

Effect of *Eryngium Planum* on Microbial Properties and Shelf Life of Marinated Olive

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Abstract—Olive scientific name (*olea europaea*) is approximately 20 species of small trees of the family *Oleaceae*. Marinated olive is one of the products olives which are produced in northern Iran. Marinated olive is a specific fermented food and traditional commercial area in the north of Iran, which supplied the country and fraught with unsaturated fatty acids and antioxidant. Lack of standardization in the production of short duration, retention marinated olive is one of the challenges this product is in production. This study examines the addition of *Eryngium planum* vegetable and Pomegranate paste 2.5, 5 and 10 percents on microbial properties and shelf life of olive deals with three replications. Olive is desirable fermentation lactic fermentation by lactic acid bacteria occurs to improve the fermentation conditions must hold: aeration (oxygen supply sufficient quantities) and the acidity of the product are suitable. The results indicated that the addition of *Eryngium planum* vegetable and by the time two months of production and maintenance, lactic acid bacteria increases and improves the process of fermentation of marinated olive production, also reduce the acidity of the product and prevent the growth of Gram-negative bacteria will be provided.

Index Terms—acidity, microbial properties, lactic acid bacteria, marinated olive, lactic fermentation.

I. INTRODUCTION

Olive scientific name (*olea europaea*) is approximately 20 species of small trees of the family *Oleaceae*. In the ancient world of the Mediterranean, North Africa, Southeast Asia, North and South China, Scotland and East of Australia have a wide dispersion. They are evergreen and have small leaves that are opposite each other are integrated. The fruit is a drupe plant. Known species of this plant is the most famous European Olive that from ancient times to produce olive oil and fruit consumption has been used [1]. The fruit of this plant contain sodium, vitamins A, E and Fe [2]. Bitter Olive and fresh fruit consumption, the bitterness of the glycoside is called Oleopichrin. The flesh there is and a variety of fruits can be removed. This action Prosing say [3]. The Fermentation, drying and freezing as a method of food preservation. Olive is desirable fermentation lactic fermentation by lactic acid bacteria occurs to improve the fermentation conditions must hold: aeration [oxygen supply sufficient quantities] and the acidity of the product are suitable. Marinated olive is one of the products olives which are produced in northern Iran.

Using both traditional and industrial production of mixed Olive and other materials produced. It is limited to industrial production in the country due to increasing demand in recent years a small number of companies began manufacturing their marinated olive but now it also produces more traditional methods of production of the industrial method [4]. To produce a kilo of marinated olive, the first stage of processing Olive and the pit of a kilogram of olives isolated, per a kilogram of Olive added 322 gram walnuts powder, one tablespoon of sour pomegranate paste, a glass of sour pomegranate juice, powder of dried mint to the need, and a little garlic powder and salt Angelica, local vegetables (*Eryngium planum* vegetable) compounds have been mixed together and then it is ready to use marinated olive [3]. In another study by Duran *et al.*, (1994) Lactic acid fermentation in the maintenance phase of ripe olive cultivars studied were Hojiblanc. The results showed that the pH barrier in olive fermentation process aeration conditions is, so by adding acetic acid to controlled and regulate. In your research possible by supplying marinated olive probiotic strains resistant to acid *Bifidobacter Bifidum* (PTCC1644), was analyzed. In this study, two types of marinated olive, one of with pomegranate paste and one of without pomegranate paste are made. Were sterilized marinated olive was added to olive and *Bifidobacter Bifidum* and after 25 days of storage at temperature 4 °C, the growth and survival of bacteria *Bifidobacter Bifidum* in the marinated olive was examined. Experimental results indicate that the *Bifidobacter Bifidum* survival in the without pomegranate paste marinated olive was better and therefore for probiotics more suitable, but it should be noted that using a certain amount of pomegranate paste marinated olive products, suitable probiotic product can be produced. Lack of standardization in the production of short duration, retention marinated olive is one of the challenges this product is in production. Chochagh or Chochakh scientific name *Eryngium planum* the *Umbelliferae* family is known as a medicinal plant. The roots and leaves of the plant is used the roots and leaves of the plant is used [5]. The purpose of this study was to evaluate the effects of adding *Eryngium planum* vegetable and pomegranate paste different percents on microbial properties and shelf life is marinated olive.

