Evaluating the effect of Tamarind extract on chemical properties of Salmon in cold storage conditions (2 ±1˚C) in a 15-day period

NEGAR YALDAEI
AZAD UNIVERSITY OF MAMAGHAN
FOOD INDUSTRIES & SCIENCES ENGINEER
IAUMAMAGHAN
TABRIZ,IRAN
RAGN_NEGAR@YAHOO.COM

SEPIDEH YARI
AZAD UNIVERSITY OF MAMAGHAN
FOOD INDUSTRIES & SCIENCES ENGINEER
IAUMAMAGHAN
TABRIZ,IRAN
SE15YARI@GMAIL.COM

Dr.AFSHIN JAVADI
AZAD UNIVERSITY OF TABRIZ
IAUT.AC.IR
TABRIZ,IRAN
AFSHINJAVADI@YAHOO.COM

Abstract

Background and objective:

Results from conducted studies on Tamarind extract suggest that plant extracts are one of the excellent sources of antioxidants. In general, the natural antioxidants in the food, pharmaceutical, cosmetic, health care industries are used and additives, normally, are used to enhance the quality of products sustainability.

Antioxidants are added to food substances to prevent fat and unsaturated oils' oxidation as well as preventing of rapid change of flavor and color of food (1).

The aim of the present study was to examine the antioxidant effect of Tamarind extract on enhancing the shelf life of drained stomach salmon in cold conditions (2 ±1˚C).

Materials and methods:

After obtaining the fish , they were divided into three series; a part of which was tested for zero samples, another part was packed as control sample in vacuum condition, and the other part was sprayed with tamarind extract, packed in vaccume condition and maintained in cold temperature (2 ±1˚C).

Chemical tests include peroxide indicators (pcc), total volatile nitrogen gases (VB-N) were performed along with ph in a 15-day period.

Findings:

Based on the results of the tamarind extract lipid oxidation in treated fish was postponed significantly and they were usable till the end of the storage period.

Conclusion:

The obtained results suggest that tamarind extract, due to its anti-oxidant properties, increased storage period of the samples sprayed with tamarind

Key words: tamarind extract; sustainability; salmon; vacuum packaging;,chemical properties

Introduction:

Although fish have high nutritional values, they are highly sensitive to oxidative spoilage and they are oxidized over maintenance period(2). Various methods have been2 proposed to prevent or at least delay the oxidative process such as temperature control and reducing it, packaging under vacuum or modified atmosphere packaging (MAP) and the addition of antioxidants(3). The adverse effects of artificial anti-oxidants are their mutagenic, carcinogenic, and etc (4).

Based on many studies about the antioxidant effects of plant extracts on aquatic it has been demonstrated that rosemary extract increased significantly the shelf life of pink shrimp(5),and Shallot extract increases self_ life of rainbow salmon (6).

The studies indicated that this herb (tamarind) has therapeutic and antioxidant properties (7); there has been no available study on the latter one.

Methods and materials:

48 salmon with the average weight and length of 320 g and 27 cm were purchased from one of the fish farms of Tabriz city. They were transferred in ice packs within 60 minutes to veterinary faculty's laboratory of Tabriz Islamic Azad University. The samples were rinsed with drinking water followed by stomach drainage and scales removing of fish were conducted. 3 of them were selected randomly as the sample of zero day and the rest were divided to 4 series that some of which were packed in vacuum with a flame as control samples, again the rest fish were divided to 3 series and each group was sprayed with a dilution of 0.5, 1, 1.5 and transferred to separate polyethylene packages in vacuum with a flame and were kept for 15 days; then they were tested in order to determine chemical properties.

The conducted Method about tamarind was so that 12 g of removed husks tamarind was added to 50ml sterile distilled water, then filtered using vacuum pump and subsequently distillation was performed in vacuum using rotary .

pH value:

10 g of minced sample of any treatment was added to 50 ml sterile distilled water and mixed in a blender for 60 seconds then the rate of pH was measured using digital pH meter with standard pHs of 4 and 7(8).

