APPLICATION OF HAZARD ANALYSIS CRITICAL CONTROL POINT SYSTEM "HACCP" IN OLIVE OIL EXTRACTION PROCESS

By

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B.Sc. Agric. Sc. (Food Technology), Ain Shams University, 2007

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تطبيق نظام تحليل المخاطر و نقاط التحكم الحرجة "الهاسب" في عملية استخلاص زيت الزيتون

رسالة مقدمة من

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للحصول على

درجة الماجستير في العلوم الزراعية
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ABSTRACT

Walaa Mohamed Ahmed El-Sayed: Application of Hazard Analysis Critical Control Point System "HACCP" in Olive Oil Extraction Process. Unpublished M. Sc. Thesis, Department of Food Science, Faculty of Agriculture, Ain Shams University, 2014.

Olive oil is extracted from fruits of the olive tree which considered as one of the most important fruit crops in Egypt. HACCP system is an international system for food safety. So, the present work was carried out to investigate the possibility of implementation of HACCP system in different methods of olive oil extraction to improve the quality and safety of olive oil. Detailed studies of different olive oil extraction plants, were achieved, these plants include Traditional and Hydraulic press and Centrifugation plants.

Olive oil extraction:

1- Traditional mill:

The results of equipments and worker's hands swabs showed noticeable microbiological load including coliform group. Water samples were contamination by coliform group. Olive paste was investigated for its content of total bacterial count, coliform group, yeast & mold and aerobic spore forming bacterial count which increased from 3, 3.18, 3.78 and 1log cfu/g to 4.48, 3.9, 4.8 and 1.6 log cfu/g; respectively, after crushing and malaxation step. The chemical characteristics of the produced olive oil were acidity (2.04%), K_{232} (2.24), K_{270} (0.68), peroxide value (27.22), TBA (3.13) and total phenols (140).

Receiving of olive fruits and extraction of olive oil by Traditional press were considered as critical control points. Propose a modifying to some steps during the extraction process, these steps are olive fruits spreading, crushing and malaxation and separation by gravity. Corrective actions have been identified which working to return manufacturing line to the correct mode, for example develop particular specifications for olive fruits, spread olive fruits

far from the direct sunlight, making flash washing after spread olive fruits, replace the management crusher with animal administered by machine, use disk filters made of polyethylene instead of filters made of palm leaves, oil storage in tanks of stainless steel with a conical base instead of plastic drums.

2- Hydraulic press mill:

The results of equipments and worker's hands swabs showed noticeable microbiological load including coliform group. Water samples were contaminated by coliform group. Microbial load of olive paste during crushing process was decreased which may attribute to the events of mechanic damage to microbial cell walls during crushing process. While it was observed an increment of the microbial load of the olive paste during the malaxation process. The chemical characteristics of the produced olive oil were; acidity (1.46%), K_{232} (2.17), K_{270} (0.45), peroxide value (10.26), TBA (1.86) and total phenols (300). The step of olive fruits receiving, olive fruits cleaning, malaxation, extraction of olive oil and separation of olive oil were considered as critical control points. Temperature and time during crunching and malaxation and pressure processes could be regarded as measures to control microbial hazard and increase the quality of the oil output. Corrective actions have been identified which working to return manufacturing line to the correct mode, for example develop particular specifications for olive fruits, renew frequently washing water, effectiveness maintenance, cleaning and disinfection program, training courses for operator, application good hygiene practices and good manufacturing practices.

3- Centrifugation mill:

The results of equipments and worker's hands swabs showed noticeable microbiological load did not including coliform group. Water samples were not contamination by coliform group. Microbial load of olive paste during crushing process was decreased. While observed increase of the microbial load of the olive paste during the malaxation process. The chemical characteristics of the produced olive oil were acidity (0.78%),

K_{232} (1.98), K_{270} (0.21), peroxide value (7.53), TBA (1.95) and total phenols (610).

Receiving olive fruits, olive fruits cleaning, malaxation and extraction of olive oil by centrifugation were considered as critical control points. Temperature and time during crushing and malaxation processes could be regarded as measures to control microbial hazard and increase the quality of the oil output. Corrective actions have been identified which working to re-manufacturing line to the correct mode, for example develop particular specifications for olive fruits, renew frequently wash water, program effectiveness maintenance, cleaning and disinfection, training courses for operator, application good hygiene practices and good manufacturing practices.

Key Words:

GMP - Hazard - HACCP – Hydraulic press - Quality – Olive oil - Safety.

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