II. MATERIALS AND METHODS

The main ingredient, olive orchards city of Zanjan, Tarom was funded by accident. After sorting the raw

product for healthy fruits congenital bitterness were maintained for 2 weeks in 5% salt water. The next important ingredient in the production of marinated olive, walnut that came from the province. Industrial apple cider vinegar with brand Famyla, refined olive oil with brand White River, salt, refined brand of crystals which were funded from the grocery store. White garlic from the Caspian region was prepared. In the experiment pomegranate paste are considered variable of Roudbar the area north of supply were used.

A. Formulations Production

Production of marinated olive treatments in Table [1] is described.

TABLE I. COMPOSITION OF MARINATED OLIVE

Constant values		Variables
Pit olives 100g + 3g garlic + Refined olive oil 7 ml + 5 ml vinegar + Salt 4 g + Walnut 50g + 4g <i>Eryngium planum</i>	The olive varieties: yellow Olive	<i>Eryngium planum</i> vegetable Existence The absence

Constant values		Variables
Pit olives 100g + 3g garlic + Refined olive oil 7 ml + 5 ml vinegar + Salt 4 g + Walnut 50g + 4g <i>Eryngium planum</i>	The olive varieties: yellow Olive	pomegranate paste
		2.5%
		5%
		10%

So without vegetable samples and vegetable of in containers made of glass and aluminum doors and door were rated for retort packaging. Glass packaging pasteurization at 80 °C for 5 min. Samples after cooling were kept in the refrigerator at 4 °C. To assess the quality indicators in the first month, once every 4 days, every week of the second month, in the third and fourth once a month in 3 replicates and controls were tested. After packing, all the samples packaged with control samples for the

pasteurization temperature for 20 min were transferred 80 °C. 80 °C reference temperatures is the temperature in most of the factories producing canned the temperature in the non-beneficial microorganisms are destroyed but has no effect on bacteria fermentation. The samples were stored in a refrigerator at 4 °C.

Methods for the determination of acidity, lactic acid bacteria count and total count of bacteria:

- Determination of acidity according to the National Standard No. 987.
- Lactic acid bacteria count on the National Standard No. 2326.
- The total count of bacteria, yeast and mold colonies on the National Standard No. 2326.

B. The Statistical Analysis

All experiments were repeated at 3 and data analysis was performed using SAS software. Mean values were compared by Duncan test at the 5% level. Graphs were plotted using Excel software.

III. RESULTS

Experimental results indicate that the addition of *Eryngium planum* vegetable in treatments marinated olive increased the number of lactic acid bacteria were Fig. 1. After two months of keeping marinated olive production of both treatments in terms of lactic acid bacteria were almost on a level but with more time to a period of three months, the number of lactic acid bacteria in the treatment of *Eryngium planum* vegetable bullish trend compared to samples without vegetable was the process to achieve a four-month period was declining Fig. 1. Lactic Acid Bacteria used in the production of fermented foods dates back to about 4000 years ago. So they actually produce products such as yogurt, cheese, sausages, pickles, etc. are used. Lactic Acid Bacteria refers to a broad category of beneficial bacteria. They are all the same features and their fermentation end-product is lactic acid.

