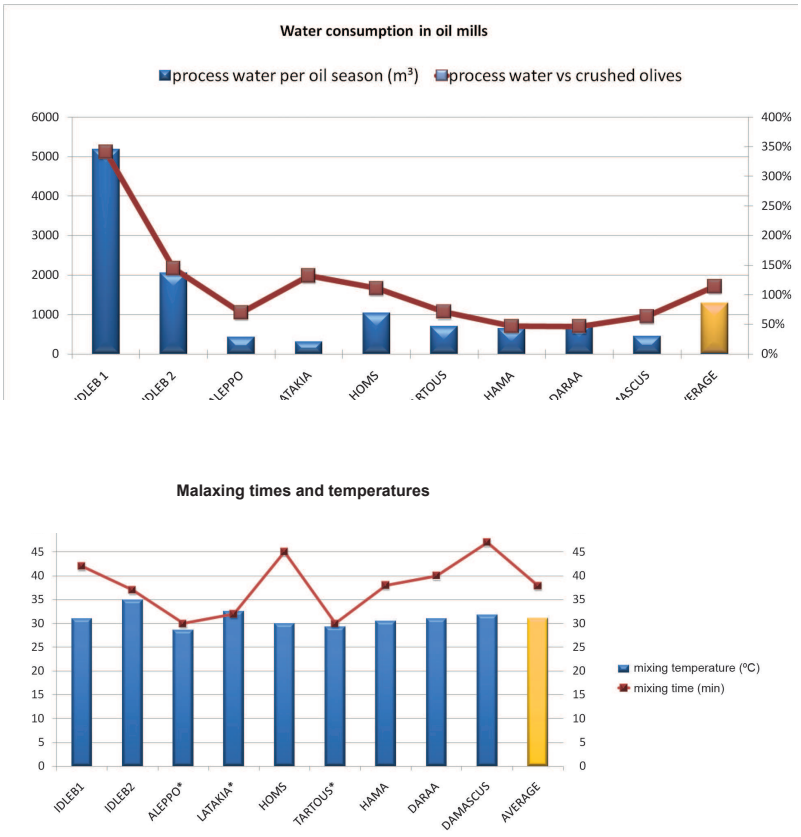

Chart 3: Extraction process parameters management.

Figure 2: Some different olive oil extraction plant.

Data shows that process parameters setup normally is linked to the maximum extraction yield, loosing in quality. May be appreciable a more deep control specially on the process water volumes to not loose polyphenols and aromatic compound that grant the oil stability during storage and appreciable organoleptic characteristics. Notice that process water volume isn't calculate according machine or olives needs, but its value seems random among the Regions or between the same Region (Idleb 1 & Idleb 2), probably according the first setup of the machines or the claim of the farmer.

By an hygienic and food safety point of view, datas and images clearly highlight low attention.

The right way to solve this problem could be to introduce, also by a legislative side, an self control system based on HACCP methods linked with some stainless covering equipment upgrading. Notice that where machine are more stainless covered there's also an high degree of every day cleaning, as in Daraa Region, characterized by new olive-groves, new extraction plant and presence of export Companies.

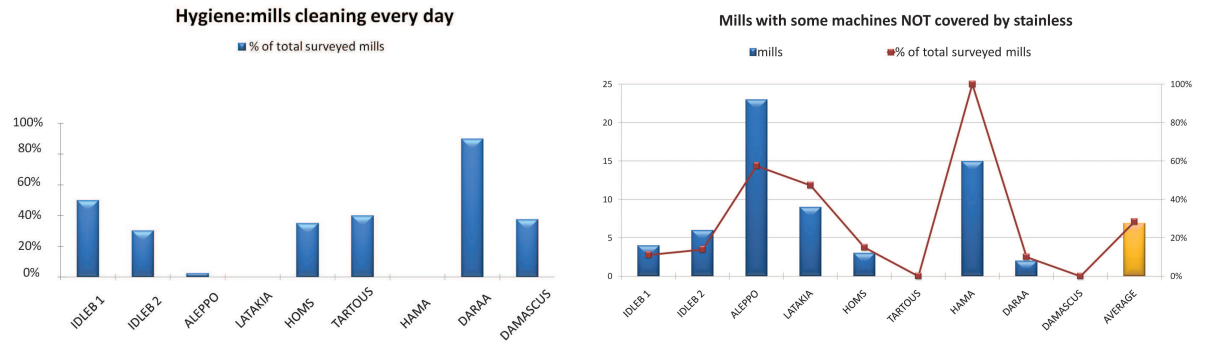

Chart 4: Hygiene plant management.

