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ANTIFUNGAL AND ANTISTALING EFFECTS OF SOME VEGETABLE WASTES ON BALADY BREAD

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ABSTRACT: ***This study was carried out to investigate utilization of some vegetable wastes. (Jews mellow JM, okra O, and taro T) in balady bread. The vegetable wastes during the processing operation were about 70% in Jews mellow, 22% in okra and 18 % in Taro. Vegetable wastes are rich in nutrients such as dietary fiber, minerals, polyphenols, carotenoids, flavonoids, vitamins C and E and mucilage. These nutrients could be used in human nutrition as ingredients to overcome antistaling and mold inhibitor in bread.***

Effect of replacement wheat flour 82 % with dried vegetable wastes at levels of 5, 10 and 15% on sensory evaluation, bread staling, fungal inhibition during storage at room temperature were carried out. Effect of total antioxidants (total phenol, carotenoids, and total flavonoids) on mycelia growth incubated for 72 hours and inhibition rate were also determined.

Macro- and micro-elements K, Na, Ca, P, Zn, Fe, Cu, Mg and Mn were found to be higher in vegetable wastes than cereal.

Treatments led to increase shelf life of balady bread from 2 days in control to 5 days in treatments.Samples also increased freshness from 56.6 % for control to 73.56 % for JM, O, and T) treatments after 72 hrs. Balady bread produced by Treatments was similar with control in sensory evaluation with the exception of samples which contained15% from either JM or O. Finally samples balady bread of different treatments had the best levels of antioxidants and elements while samples which contained T was the best in sensory evaluation.

Key words: ***Vegetable wastes-Jews mellow waste- Okra waste-Taro waste-antioxidants from vegetable wastes.***

INTRODUCTION

Vegetable and fruits are rich sources of different nutrients including vitamins, trace minerals, dietary fiber; and many other classes of biologically active compounds. These Phytochemicals can have complementary and overlapping mechanisms of action, including modulation of detoxification enzymes, stimulation of immune system, reduction of platelet aggregation, modulation of cholesterol synthesis and hormone metabolism, reduction of blood pressure, prevented the onset of chronic diseases antioxidant, anticancer, antibacterial and antiviral effects (Leuschner and Ielsch, 2003).

The manufacture processing of vegetable led to high waste, about 70% in Jews mellow, 22 % in okra and 18 % in taro, (Food Composition Tables 2000). These wastes, already, lead to environmental pollution, in the same time they have high levels of different nutrients, and healthy components, such as (mineral, antioxidants and mucilage) which could be used in human nutrition and solve some problems in bakery products such as staling and mold growth.

Dietary fiber may be divided into two parts when it is dispersed in water: a soluble and an insoluble fraction (Periego *et al.,* 1993) each fraction has different physiological effects. The insoluble part is related to both water absorption and intestinal regulation, whereas the soluble fraction is associated with the reduction of cholesterol in blood and the diminution in the intestinal absorption of glucose.

Abo- Elnaga (2002) found that the chemical composition wheat flour 82% and 72% extraction found that, protein (11.97%), (10.56) respectively , fat (1.72%) , (1.42%) respectively , Ash (0.93%), (0.46%) respectively , Fiber (1.76%), (0.92%) respectively total carbohydrate (83.63%), (86.55%) respectively.

The chemical composition of dried Jews mellow waste were, moisture (6.24%) ,protein from 9.10 to 12.2%, lipids from 2.3 to 3.3%, ash from 18.0 to 20.00 %,crud fiber from 31.0 to 36.5% and total carbohydrate ranged from (30.8 to 31.2%) respectively (Mahmod 1996) and Arnaot 2003) .

Jews mellow, was rich in antioxidant group (tocopherol, carotenoids, flavonoids, and vitamin C) beside its importance of a varied complement of antioxidants in the diet. Among the groups of antioxidant molecules, the flavonoids are somewhat distinctive because of their different active roles in human physiology. Carotenoids, tocopherols and ascorbate are all recognized as antioxidants in both plants and humans. (EL-Hadidy, 2004)

Mucilage in Jews mellow, okra and taro can be used as a good suspending agent. This may be due to its high viscosity and good flocculating property. Also, it was reported to be a biodegradable, non toxic, shear stable and easily available. Mucilage was evaluated as antioxidant and was found to have good activity. Antioxidant activity of this mucilage might be due to protein complex or amino acids present in it. However, mucilage coats the various tissues, provides lubrication and gives protection against gastric ulcers. (Shiny Ganji *et al,* 2008) So, Hepaloprotective action of mucilage could be gave protection to liver injury upon used it in human nutrition.