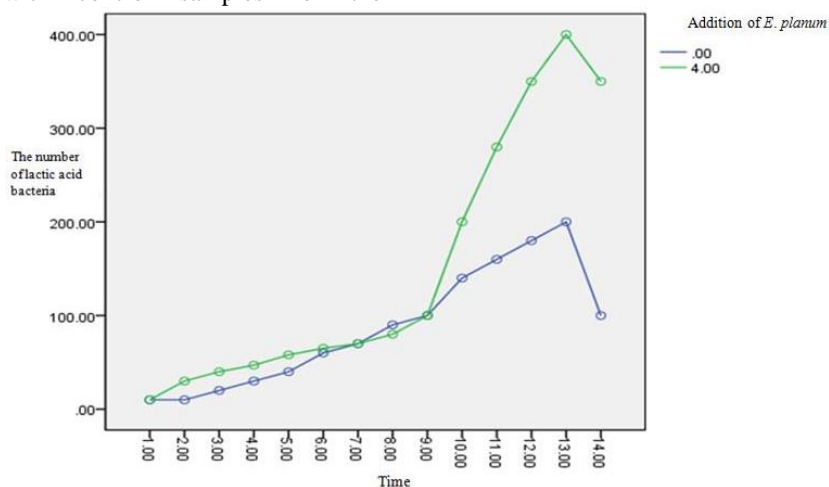


Figure 1. Interaction of time of addition of vegetable on the number of lactic acid bacteria

Add *Eryngium planum* vegetable in treatments marinated olive statistically significant effect on the acidity.

As Fig. [2] is visible use of *Eryngium planum* reduced acidity in marinated olive production but as time went

acidity uptrend and in the third month after their equality with the control sample. Due to the increasing amount of

lactic acid bacteria in the treatment of *Eryngium planum* vegetable so reducing its acidity justified [Fig. 1 and 2].

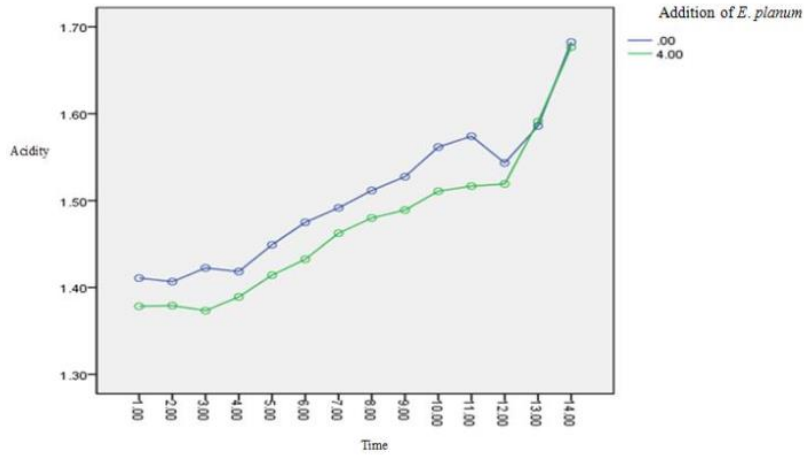


Figure 2. Effect of addition of *Eryngium planum* on acidity changes

Add *Eryngium planum* vegetable in samples marinated olive total bacteria were increased Fig. 3. The results are shown in Fig. 3 non-use of *Eryngium planum* reducing total of bacteria in the production marinated olive than the treatments of have been *Eryngium planum* vegetable. But as time passed without *Eryngium planum* treatments the

prior bullish trend total number of bacteria was. Thus, total number of bacteria, samples of vegetable in the third quarter was equal to the number of without *Eryngium planum* samples in the fourth month. When microorganisms into food, if conditions are favorable for their growth, proliferation, and steps will be spent.