Peroxide value (PV):

The test was conducted based on Egan and colleagues' research (9). After removing the fish from their shells they were perfectly homogeneous using a mortar. 60 cc methanol and 60 cc chloroform was added to the homogenized fish sample and 48 cc of distilled water was added after 24 hours. The needed oil was separated after one hour from the mixture. The extracted Fish oil was carefully weighted in 25 ml Erlenmeyer and 25 ml chloroform-acetic acid solution (the ratio of chloroform to acetic acid was 2:3) was added to the Erlenmeyer contents.

Then, the 0.5 ml iodine in saturated potassium solution, 30ml distilled water, and 0.5ml of 1% starch solution was added to the contents and the amounts of free iodine was titrated with 01% normal thiosulphate solution .

Total value of base-nitrogen (TVB-N):

Jean et al. method was used in order to measure the index (10). In this method, 10 gr of homogenized meat sample, 2 g of magnesium oxide, 2 drops of

anti-foaming and 200 cc distilled water and a few drops of pearl glass were poured into the Chaldean flask. 25 cc of 2% boric acid and 2 drops of methyl as a reagent were purred to Erlenmeyer. When the volume of flask reached to 100 cc it was titrated with 1% sulfuric acid.

Findings:

For fish treated with tamarind extract.

Discussion:

Phytochemical constituents such as tannins, flavonoids, alkaloids, and several other aromatic compounds are secondary metabolites of plants that serve as defense mechanisms against production by many microorganisms, insects and herbivores(11).study of T.indica seed coat extract was found to posses strong antioxidant activity attributed to free radical scavenging activity.

Based on the statistical analysis total volatile nitrogenous bases (TVB-N)consists of volatile ammonia and amines which is considered as one of the main indicators of meat degradation ($p<0.0001$). Increasing the rate of TVB-N during the storage period may associate with the activity of putrefactive bacteria and endogenous enzymes ($p<0.05$). Then, the increase of bacterial load of fish is due to bacterial breaking down.

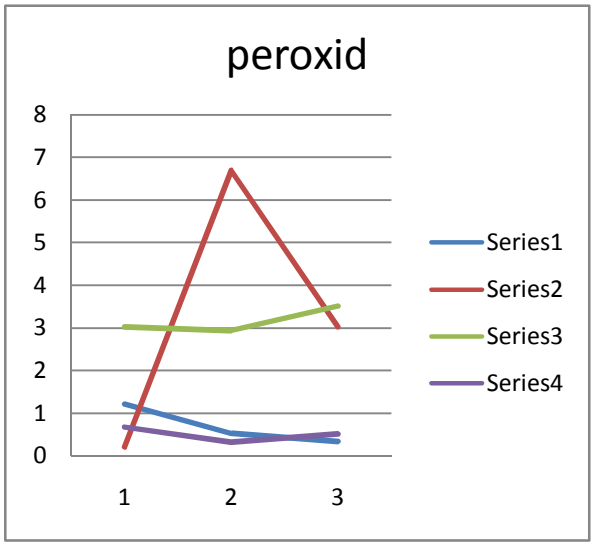
The increase of bacterial load in this period can be a reason for increasing TVB-N rate ($p<0.05$); its optimal rate for freshwater aquatic are : 20 for max utilizable, 21-22 for normal utilizable, 23-25 for fast utilizing rate, and unutilizable rate is higher than 25.

According to the figure, the rate of TVB-N in treated samples with tamarind extract did not exceed the limit during maintenance even it was more than allowed rate during storage period compared with control samples.