The chemical composition of okra waste were, moisture (5.54%) ,protein (12.8%), lipids (3.4%), ash (39.8%), fiber(9.9%),and total carbohydrate (30.1%), respectively. (El-haolagy and Mokhtar, 1996). On the other hand, (Ravi Kochhar, 2006*)*, reported that, okra is a rich source of many nutrients, including dietary fiber, vitamin B6 and folic acid (100 g okra) gave 25 Calories, 2 gm dietary Fiber, 1.5 gm protein, 5.8 gm carbohydrates, 460 IU

vitamin A, 13 mg vitamin C, 36.5 mcg folic acid, 50 mg calcium, 0.4 mg iron, 256 mg potassium and 46 mg magnesium on fresh weight basis.

Okra contains a powerful compound that fighting cancer and heart disease. It contains large variety of healthy nutrients. Also contains a compound called glutathione that attacks cancer. It's an antioxidant, and its protects healthy cells from cancerous damage (Dhillon, 2008)

El-haolagy and mokhtar (1996): studied the chemical composition of taro waste, they found that their constituents moisture (7.35%), protein (7.1%), lipids (2.4%), ash (7.1%), fiber (15.3%), and total carbohydrate (60.65%), respectively.

Arnoat (2003) Chemical composition of dry taro waste were 11.5%,5.9%, 2.0%, 59.5%, 14.32% and 6.54%, for moisture content ,total protein ,lipids, carbohydrate ,fiber and ash respectively.

Sen *et al* (2006) studied the chemical composition of taro The lipids, sugar, starch and crude protein content in fresh corms varied from 0.08 to 0.98, 0.2to1.5, 7.5to24.8 and 1.0to2.8 % respectively. Corms provide 166-519 kJ of energy/100g fresh weight.

Hitokoto *et al.* (1980) demonstrated that all the spices powder inhibited the growth of three species of mycotoxigenic fungi, (Aspergillus flavus, aspergillus versi and aspergillus ochraceus). Phytoalexins (stress metabolites) produced from young leaves of corchorus olitorius L . plant is antimicrobial compounds synthesized by the plant in response to infection or stress . Accumulation of these compounds is determined by rates of synthesis in the plant and by rate of metabolism by the infecting organism and possibly also by the plant itself.

Therefor the aim of this investigation was to improve the shelf life for balady bread through the utilization of antifungal and antistaling effects of some vegetable wastes "Jew's mellow, okra and taro" were high content of antioxidants and dietary fiber which could affect on the mold growth and bread staling.

MATERIALS AND METHODS

Vegetable wastes samples:-

Three vegetable wastes samples "Jew's mellow waste (stems), okra waste (fruit of top and pedestal) and taro waste (peels)" were obtained from Montana Co for vegetable freezing, Qaluobia governorate, Egypt.

Mold *(Aspergillus niger):-*

Mold *(Aspergillus Niger)* were obtained from department of microbiology, Faculty of Agriculture, Ain shams Univ.

Culture media;-

Fungi- yeast counts media:-

Potato dextrose agar (PDA) medium CM 139 (Sahar, 2003) was used.

The medium composed of the following ingredients (mg. /L.): Potato extracts 4.0g, Glucose20g and Agar 17.0g, Distilled water1000.0 ml.(L.) and PH 5.6 +0.2

Appropriate aliquots (one ml) of each sample dilution was transferred in duplicates to asterile drypetri-palte, 15 ml .of melted potato dextrose agar was poured in each plat, the content was mixed thoroughly and allowed to solidify-plates and incubated at 25^{o}C for three days the colonies were counted as mold and yeast per gm/or ml .of sample, according to the method described in the A.O.A.C. (2005):-

Preparation of dried vegetable samples:-

Vegetable waste were washed, cut to around 3 mm. then dried quickly in convection oven at 50 ^{0}C for 24 hrs as described by Azaa *et. al.* (2005), samples were milled (ground) using laboratory hummer mill, sieved on 600 µm and siftening in cyclone mill, sieved again on 160 µm s, resulted flours were packed in polyethylene bags and keeping in room temperature 25 ^{o}C.