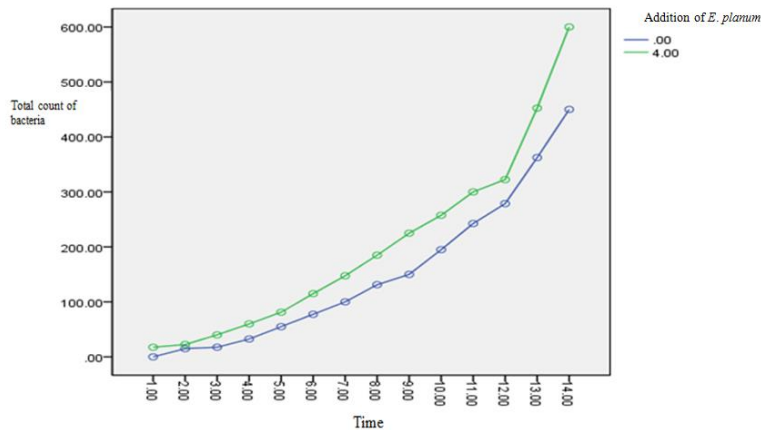


Figure 3. The effect of adding vegetable to the total count bacteria

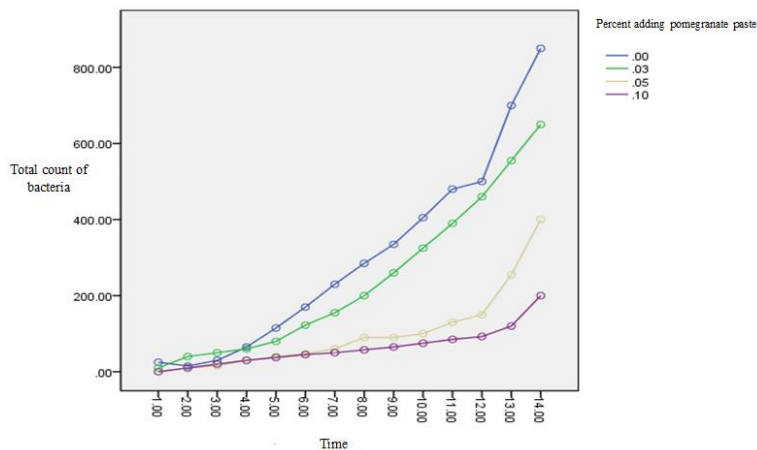


Figure 4. The effect of adding pomegranate paste percentages

IV. DISCUSSION

According to the results, with the percentage paste of the total number of bacteria pomegranate paste of marinated olive production has dropped. The lowest number of bacteria in a sample pomegranate 10% of marinated olive and largest number in the sample without pomegranate paste (control) were evaluated (Fig. 1). Pomegranate paste with compounds such as tannins and anthocyanin's are which has antibacterial and antiseptic properties against microorganisms such as *B. subtilis*, *E. coli* and *Saccharomyces cerevisiae* are and also adjust the pH of the environment that result from the growth of undesirable bacteria prevent and helps lactic fermentation is well done.

The effect of the addition of pomegranate paste the number of lactic acid bacteria was statistically significant difference. With the addition pomegranate paste Percent with time, the number of lactic acid bacteria in marinated olive took uptrend. So by adding pomegranate paste 2.5% within three months of lactic acid bacteria to the largest number of lactic acid bacteria was 580 milligrams per hundred grams (Fig. 2). But this level of treatment pomegranate paste 10% of marinated olive to reach 990 milligrams per gram (Fig. 3). After three months, the amount of lactic acid bacteria was reduced (Fig. 2 and Fig. 3). Highest Lactic acid bacteria in the sample with the number of pomegranate paste 10% were assessed over three months (Fig. 3).

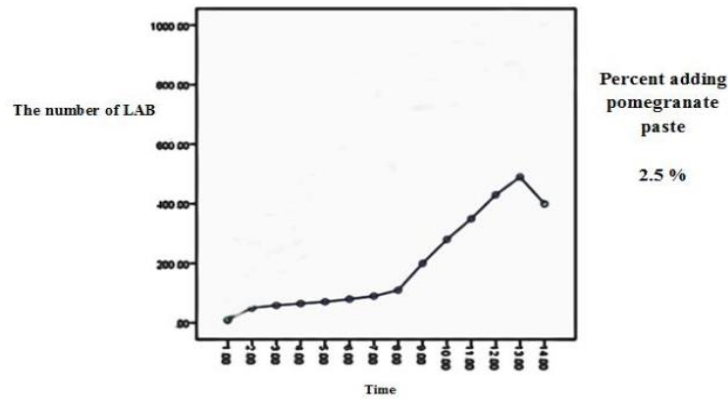


Figure 5. Interaction between the times in pomegranate paste 2.5% addition, on number of lactic acid bacteria

