**Effect of adding barley flour to wheat flour on some quality factors and measuring consumer acceptability to the final bread products .**

**By**

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**Kufa – Najaf - Iraq July 2017**

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 **Abstract**

 **Part of wheat flour has been substituted by using barley flour (25% , 50% ) making eight treatments from them .**

**Chemical analysis has been done to these treatments and sensory evaluation of some organoleptic tests for the final products by using 20 panelists from the department of food science faculty and students . The results of these analysis showed increases in percentages of protein and minerals , by using barley flour . while they showed decrease percentages of glutein at ( 0.05 %) in another hand the results showed increase quality elements by using 25% of barley flour . and 50 % for the final acceptability for these products . It has been noticed decreased the color degree whenever Percentage of substitution occorur with barley flour , also Percentage of protein showed similarity with in all treatments . while absence of Glutein (wet and dry ) due to barley flour .**

**Sensory evaluation degrees showed similarity in all treatments so there were no deferences among the overall acceptability , accept the treatment with the local barley was completely different . All treatments had less degrees in sensory evaluations overall acceptability , only (Trade ) barley flour treatment showed increases the sensory evaluation degrees .**

**Introduction :**

**Barley is one of the most important crops throughout the whole worlds . It is the fourth economical crops after wheat , Rice and Corn. ( Pomeranz , 1973 ) Its importance is due to its posibitity of cultivate capability in wide area through the world , as well as its resistance to dryness and salty soils (Rossnagle , blatly , 1981 ) Recently It has been noticed some of increase in developing of kinds of barley crops .**

**Research that has been done by FAO , FDA emphasis on using barley , wheat mix flour products which have more dietary importance than using wheat flour only importance due to the of barley . Barley has many benefits Strengthen of nerve system , Liver enhancing , Curing of low blood presses , (use as) Laxative , Curing of diariea using and intestinal infection , Liver infection , Decrease of blood sugar Decrease of cholesterol by using barley bran , Anti-carcinogenic of intestinal cancer , Increase of urine secretion , Decrease of sugar storage directional absorption , Increase of bowel movement decrease of heart diseases , Delete of zehiamare , Increase of Leucoeitye in the blood , Increase of immunity system .**

**Purposes of this research are :**

1. **Produce bread loaf from wheat and barley flour mixture in order to increase dietary health values of the final products in Iraq .**
2. **Study of quality characteristics of each treatment and make some comparison (chemically and orgnolypticaly ) between them.**

**Materials and Methods**

**Wheat flour has been taken from AL – Najaf Mill company while barley flour was purchased from the local grinder the Najaf Mill , Two kinds of flour were purchased also from local markets the Eight treatments were prepared from these four flour samples .**

**Treatment 1 is wheat flour 100% .**

 **Treatment 2 is Iraqi barley flour that has been purchest from the local AL- Najaf Mill . , Treatment 3 is wheat flour with zero bran 100%**

**Treatment 4 is barley flour (Trade ) perchest from the local market .**

**Treatment 5 is mix 50% wheat flour and 50% barley flour .**

**Treatment 6 is 75% mixture of Iraqi wheat flour and 25% Trade barley flour .**

**Treatment 7 is a mixture of 75% Iraqi wheat flour and 25% of Iraqi barley flour .**

**Treatment 8 is 50% Iraqi wheat flour and 50% Iraqi barley flour .**

**Statistical analysis has been done due to the method of complety Randomlzed statistical Analysis and the differences between the eight treatment has been studied using Dankn Randomized Analysis at 0.05 level of quality differences .**

**Moisture determination :**

* **Material is done at the quantity and quality control laboratory the Al Najaf Governor Mill company**

**Protein content percentage , Ash percentage and color degree were determined by (Perten Inframattic 9500)instrument Brabender company – Germany**

**- Wet and Dry Gluten were determined by Glutamic system instrument.**

**- Electric Oven ( Korian ) for baking Bread loaf .**

**- Dough making by using kneader instrument (chinease ) Methode**

 **grams of yeast (Pakmaya )company were added to 15 ml of tab water in a beaker mixed with (6 gram of sugar ) and leaved for (5-8) minutes for fermentation**

**Using Dough maker to make the dough using 380 gram of flour and 5 gram salt and 19 gram of milk powder . these material added while the dough make working then 5 ml of melt Margarine was added to the Mixture**

**The dough was left in a warm and dark place for fermentation for one houor . The prepared dough was then put in the baking pan adding some sesame to inhance the final appearance of the product using baking oven at 250 C for 40 minutc to complet baking**

**In order to enhance the final loaf appearance oil was**

**used to lubricate the surface of the final loaf bread .**

**Results and Discussions**

**Chemical characteristic**

**Simmiler percentages of protein has been noticed among treatments (wheat flour , barley , local barley , trade ). The lowest degree (4.6) was noticed in the treatment with 25% barley while wheat flour was 11.9% barley flour was 12% wheat flour with zero percentage of bran had the highest percentage of wet and dry glutein Table 1 showed decreases of percentages of wet and dry glutein when mixes had been done with flour wheat and barley flour.**