Preparation of balady bread:

Was prepared according to the common method by Faridi and Rubenthaler (1984). described used for balady bread making.

Chemical analysis:-

Dried waste of (jaw's mellow, okra and taro) were chemically analyzed for moisture content, protein, ash, crude fiber and total lipids according to the methods described in A.O.A.C (2005) total carbohydrates was determined by difference.

Minerals analysis:-

Magnesium, sodium, zinc, manganese, iron, calcium,, copper and potassium were determined using a Pye Unicom SP 19000 Atomic Absorption Spectroscopy in Agriculture Research Center, Giza, Egypt as described by A.O.A.C (2005)

Phosphorus was spectrophotometrically determined according to the method of *(*Rangana 1978*)* which has been based on phosphorus reaction with molybdic acid to form phosphomolybdate complex. It was then reduced with amino naphthol sulphonic acid to complex molybdenum blue which was measured colometerially at 650 nm.

Determination of dietary fiber

Total dietary fiber (TDF) was determined according to the method described by Prosky *et al.* (1984), Soluble dietary fiber (SDF) and insoluble

dietary fiber (IDF) were determined according to the method described by (Lee and Prosky 1995)

Determination of total pigments:-

Total chlorophyll (Chlorophyll-A, chlorophyll-B) and carotenoids were extracted from vegetable wastes according to the methods of (Fedtke 1973)

Determination of phenols:-

Phenols were determined colorimetrically as described by (Daniel and George 1957)

Determination of flavonoids:

Flavonoids were determined according to the methods of (Snell and Snell 1954).

Effect of antioxidant sources in vegetable wastes on fungi growth:-

Effect of vegetable wastes on mycelia growth of (*aspergillus Niger*) were determined according to (Singh and Tripathi 1999). These sources of antioxidants were tested for their fungi toxicity at zero, 5%, 10% and 15% concentration.

Mold free shelf life (MFSL):-

Different samples of balady bread loaves from different stage were packaged in a sterile poly ethelne bags and stored at room temperature (25-30) ^{o}C. The loves were examined daily for visible and mold growth (spoilage) and the time elapsed before appearance of molds was considered to be the (MFSL) of different loves samples as reported by(Sahar 2003)

Sensory evaluation: **The prepared bakery products (balady bread) were organoleptically evaluated for its taste, odor, crust color, crumb color, stickiness, and texture according to the method of (Faridi and Rubenthaler 1984).**

Staling of balady bread: **loaves was tested by alkaline water retention capacity (AWRC) according to the method of (Kitterman and Rubenthaler 1971).**

Statistical analysis:-

The sensory evaluation of the produced cereal products were statistically analyzed by analysis of variance (ANOVA) and determination of least significant difference according to the methods of (SAS 1993) and statistically analyzed according to the methods of (Hills 1996)

RESULTS AND DISCUSSION

Chemical composition of raw materials:-

Results of chemical composition of Dried vegetable wastes of investigated vegetable wastes are presented in Table (1) could be noticed that moisture contents were 12.1, 11.5 and 12.9 % for dried Jew's mallow waste JM, dried okra waste O and dried taro waste T respectively. While total protein were 9.1, 12.9 and 5.7% for JM, O, and T, respectively, from results okra waste is characterized by high protein content compared with other wastes. Lipids were 3.3, 3.5 and 1.85% respectively. Ash content was 20.0, 30.14 and 6.22% respectively. Crude fiber contents were 35.2, 12.84 and 14.56% for JM, O, and T respectively. These results are in agreement with results reported by El-haolagy and mokhtar,(1996) and Azaa *et. al.* (2005)

Table (1): Chemical composition of Dried vegetable wastes:-

Dried vegetable wastes	Moisture%	Total Protein%	lipids%	Ash%	Curd Fiber%	Total carbohydrate %
Jew's mellow	12.1ab	9.1b	3.3a	20.0b	35.2	20.3c
Okra	11.5b	12.9a	3.5a	30.14a	12.84a	29.12c
Taro	12.9 a	5.70d	1.85d	6.22d	14.56b	58.77a
LSD	1.15	2.84	0.54	8.45	4.29	12.69