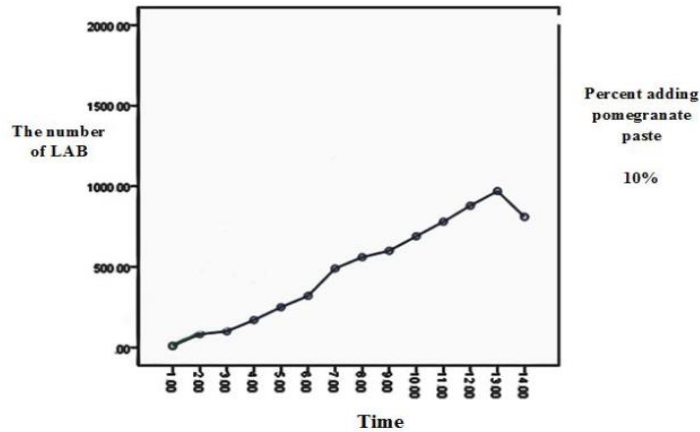


Figure 6. Interaction between the times in pomegranate paste 10% addition, on number of lactic acid bacteria

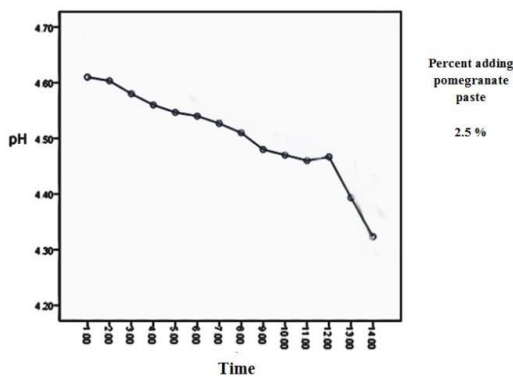


Figure 7. Interaction of the time in addition pomegranate paste 2.5% on the pH

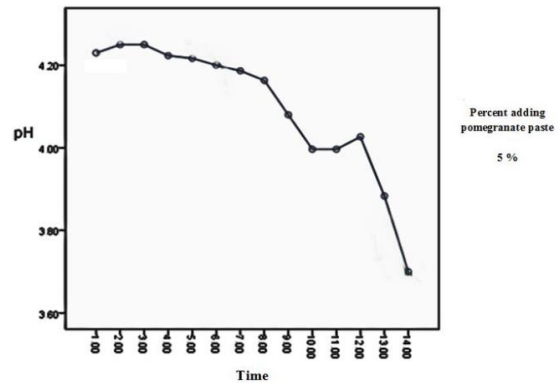


Figure 8. Interaction of the time in addition pomegranate paste 5% on the pH

Increase the percentage of pomegranate paste olive samples even in the first months of to reduce the pH of the production marinated olive (Fig. 4 and Fig. 5). Over time, the pH of the samples was reduced so after a four month to keep period the lower Percent of pomegranate paste treatments was the lowest pH = 4.33 and the further Percent of pomegranate paste treatments 3.65 was (Fig. 4 and Fig. 5). This demonstrates the effect of pomegranate paste on pH and reducing it.

History of microorganisms used in food, particularly lactic acid bacteria producing to protect and improve human health is very long [6]. Lactic acid fermentation by lactic acid bacteria is the major role in the production of dairy products, juices, sausages, pickles and salt plays [7], [8]. Lactic acid bacteria not only the growth but also to stimulate the immune system and prevention of diseases such as cancer, infections, asthma and skin allergies are used [9]. Several studies show that most lactic acid bacteria produce substances that inhibit the growth of pathogenic microorganisms [10]. By controlling the pH at about 4-4.2 will prevent the growth of Gram-negative bacteria and aerobic conditions to remove the excess accumulation of carbon dioxide but aerobic conditions prevents the production of acid and increases the pH, that's why adding acetic acid or lactic acid for pH control is essential. Studies have shown that bacteria "lactic acid" contributes to improving immunological function of lymphoid tissue in the gastrointestinal tract. Create low acidity, producing organic acids, carbon dioxide, hydrogen peroxide [as a bacteria killer], ethanol, intake of nutrients and competition for physical space by the bacteria, the effective factors in this equation are, the effective factors in this equation are [5]. The results of this experiment by adding *Eryngium planum* vegetable and as time passed two months from production and maintenance, as lactic acid bacteria increases and improves the process of producing marinated olive fermentation, also reduces the acidity of the product and prevent the growth of gram-negative bacteria will be provided. Thiem *et al.*, [9] for centuries, the fermentation are used as a method of food preservation. Antimicrobial activity of alcoholic extract of the leaves and roots of three genera (*Eryngium* Lgenera, *E. planum*, *E. campestre* and *E. maritimum*) at various dilutions two strains of Gram-positive bacteria and five fungi tested. Two strains of Gram-positive bacteria and five fungi tested. The results showed that the extract inhibits the growth of *Staphylococcus aureus* and *Candida* species is all. The extracts were analyzed by TLC analysis, including phenolic acids, saponins, flavonoids and acetylene, respectively. The results of this study add *Eryngium planum* vegetable increase the number of lactic acid bacteria and increasing acidity until 2-3 months. Due to the growing anti-pathogenic microorganisms, lactic acid