Figure 3: Some output of hygiene plant management.

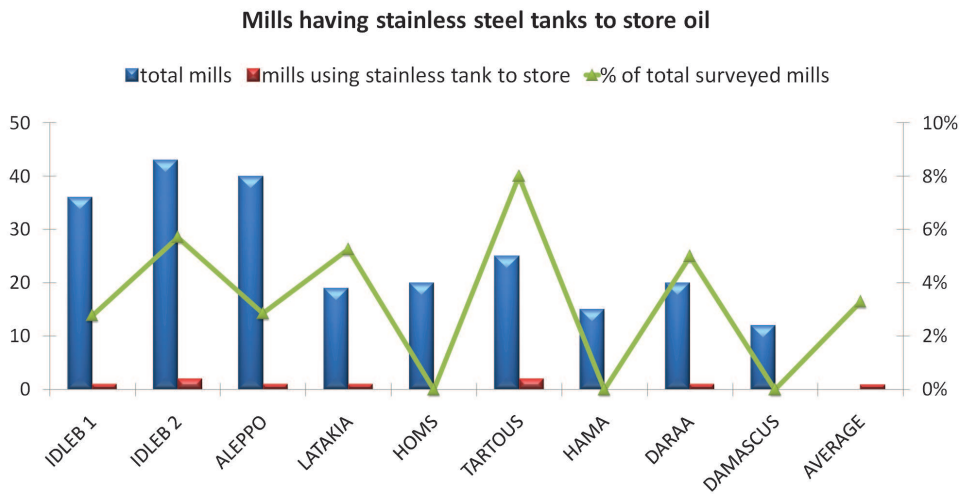

Chart 5: Oil storage management.

Figure 4: Different methods of oil storage.

Overall, in the same Daraa Region, characterized by young farmers, new orchards and new extraction plants, where process parameters are setted up at an enough quality level, the last production factor (oil storage - Chart 5) is not on the “quality line”. This observation underline that few and small intervention, such as stainless steel tank to store the oil (also with financial grant), preserving the oil by accelerate oxidation, could complete the “quality chain”

By a general point of view, oil storage methods, different among the Regions and in the same Region, need to be improved, eliminating plastic tank and any no stainless steel store container.

Demonstration activities

Among the demonstration activities effected within the project (short courses for technicians and operators, technical seminars of close examination, technical brochure, informative sheets), great attention has been set to the possibility of reality implementation of a series of joined actions, related to the process management and to the extraction plants, such to raise the highest level of “quality”.

To such intention 4 pilot sites (Daraa, Jeinderes, Salamieh, Maar Ballit) have been implemented, each with some own organizational peculiarities, as brought in Fig. 5.

All the pilot sites have been supported through some operational protocols, arranged with the actors of the olive oil process and the supply of technical equipment, where necessary, with the purpose to act in all the best conditions to exalt the quality of the final product. Particularly are been applied:

- procedures of selection of the entry product (evaluation of the sanitary state, of the maturation degree and of the drupes detaching strength);
- procedures of harvest and transport of the olives (picked up by the tree with pneumatic combs and nets under canapy, storage of the drupes in plastic boxes and them sudden transport in mill);
- procedures of hygienic-sanitary control (accurate cleaning of the oil extraction plant and the of the premises before process starting);
- procedures of control of the process parameters of trial (three phases centrifugal system, attended time before crushing maximum 8 hrs, process water maximum 25% of the weight of the olives, or to the solid-liquid optimal separation line, mixing temperature less than 30°C, mixing time maximum 60 minutes);
- oil quality control procedures (sampling and analytical and organoleptic evaluation);
- procedures of oil storage (stainless tank);
- procedures of product value increasing (dispatch sampling, also on request, to exporting/importing Companies).