(P < 0.05)

Dietary fiber and its fractions:-

Results of dietary fiber and its fractions in raw materials are presented in Table (2) the results indicated that values of Total dietary fiber TDF, SDF and ISDF for dried vegetable wastes were higher then that of wheat flour 82 % extraction. TDF values were higher (49.8, 28.4, and 29.51%) for dried, JM, O and T, respectively compared to 3.17% for WF 82%. While SDF values were 14.7, 15.49 and 12.8 % for dried, JM, O and T respectively, and 1.82% for WF 82%. However, ISDF were35.1%, 12.91% and 14.6 for dried JM, O and T respectively, and1.35% for WF 82%. These results are in agreement with Innami *et al*. 1995, El-haolagy and Mokhtar 1996, Hussein 2001and Azaa *et al* 2005).

Table (2): Total dietary fiber (TDF), insoluble dietary fiber (SDF) and soluble dietary fiber (ISDF) in dried vegetable wastes.

Materials	TDF	ISDF	SDF	ISDF/TDF%	SDF/TDF%
Dried Jew's mellow waste. JM	49.8	35.1	14.7	70.48	29.52
Dried Okra waste. O	28.4	12.91	15.49	45.42	54.58
Dried Taro waste.T	29.5	14.6	12.8	49.49	50.51

Antioxidants contents:

Results in Table (3) it could be noticed that, the antioxidant contents of (total phenols, total chlorophyll, carotenoids and, total flavonoids) in dried vegetable wastes were higher, values of total phenols compounds were 26.0, 1.02 and 0.72 mg/g for JM, O and T respectively on dry weight basis. Data in some Table revealed that the Total chlorophyll were 20.23, 8.79 and 0.0 mg/g for JM, O and T respectively.

Table (3): Antioxidants contents in dried Jaw's mellow, Okra and Taro waste (on dry weight basis).

Antioxidants(mg/g)	Jew's mellow JM	Okra O	Taro T
Total phenols	26.0	1.02	0.72
Total chlorophyll	20.23	8.79	0.0
Chlorophyll-A	19.64	6.45	0.0
Chlorophyll-B	0.577	2.34	0.0
Carotenoids	0.132	6.57	0.490
Total flavonoids	1.92	0.512	0.11

Results in the same Table reveal that, carotenoids in JM, O and T were 0.132, 6.57 and 0.49 mg/g. Total flavonoids content were high value in JM 1.92 mg/g, followed by O 0.512 mg/g then T 0.11 mg/g. from results in table (3) showed that JM was higher content in Total phenols, Total chlorophyll and Total flavonoids followed by O. On the other hand O was higher content in Carotenoids. While, T was lowest in Antioxidants.Data are in agreement with EL-Hadidy (2004), Azaa *et al* (2005), Nezam EL-Din *et al* (2005) and Adetuyi *et al*, (2008)

Macro- and micro-elements

Results in Table (4) show that, JM, O and T were rich in macro- and micro-Elements. Potassium (K) was 3029.03, 1350 and 2231.2 mg/100g for JM, O and T respectively. Sodium (Na) was 195.24, 60.0 and115.1 mg/100gm. Calcium (Ca) was 860.96, 770.0, and 393.21 mg/100g for MJ, O, and T respectively.

Moreover dried vegetable wastes consider a good source of Phosphorus (P), values were 308.45,320 and 481.12 mg/100g for MJ, O and T respectively. On the other hand, the JM was higher in Zn 12.91 mg/100g then O and T, values were (4.59 - 4.90). However, Fe 35.62 mg/100g in JM flowed by T and O 9.77-6.84 mg/100g respectively. Also JM and T had a higher content in Copper Cu values were 4.63-5.51 mg/100g respectively, then O 0.86 mg/100g. While O was both rich in Magnesium Mg 360 mg/100g followed by JM 315.62 mg/ 100g, then T 138.8 mg/100g. Manganese Mn was the high in JM 7.88 mg/100g followed by O 3.21 mg/100g then T 0.712 mg/100g. Moreover dried vegetable wastes consider a good source of (P), (Zn), (Cu), (Mg) and (Mn). Results are in agreement with Mahmod (1996), Habashy and Radwan (1997) and Bahlol *et al.* (2000).

