

## Summary

### Part –I

The aim of this investigation was to study the possibility of using some cold and safe gamma rays, dry hot (microwave) and moist hot soaking in hot water(100°C) as physical treatments to improve the quality of olive fruits cultivar (Calamata) during storage at ambient temperature, The present work was carried out to study :-

- (1)The effects of these treatments on the chemical composition of olive fruits undertaken as well as the effect of the treatment on physico-chemical properties and fatty Acids composition for oils extracted from olive fruits under investigation.
- (2) The effect of these treatments on the sensory properties and microbiological quality of olive fruits (Calamata).

Samples of olive fruits cultivar (Calamata) were divided to four groups as follows:-

- The first group was left without any treatment as a control.
- The second group was divided to two sub-groups and gamma irradiated at doses of 1 and 3 kGy
- The third group was also divided to three subgroups and microwaved for 10, 13 and 15 minutes.
- The last group was also divided also to three subgroups and soaked in a hot water at 100°C for 6, 9 and 12 minutes.

The obtained results can be summarized as follows:-

**(1) Effect of treatments on the chemical composition of olive fruits.**

- 1-1- The results showed that the percentages of moisture, crude protein, crude oil, carbohydrates and ash contents were 46.80, 1.21, 19.00, 72.79 and 7.00 for Calamata olive fruits respectively.
- 1-2- Treatment of olive fruits undertaken by gamma irradiation doses or by soaked in hot water had no real effects on the chemical composition of olive fruits, post treatment and during storage.

Moreover, microwave heating did not alter the chemical components of olive fruits except for moisture contents which was decreased from 46.80 in control Calamata olive fruit samples to 43.20, 41.50 and 39.7 in olive fruits after microwave heating for 10, 13 and 15 min. respectively.

**(2) Effect of treatments on physico chemical properties of oils extracted from olive fruits .**

- 2-1- The acid value of olive fruits oils slightly increased due to treatment of fruits by gamma irradiation doses, moreover, treatment of olive fruits by microwave heating or soaking in hot water increased the acid value of their extracted oils. The increasing in acid value tookplace during storage.
- 2-2- The results showed that treatment of olive fruits undertaken by gamma irradiation doses, microwave heating or

soaking in hot water increased the peroxide value of their oils post treatments and also, during storage .

2-3- In all treated olive fruits, the thiobarbituric acid reading absorbance of the extracted oils increased due to treatments but the microwave heating had the highest effects on increasing the peroxide value post treatment and during storage periods.

2-4- The determination of iodine value and saponification number for oils extracted from treated and untreated olive fruits showed that all treatments under investigation had no real effects on both values .

### **(3) Effect of treatments on the fatty acids composition.**

3-1- The gas chromatographic analysis showed that the total saturated fatty acid amounted to 17.71% in oil extracted from control Calamata olive fruits sample Palmitic acid was the major saturated fatty acid 14.78% followed by stearic 1.88% and myristic 0.68% acid of control sample .

Meanwhile, the total unsaturated fatty acids were 82.27% in oils extracted from Calamata olive fruits. Oleic Acid was the predominant unsaturated fatty Acid (66.37)% followed by linoleic 12.66% and palmitolic (C 16: 1) 2.38% and linolenic 0.68 %acids in oil extracted from calamata olive fruits .

3.2: Treatments of olive fruits by gamma irradiation at doses of 1 and 3 kGy or microwave heating for 10, 13 and 15 min.

or soaking in hot water for 6, 9 and 12 minutes had no real effect on fatty acids composition of their extracted oils.

#### **(4) Effect of treatments on the sensory properties and microbiological quality of olive fruits.**

The results showed that the overall acceptability scores of each treatment gradually decreased by increasing the storage periods, in addition the total counts of bacteria, molds and yeasts were decreased by applying there treatments.

#### **• Conclusion-:**

It could be concluded that gamma irradiation at doses of 3 kGy was the best treatment under investigation for extending the shelf- life of olive fruits (Calamata variety) to 35 days which stored at ambient temperature without a deleterious effects on their chemical and sensory properties compared to 20 days for control sample.

### **Part II (The application part)**

The virgin olive oil obtained from the best treatment in part one of the present study is used for manufacturing soft cheese from skim homogenized milk containing 4 % olive oil as milk fat substitute where two levels of salt (1 and 2 %). Were used some cheese samples were irradiated with gamma rays at a dose of 1.5 and 2.5 kGy. The produced cheese samples were stored in the refrigerator or room temperature. In addition Zabadi was made from fresh mixed milk buffaloe's and cow's milk containing 4 % milk fat as a control. Olive oil was used to

replace milk fat at percentage of 25% , 50% and 75% ,The results could summarized in the following:-

◀ **In respect of soft cheese:**

- A good quality of fresh soft cheese was obtained going more white color with slight oily flavor having 80 score points compared with 95 points for the control cheese.
- The shelf life of the obtained non irradiation cheeses were 6 and 12 days when stored at room temperature and in the refrigerator respectively.
- The storagability of the cheese contained higher percent of salt was extended to 9 and 18 days when stored at room temperature and in the refrigerator in the same order.
- Irradiation, gamma rays prolonged the shelf life of cheese samples depending on the dose of irradiation and the storage conditions. The shelf life periods were 36 and 40 days for irradiated cheese with 1.5 and 2.5 kGy when stored at cold storage condition, while at ambient condition only 9 and 12 days were recorded.
- It can be concluded that bind effect of irradiation and cold storage condition of soft cheese containing olive oil and low salt content led to prolong the shelf life of the produced cheese.
- The obtained soft cheese containing olive oil as fat substitute can be considered as a healthy food item containing high percentage of unsaturated fatty compared with cheese made from natural milk.

◀ **In regarding to Zabadi containing virgin olive oil as practically replacer of milk fat, the important obtained results are-:**

- Using different levels of olive oil as milk fat substitute in Zabadi manufacturing has a slight effect on the total sold of the final product. A noticeable effect on total acidity for fresh Zabadi or after 8 days of the cold storage was noticed .In addition a noticeable reduction in the total volatile fatty acids were observed.
- Sensory evaluation of the produced Zabadi indicated that the product containing virgin olive oil was characterized by inferior quality mainly in body and texture. The only advantage of this product that it contains large amount of unsaturated fatty acids which are of great important from the nutritional point of view especially to those suffering of high blood presage and cholesterol .
- To overcome weak body and texture of the produced zabadi, can be covered by mixed or homogenizing and consumed as a fermented drink milk product.
- The results revealed that 50 % replacement of milk fat by olive oil is the higher limit to give an acceptable zabadi product as stated by the score panel tasters.