**Percentages of ash was varied due to different treatments zero bran wheat flour had the highest percentages (0.79%) while the highest percentages of ash was with the bran flour with 25% substitution that perhaps due to increases of bran with the barley flour due to severing's processes were not perfect .**

**Local barley flour had the lowest percentages of absorption (6.94%) , while zero bran wheat flour had the highest percentage (10.9%) other treatment were almost similar to each other .**

**Color degree had been noticed degrcrcase while Increase Percentage of barley flour throughout the ather treatments . The lowest color degree was barley flour (local) ( 81.2%) while zero bran wheat flour had the highest color degree (90.1%) that was due to increase of bran in the local barley flour.**

**Table( 1) chemical properties of flour treatments**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Moisture %**  | **Protein %**  | **Ash %** | **Gluten % Wet** | **Gluten % Dry** | **Color %**  | **treatments** |
| 10.9 | 12.1 | 0.79 | 29.4 | 9.8 | 90.1 | Soft F |
| 9.5 | 11.9 | 1.25 | 24.7 | 8.23 | 88 | W F |
| 9.5 | 11.6 | 1.57 | 18.5 | 6.1 | 86.7 | %25 LB F |
| 8.1 | 11.8 | 2.07 | 12.3 | 4.1 | 84.3 | 50 % LB F |
| 6.94 | 12.0 | 2.5 | 0.0 | 0.0 | 81.2 | L B |
| 9.7 | 11.8 | 1.33 | 24.5 | 8.1 | 87.5 | IB 25 % |
| 8.7 | 12.1 | 1.41 | 18.4 | 6.13 | 87.1 | IB 50 % |
| 8.1 | 12.0 | 1.77 | 18.2 | 6.06 | 85.5 | I B |

**S: Soft flour , W: wheat flour , L B F : locally barley flour , T B: trade barely flour**

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**Sensory evaluation**

**Colour, taste , flavor , odor , Texture and the over all acceptability of bread products were shown in table 1**

**The color of treatment 3,4 have the highest degree by the panalysit . while treatment 4 has the highest degree of test odor and flavor .Treatment 5 showed the highest degree of Texture evaluation.**

 **Table( 2) Sensory Evaluation for treaments**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Treatments | اللون | الطعم | الرائحة | النكهة | النفاشية | القبول العام |
| S F | c8.65 | c8.25 | c8.45 | b8.35 | bc8.45 | c8.65 |
| W F | c8.65 | bc7.9 | bc7.95 | b8.05 | bc8.6 | c8.45 |
| %25 LB F | bc8.1 | Abc 7.35 | bc8.2 | ab7.6 | bc8.45 | bc8 |
| 50 % LB F | b7.45 | abc7.45 | bc7.75 | ab7.35 | b7.65 | ab7.3 |
| L B | a6.5 | a6.75 | a6.6 | a6.85 | a6.5 | a6.55 |
| IB 25 % | bc7.9 | bc8 | bc7.9 | ab7.8 | bc7.7 | bc7.9 |
| IB 50 % | bc7.8 | bc8 | bc8.1 | b8.05 | c8.65 | bc8.2 |
| I B | bc7.75 | ab7.2 | ab7.35 | a6.85 | bc8.45 | bc7.75 |

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**Conclusion and Recommendation**

**The sensory evaluation showed significant differences at 0.05 between treatments , and control .**

**The odor of barley has been recognized of bread treatments .**

**Increases of protein percentage and Ash precrtages were found in all treatment with using barley Percentage We recommend using % of barley flour mixed Percentage with wheat flour it diactry interest due to increase of minerals ( Calcium , potassium , phosphor )**

 **The local barley treatment showed the lowest color degree 6.5 and that was significantly deferent among all treatments , trade barley flour treatment did not show any significantly differences among all treatments**

**Barley flower substitution treatments showed similar degrees in sensory evaluation of bread loafs while the local barley flour noticed had been noticeable 25% substitution had the highest degree of smell (8.2) but that was not significantly different, local barley flour treatment showed the highest degree of sensory evaluation (texture ). Similarity in the treatments showed in the overall acceptability that means no significantly differences in the overall acceptability with trade barley flour and other treatments .**

**Only local barley flour treatment showed the lowest acceptability degree and that was significantly different (6.5) In all sensory evaluation tests degrees and the overall acceptability degree . statistical analysis showed no significantly differences between all treatments and the results were similer in color , taste , odor , flavor , texture , and the over all acceptability . Due to this important results of using barley flour substitution can be used in the bread loaf products and that make use of barley benefits to the dietary allowances using barley bread loaf instead of wheat flour only.**

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