Table (4): Macro-and micro-elements contents of dried Jew's mellow, Okra, and Taro waste (mg/100g).

Elements	Jews mellow JM	Okra O	Taro T
Potassium (K)	3029.03	1350	2231.2
Sodium (Na)	195.24	60.0	115.1
Calcium (Ca)	860.96	770	393.21
Phosphorus (P)	308.45	320	481.12
Zinc (Zn)	12.91	4.31	4.59
Iron (Fe)	35.62	6.84	9.77
Copper (Cu)	4.63	0.86	5.51
Magnesium (Mg)	315.62	360	138.8
Manganese (M n)	7.88	3.21	0.712

Effect of different levels of dried vegetable wastes on the mycelia growth:

From the results presented in Table (5) it could be noticed that, replacement of dried Jew's mallow JM to the media (potato dextrose agar) at

concentration of 5, 10 and 15% (w / v) and 100% media as a control, the replacement at concentration of 5, 10 and 15% decreased the growth of fungal (*Aspergillums Niger*). Diameter values of growth were 6.8, 4.3 and 2.1 cm. respectively, compared to 9.1cm For control. Also the percents of mycelia inhibition were 35.28%, 52.74% and 78.0% compared to zero in control. This inhibition may by come back to poly phenol and other antioxidant component in JM. in this results found by Azaa, *et al* (2005) found that, Jew's mallow stems powder had good result as antimicrobial agent.

Table (5): Effect of different levels of dried vegetable wastes on the mycelia growth after being incubated for 72 hours and inhibition rate .

Concentration g/10ml potato dextrose agar	Colony diameter (cm)	Inhibition of mycelia Growth (%)
Control 10ml media	9.1a	0%
5% Jew's mellow JM	6.8bc	35.28%
10%Jew,s mellow JM	4.3d	52.74%
15%Jew,s mellow JM	2.1e	78.0%
5 % Okra O	8.0a	12.1%
10% Okra O	6.2bc	31.9%
15% Okra O	4.3d	52.75%
5%Taro T	8.2a	10.0%
10%Taro T	7.4b	19.7%
15%Taro T	6.1c	33.0%
L.S.D	1.29	

(P < 0.05)

The same trend was observed with dried okra lead to decrease the Diameter of growth were (8.0,6.2, and 4.3) respectively compare to(9.1) in control (100 ml media only). As well as the percents of mycelial inhibition were (12.1, 31.9 and 52.75 %) compare to control. This inhibition may by come back to carotenoieds. Also Taro wastes at the same levels lead to decrease in Diameter growth were (8.2, 7.4 and 6.1) respectively compare to (9.1) in control .also the percents of mycelial inhibition were (10.0, 19.7 and 33.0 %) compare to control.

Results are in agreement with the results of Yin and Cheng (1998), Hussein (2001), and Zhu *et al* (2006) They reported that carotenoieds from some vegetable inhibited of mycelial growth.

Sensory characteristics of balady bread:-

Results in Table (6) show that the replacement of dried Jew's mallow waste to wheat flour (82%) at levels of 5, 10, and15 % lead to produce satisfactory balady bread for all the evaluation characteristics as well as control sample. Samples containing 5% Jew's mallow waste showed excellent quality. however, the statistical analysis indicted that significant difference was observed between control and the treated samples with dried Jew's mallow waste with exception of samples which content 5% Jew's mallow waste showed that no significant difference concerning dried okra waste at levels of 5, 10, and 15 to wheat flour 82%. Replacement of dried taro waste to wheat flour (82%) at levels of 5, 10,and 15 resulted in production of balady bread samples having excellent quality for all the evaluation characteristics as well as control sample.