bacteria and the results Thiem *et al.*, [11] *Eryngium planum* use of marinated olive production for up to 2-3 months is recommended the duration of 60-70 days because it has less total bacteria is more appropriate evaluation. After three months, total number of bacteria present in the treatment was added and the number of lactic acid bacteria will follow the trend the result will be an increase in acidity. *aureus* was investigated. As a result, he found that the antimicrobial properties pomegranate paste the effect on vegetables contaminated was much higher than with normal flora vegetables. The test time is an important parameter was found to have a direct effect on the antibacterial pomegranate. This was consistent with the results of the test. Regarding the gas permeability of the packaging material to hold the initial composition of the atmosphere and reduce the activity of aerobic bacteria effectively. Due to lack of oxygen during the holding of *Lactobacillus* bacteria that are suitable Microaerophilic (Aviram *et al.*, 2001). In this study the use of pomegranate paste 10% holding period of three months to produce quality marinated olive it took more than three months after the increase in acidity and overall growth of bacteria, lactic acid bacteria to diminish. Because the growth of bacteria and produce more acid pH-decrease and prevent the growth of bacteria.

REFERENCES

- [1] A. Akbarzadeh, K. Jaimand, A. Hemati, and B. Khanjani Shiraz, "Medicinal plants of gilan province and their applications," *Iranian Journal of Medicinal and Aromatic Plants*, vol. 26, no. 3, 2010.
- [2] E. Hazbavia, F. Fattahi, S. H. Kazemib, Z. Ashraf, and S. Minaei, "Some engineering properties of olive fruit and its pit," in *Proc. 18th National Congress on Food Technology in Iran*, 2008, pp. 5.
- [3] J. Kavosi and A. Asghari, *Different ways of Processing Olives*, PDF Text, 2013, pp. 10.
- [4] S. H. Maghsodi, *Olive Technology and its Products*, Azin Publishing, 2005, pp. 127.
- [5] S. H. Moradi. (2009). *Biology Database (all about yogurt)*. [Online]. Available: <http://biologybase.blogfa.com>
- [6] D. E. Rodas, "Hypocholesterolemic action of *Lactobacillus acidophilus* ATTC 43121 and calcium in swine with hypercholesterolemia induced by diet," *Journal of Dairy Science*, vol. 79, pp. 2121-2128, 1986.
- [7] R. Pourahmad, M. Mazaheri-Assadi, and S. Mirdamadi, "Isolation and identification of Iranian native yoghurt starters," *Pajouhesh & Sazandegi.*, vol. 65, pp. 42-48, 2004.
- [8] G. Tadesse and E. Ephraim, "Assessment of the antimicrobial activity of lactic acid bacteria," *Internet Journal of Food Safety*, vol. 5, pp. 13-20, 2000.
- [9] B. Thiem, O. Goślińska, M. Kikowska, and J. Budzianowski, "Antimicrobial activity of three *eryngium* L.," *Species (Apiaceae)*, pp. 52-58, 2010.
- [10] L. Tserovska, S. Stefanova, and T. Yordanova, "Identification of lactic acid bacteria isolated from katyk, goat's milk and cheese," *Journal of Culture Collections*, vol. 3, pp. 48-52, 2002.
- [11] H. Tahori, "Encyclopedia of medicinal plants," *Press the Phenomenon of Knowledge and Admiration*, pp. 518, 2011.