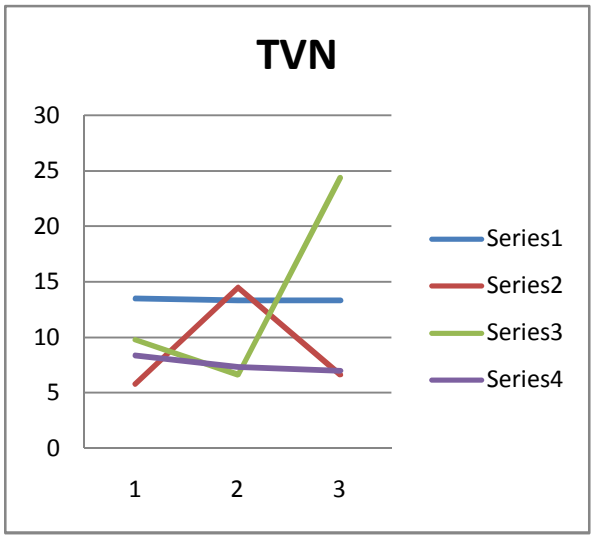
Conclusion:

The obtained results suggest that tamarind extract, due to its anti-oxidant properties, increased storage period of the samples sprayed with tamarind

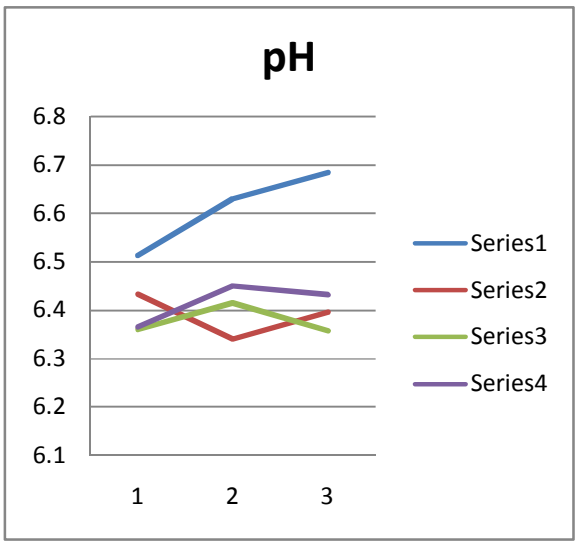
PV(meq 02/kg fat)



TVB-N (mg/100g)



pH



REFERENCES:

[1]. Antioxidant and biological activity of phenolic pigments from Theobro ma cacao hulls extracted with supercritical CO2 / M. Arlorio, J.D. Co¨isson, F. Travaglia et al / Food Research I nternational 38 (2005) 1009–1014.

[2]. Mexis SF, Chouliara E, Kontominas MG. Combine

effect of an oxygen absorber and oregano essential oil on shelf-lif extension of rainbow trout fillets stored at 4°C. Food Microbiol. 2009; 26: 598-605.

[3].Lin CC,LinCS.Enhancement of the storage quality

Of Frozen bonito fillet by glazing with tae.Food Chem

2004;16(2):169_75.

[4].Sakanaka S,Tachibana Y,Okada Y,Preparation and

Antioxidant properties of extracts of Japanese

Persimmon leaf tea (kakinoha-cha). Food Cham

2005;89(4):569-75.

[5].Cadum A,Duygu Kis_la,S_ukaran,C akl.Marination of deep-water pink shrimp with rosemary extract and the determination of its shel-life. Food Chem 2008;109:81_87.

[6].Pezeshk S, Rezaei M, Hosseini H.Journal of nutrition food industries of IRAN.2010;17 JUL: NO 2.

[7].A new hydrophylics antioxidant from tamarindus indica / SOFW-journal ISSN 0942-7694.2004,VOL.130.no 7,PP.10-16.

[8].Sallam KI, Ishioroshi M, Samejima K. Antioxidant and antimicrobial effects of garlic in chiken sausage. LWT.Food Sci Technol 2004;37:849-55.

[9].Egan H, Kirk RS, Sawyer R. In:Pearson's chemical analysis of Food. (9th ed). Lomgman Scientific and Technical 1997;609-34.

[10].Jeon YJ,kamil JY,Shahidi F.Chitosan as an edible invisible film for quality preservation of herring and atlantic cod.

[11].LutterDTl GD, Ismail A, Basheer RH, Baharudin HM.Antimicrobial effect of Psidium guajava extracts as its antiarr hoeal action.malasion J med sci 1999;6(2):17-20.