Table (6): Sensory evaluation of balady bread

Blends	Crust color (20)	Crumb color (20)	Texture (20)	Taste (20)	Odor (20)	Overall acceptability 100
Control WF 82%	16.8a	17.6a	16.4b	17.9a	17.0a	85.6a
95%WF+5%JM	17.2a	16.2b	17.2a	16.4a	16.8a	83.8a
90%WF+10%JM	16.2b	13.8c	16.0a	12.2c	12.6d	70.8c
85%WF+15%JM	10.8d	11.4d	15.0b	10.04d	11.0c	59.0.d
95%WF+5%O	17.0a	16.4b	18.2a	16.2a	15.6a	83.4a
90%WF+10%O	15.8b	15.2c	17.8a	13.8b	15.0b	77.6b
85%WF+15%O	14.2c	14.6c	17.2a	12.8b	13.8d	72.6b
95%WF+5%T	18.2a	18.6a	18.0a	17.8a	16.8a	89.6a
90%WF+10%T	18.0a	18.2a	17.4a	17.2a	16.0a	86.8a
85%WF+15%T	16.8a	17.4a	16.4b	15.8b	15.2b	40.8b
LSD	1.782	1.628	1.364	1.674	1.48	6.094

($P < 0.05$)
WF=wheat flour 82% extraction JM =jaw's mellow waste
O= okra waste T= taro waste

Effect of replacement of dried vegetable wastes on fungal growth in balady bread:-

Effects of replacement of JM, O and T waste powder to wheat flour (82%) on fungal growth in balady bread during storage in polyethylene package at room temperature (25:30) ^{o}C were studied. From results in Table (7) it could be observed that replacement of dried JM waste at levels 5, 10 and15 % increases the preservation period of balady bread to 5 - 6 days compared to 2 days for control sample, these results may be due to the high contents of antioxidants especially total phenols. These results are in agreement with, (Abou zeid 2002) found that Phytoalexins (produced from Jew's mellow powder) are antimicrobial compounds and inhibited the growth of mycotoxigenic fungi, (*Aspergillus flavus, Aspergillus versi and Aspergillus ochraceus*). Replacement of dried O waste at 5, 10 and 15 % increased the preservation period of balady bread to 4–5 days compared to 2 day for control sample, these results may be due to carotenoids content in okra which was found to have antibacterial and antifungal activity.

Table (7): Effect of Addition of dried vegetable wastes to wheat flour (82%extraction rate) on fungal growth in balady bread during storage in polyethylene package at room temperature.

treatment	Storage period						
	1days	2 days	3 days	4 days	5 days	6days	7 days
Control 100% WF 82%	_	+	++	+++	++++	++++	++++
95%WF+5% JM	_	_	_	_	+	++	++++
90%WF+10% JM	_	_	_	_	+	++	+++
85%WF+15% JM	_	_	_	_	_	+	++
95%WF+5% O	_	_	_	+	++	+++	++++
90%WF+10% O	_	_	_	_	+	++	+++
85%WF+15% O	_	_	_	_	+	++	+++
95%WF+5% T	_	_	+	+	++	+++	++++
90%WF+10% T	_	_	_	+	++	+++	++++
85%WF+15% T	_	_	_	+	++	+++	++++

(-) =Mold growth area (+) =25% visible Mold growth (++) =50% visible Mold growth (+++) =75% visible Mold growth (++++) =100% visible Mold growth

However, dried T waste showed slightly preservation effect compared to dried JM and dried O, the results indicated that the shelf life of balady bread increased from 2 day for control sample to 3 – 4 days for samples contained dried taro waste.

(EL-Hadidy 2004*),* found that antioxidant contents in ethanol extracts of some vegetable (Jews mellow and parsley) have the inhibition effect on fungi. Also Phenolic compounds and their subclasses such as cumarins, flavonoids, tannins, saponins, and essential oil, have antimicrobial function (Kubo *et al*. 1993).