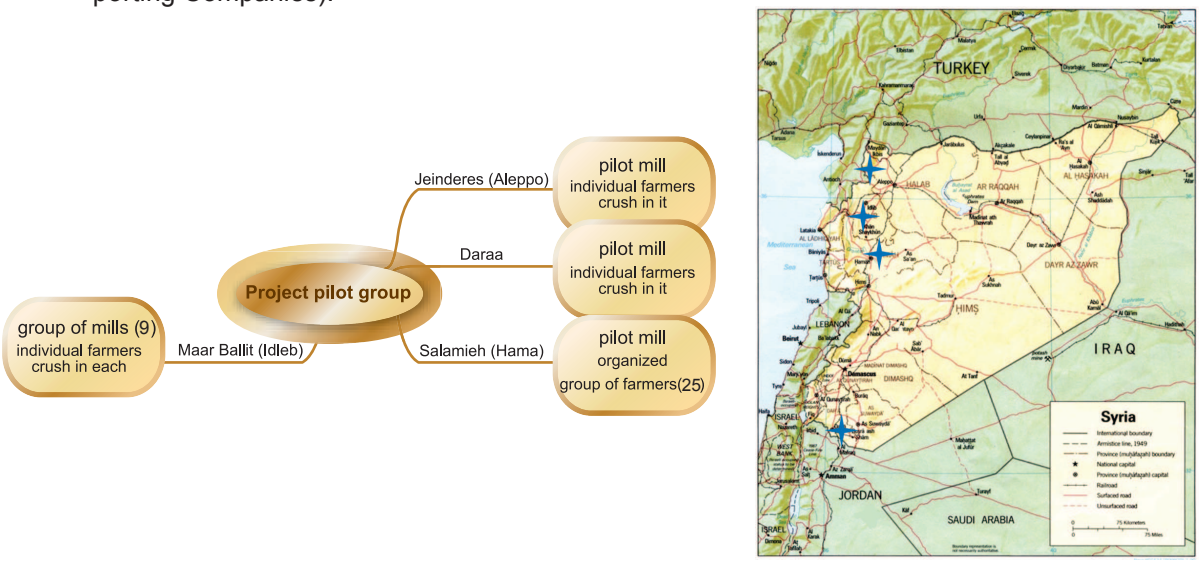

Figure 5: Demonstrative layout – pilot group (sx) and sites map (dx). In Jeinderes miller buy olives from farmers; in Salamieh farmers chose mill according to processing and hygienc rules

Figure 6: Harvesting, olive transport & storage and oil extraction in pilot sites.

Following the main qualitative characters (Table 2) and the organoleptic profiles (Fig. 7) of the oils extracted in the pilot sites are brought; in Maar Ballit, at this paper's release, activities are still in progress.

The extracted oils are attested all on elevated qualitative levels, also showing characters of peculiarity and identification related to the cultivar (or mixture of cv) and to the production area. The analysis of the data underlines that the extraction process management "in quality", with the rigorous planning and observation of the fixed rules, hand to a meaningful qualitative raising of the product oil, also for its peculiar characterization.

The unique link between farmer and miller, also in the different forms of aggregation, has allowed the implementation of the development model, according to which both the actors extend to a mutual aim, the one checking operates of the other. Some further result from Maar Ballit site are expected, where the model comes to complicate with the presence more millers, each of which has selected his own best clients to constitute a bulk of product with high and standards qualitative characteristic to arouse the interest of the export/import Companies.

Table 2. Oil main quality parameters in pilot group.

Pilot group	Cultivar	Acidity	Peroxides
Daraa	Sourani, Nibali, Zaiti	0.25	4
Salamieh (Hama)	Kaisi, Sourani, Jlot, Safrawi, Nibali, Khoudeiri	0.23	5,4
Jeinderes (Aleppo)	Zaiti, Sourani	0.25	6

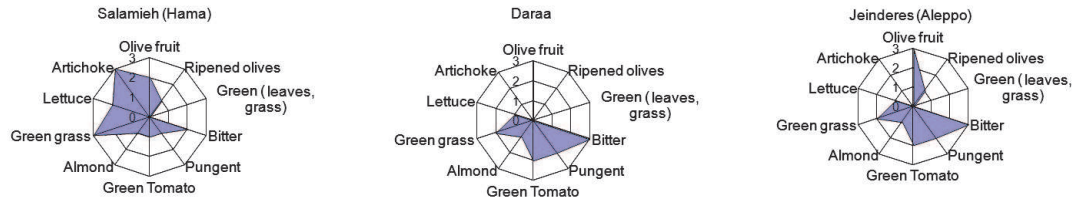

Figure 7: Oil organoleptic profiles in pilot sites (Source: *Dubla - Perrucci*)

Conclusion

The done activities in this project framework and the datas analysis have underlined that, to set the conditions to increase the percentage of "good quality" produced oil, are not necessary big financial investments: it is possible to hypothesize enough a fine and correct information and education of the workers linked with some small punctual supports, now on the management, now on technical equipment, diversifying it for each Syrian olive growing region.

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