Alkaline water retention capacity AWRC (%) of balady bread:-

Alkaline water retention capacity (%) of balady bread produced from wheat flour (82%) and its blends during storage. Data in Table (8) revealed that The Alkaline water retention capacity AWRC as a measured of "bread staling" for balady bread replaced with JM, waste, O waste and T waste at different levels. In this concept the control bread made of 100%WF 82% had the lowest value of ARWC at zero time, after 24 hrs, 48 hrs and 72hrs of storage. Also the loss of freshness value %. Meanwhile, balady bread treated with JM waste, O waste and T waste at different levels were better its recorded higher values of AWRC at different storage time then control sample, also the percentage of freshness value were higher then control sample. Values for different treatments ranged from 91.14 to 94.26 % after 24 hrs compared with 87.88% for control, also from 84.32 to 85.26 % after 48 hrs for different blends compared with 77.4% for control, and from 71.17 to73.56% after 72 hrs for different blends compared with 56.66% for control. Its may by come back to dietary fiber especially soluble dietary fiber (mucilage).This results agreement with (Abo-Elnaga 2002) who fund that the addition of dietary fiber to wheat flour in balady bread increased the water absorption.

Antioxidants contents in balady bread made from wheat flour 82% with replacement vegetable wastes (mg/100g) on dry bas.

Antioxidants contents in balady bread made from 100% wheat flour 82% as a control sample and balady bread made from wheat flour replacement with dried vegetable wastes at level of 10%.Data in Table (9) show that the thermal processing during baking balady bread lead to increase total phenols values ranged from 10.0 to 11.21 mg/100g for control sample and from 221.0 to 225.35 mg/100g for sample which content 10% dried JM waste, also from21.0 to 23.84mg/100g in sample which content 10% dried O waste and from15.3 to 17.8 mg/100g in sample which content 10% dried T waste, these results are in agreement with Results of Gazzani *et al* (1998),Giovanelli *et al*,(2001) , and khames (2004), they reported that thermal treatment increased soluble phenol component. Moreover, results appeared that, thermal process during baking lead to decrease carotenoids of balady bread

control sample and other treated bread, the higher percentage loss were observed in control sample, which decreased from 0.8to0.39 mg/100g, while treatment with 10%T waste decreased from 5.36 to 2.4 mg/100g), treatment with 10% O waste from 64.6 to 43.64 mg/100g, and 2.1 to1.42 mg/100g in treatment with 10% JM, waste. These results are in agreement with results obtained by (Hussein 2001), who found that the baking thermal lead to the decrease in carotenoids. Also, total flavonoids were decrease in replacement at level of,10% by effect baking thermal, however control was free from its. Treatments lead to increase total antioxidant in blends compared with control sample, values were 239.21, 96.11 and 20.72 mg/100g for 10 % JM, O and T samples compared with 11.60 mg/100g in control sample.

Table (8): Alkaline water retention capacity (%) of balady bread produced from wheat flour (82%extration rate) and its blends during storage.

Blends	ARWC Zero time (F.V=100%)	ARWC After 24hrs.	F.V% After 24hr	ARWC After 48hrs.	F.V% After 48hrs.	ARWC After 72hrs.	F.V% After 72hrs.
Control100% WF 82%	355	312	87.88	274	77.18	201	56.66
95%WF+5%JM	370	345	93.24	312	84.32	265	71.62
90%WF+10%JM	376	348	92.8	319	84.84	272	72.34
85%WF+15%JM	384	355	92.44	327	85.11	278	73.15
95%WF+5%O	377	342	91.14	318	84.35	270	71.61
90%WF+10%O	380	347	91.31	321	84.47	278	73.15
85%WF+15%O	382	349	91.35	324	84.81	281	73.56
95%WF+5%T	360	336	93.59	307	85.27	258	71.66
90%WF+10%T	364	341	93.86	310	85.16	261	71.17
85%WF+15%T	368	347	94.26	312	84.78	266	72.28

WF= wheat flour 82% extraction. JM =jaw's mellow waste. O= okra waste T= taro waste. F.V =percentage freshness value.

Table (9): Antioxidants contents (total phenol, carotenoids, total flavonoids,) mg/100g on dry bass in balady bread made from Wheat flour 82% with replacement vegetable wastes.

	Total phenols (mg/100g)	Carotenoids (mg/100g)	Total flavonoids (mg/100g)	*Total antioxidant (mg/100g)
W f 82%	10.0	0.8	_	10.8
Bread 100% WF	11.21	0.39	-	11.60
10% JM(unbaked)	221.0	2.10	18.4	241.5
10% JM (baked)	225.35	1.42	11.23	238.0
10% O unbaked)	21.0	64.6	4.62	90.22
10% O baked	23.84	43.64	2.95	70.43
10%T unbaked)	15.3	5.36	0.91	22.07
10%T (baked)	16.8	2.4	0.51	19.72

*Total antioxidant by addition antioxidant components
WF= wheat flour 82% extraction. JM =jaw's mellow waste.
O = okra waste. T= taro waste

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التاثير المضاد للفطر وظاهرة البيات لبعض مخلفات الخضر علي الخبز البلدي

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الملخص العربي

تشتمل هذه الدراسة علي الاستفادة من بعض مخلفات الخضر (الملوخية، الباميا، القلقاس) في الخبز البلدي حيث يتخلف عن عمليات تصنيع الخضر نسبه عالية من المخلفات والتي تصل إلي ٧٠% في الملوخية ، ٢٢% في الباميا، و١٨% في القلقاس . هذه المخلفات غنية في محتواها من العناصر الغذائية مثل الألياف الغذائية،والعناصر المعدنية و الميوسيلاج ومضادات الأكسدة (الفينولات– الكاروتينات– الفلافونات– التانينات) فيتامين E ،C والتي يمكن أن تستخدم في تغذية الإنسان , وكذلك يمكن إن تستخدم في حل بعض المشاكل في الخبز البلدي مثل تأخير البيات عن طريق الميوسيلاج و تأخير العفن عن طريق مضادات الأكسدة .وفي هذه الدراسة تم أجراء تحليل كيماوي للخامات (دقيق القمح و٨٢% ومخلفات الخضر المجففه) وأظهرت النتائج ارتفاع مخلفات الخضر في كل من الدهون والألياف الغذائية و الرماد في حين تقاربت مع الدقيق في البروتين وانخفضت في الكربوهيدرات. كما تم أجراء تحليل للعناصر(Mn K, Na, Ca, P, Zn, Fe Cu Mg,) وتبين أن مخلفات الخضر غنية في محتواها من العناصر المعدنية. كذلك تم تقدير مضادات الأكسدة (الفينولات– الكاروتينات– الفلافونات– التانينات) , وتبين أن مخلفات الخضر غنية في مضادات الأكسدة و التي توجد بها نسب جيدة .كما تم اختبار المضاد للفطريات لهذه المخلفات عن طريق إضافتها بنسبة ٥،١٠،١٥% إلي بيئة نمو الفطر واستخدم فطر (الاسبرجلس نيجر) كأحد أهم مسببات العفن في الخبز ووجد أن إضافة المخلفات بالنسب السابقه إلي بيئة النمو أدئ إلي تثبيط نمو الفطر بنسبة تصل إلي

٧٨%–٥٢%- 33% فـلخم نم لكل (الملوخية– البامية القلقاس) ٠تم إنتاج خبز بلدي بإضافة مخلفات الخضر(الملوخيـة– الباميـة القلقاس) بنسبة ١٥،١٠،٥% الـي دقيق القمـح ٨٢%. ٠ تم تقدير العناصر السابقه في عينـات الخبز والكنتـرول ووجد أن الاستبدال أدي إلـي ارتفاع العينات في تلك العناصر ٠درس ثبات ومحتوي العينـات من مضادات الاكسده بعد الخبز لكلا من (الفينولات– الكاروتينات– الفلافونات) ولـوحظ ارتفـاع فـي عينـات الخبـز فـي مضادات الاكسده.٠ كما تم أجراء اختبار بيات علي عينات الخبز وتبين إن الطزاجة بعد ٧٢ساعه تتراوح من ٧١ إلـي ٧٣% فـي العينـات بينمـا كانـت ٥٦% فـي الكنتـرول ٠ درست فترة صلاحية الخبز الناتج من الناحية الميكروبيولوجيه ووجد أن صلاحية الخبز الناتج تصل إلي ٦ايام علـي درجـة حرارة الغرفة (25-30)م° بينمـا كانـت ٢يوم فـي الكنتـرول ٠ تم أجراء اختبـار تـذوق لكـلا من عينات الخبز والكنترول ووجد أنـه لا توجد فروق معنوية بين عينات الخبز و الكنترول فـي معظم صفات التحكيم فيما عدا العينات التي تحتوي علي نسبة مرتفعة من مخلف الملوخية والباميا .