production of balady bread by using

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The aim of this study is evaluation of some additives as improvers to produce balady bread with good quality and choose the best improver for them, The study included the effects of those additive on the rheological properties of dough, on organoleptic, characteristics chemical composition, microbiological and staling of produced balady bread, In this study wheat flour (82% extraction rate) and corn flour (97% extraction rate) were used for preparation of balady bread with additives such as defatted soybean flour, whey powder, skim milk powder, calcium diphosphate and calcium chloride, Chemical composition of raw materials : Wheat flour (82% extraction rate), corn flour (97% extraction rate), 80% wheat flour (82% extraction rate) plus 20% corn flour (97% extraction rate), defatted soybean flour, whey powder and skim milk powder were analyzed for their chemical composition. The chemical composition included moisture, crude protein, ether extract, ash and total carbohydrates.•The results indicated that, the moisture content of wheat flour was 13.89%. The content of crude protein, ether extract, ash and total carbohydrates were 14.12, 2.61, 1.36 and 81.91%, respectively (on dry weight basis), The results indicated that, the moisture content of corn flour was 12.41%. The content of crude protein, ether extract, ash and total carbohydrates were 11.99, 6.31, 1.58 and 80.12%, respectively (on dry weight basis), The results indicated that, the addition of corn flour to wheat flour increased ether extract and ash content from 2.61, and 1.36% for wheat flour to 3.36, and 1.41% for the mixture of 80% wheat flour + 20% corn flour, respectively (on dry weight basis). While, it was 14.12 and 81.91% for crude protein and total carbohydrate of wheat flour compared with 13. 68 and 81.55% of the mixture of 80% wheat flour + 20% corn flour, respectively, The defatted soybean had the highest contents of protein (51.46%). While, in whey powder and skim milk were 13.71 and 36.98% respectively Whey powder had 8.41% ash, while skim milk powder had 7.89% and also defatted soybean flour had 6.74%. Minerals content in raw materials : The obtained data indicated that, whey powder contained the highest value of potassium and sodium 2210.00 and 811.00 mg/100 g, respectively. While, they had lower contents from iron , •The defatted soybean flour contained higher contents of manganese, iron, cupper and zinc. While, skim milk powder contained higher contents of magnesium, calcium and phosphorus. But, wheat flour had lower contents of these minerals compared with defatted soybean and skim milk, Blend of wheat flour and corn flour (80 : 20%) had higher content of all minerals except manganese (0.09 mg/100 g) and cupper compared with wheat flour (82% ext. rate) without any additive,Rheological measurements of dough formula : Farinograph parameters :•The water absorption of wheat flour (82% ext. rate) [control 1 (C1)] was 56.2%, while it was 54.5% for 80% wheat flour + 20% corn flour [control 2 (C2)], The addition of defatted soybean flour to (C2) did not affect the arrival time, dough development, dough stability and degree of weakening compared with wheat flour. While, in (T3), the sample contains food additives increased in water absorption (55.7%), arrival time (2.5 min), dough development (3.0 min) and dough stability (4.5 min) compared with 54.5 for 80% wheat flour + 20% corn flour, T2 was 3 min, compared with C2 (4 min), Water absorption decreased in most treatments except T6 and T3 compared with C2.•Also, stability of dough produced from 80% wheat flour + 20% corn flour was 4 min, while it decreased in all treatments prepared with additive calcium chloride, •T4 had also decreased in water absorption (49.5%). The water absorption of the sample T3 was 55.7%. Arrival time of sample T3 was 2.5 min, while it was 1.0 min for samples Ti and T5, Dough development time of sample T5 was 1.5 min.. Extensograph parameters : The obtained data, it could be observed that the extensibility (E) of dough produced from 80% wheat flour + 20% corn

flour C2 was decreased compared with dough produced 100% wheat flour. But, most treatments which added to defatted soybean flour was decreased compared to C2 Concerning the resistance to extension (R) of dough, most treatments which added to defatted soybean flour was higher. This may be due to the induction of more hydrogen bonds in gluten-carbohydrate complex of dough, which reinforces the dough resistance •In the same time, the proportional number (R/E) of dough increased with adding different improvers except Tl.•Energy values of dough prepared from different treatments were decreased compared with energy values of dough produced from 100% wheat flour except T3, T4 and T5 because no adding calcium salts to these treatment. This is may be due to no adding calcium to these treatments. Falling number : •The obtained data showed that, the addition of corn flour to wheat flour decreased the falling number value and falling time compared with wheat flour. the falling number was 280, sec for wheat flour (C1), while it was 275 sec for sample of wheat + corn flour (C2). The falling time was 220 sec for wheat flour (C1) while it was 215 sec for the sample of 80% wheat flour + 20% corn flour (C2), •The liquefication number was increased by adding corn flour to wheat flour from 26.09 to 26.66%. This means that, the addition of corn flour increased the amylolytic activity of the dough, •The addition of defatted soybean flour and chemical additives decreased falling number of sample (T3). While, the addition of calcium salts (diphosphate or chloride) without adding defatted soybean flour increased in falling number, Evaluation of balady bread produced from wheat flour and different blends : Chemical composition of balady bread : •Results indicated that the moisture content of control 1 balady bread (Cl) was 3 8.89%. The content of crude protein 17.08%, ether extract 1.67%, ash 5.45% and total carbohydrate 75.80% for control 1 bread (C1) (on dry weight basis). While, moisture content was 38.11%. Theontent of crude protein 16.50%, ether extract 2.20%, ash 6.04% and total carbohydrate 75.26% for C2, The addition of 20% of corn flour increased ether extract, ash of bread, while it decreased the moisture and crude protein, •The addition of different improvers to make balady bread, affected moisture content, owed that significant difference in moisture content in all treatments compared with C 1, while it had significant difference compared with C2 except sample T2 had significant difference with C2, •The improvers increased the percentage of protein for all samples. Crude protein content of bread made from C2 decreased compared with bread made from Cl. Ether extract content of all bread treatments had no significant difference compared with C2, while ash content had significant difference in all treatments compared withCl or C2, minerals content of the produced balady bread : •The sample of bread produced by using wheat flour (C1) had Zn of 0.07 mg/100 g, while, it was 2.59 mg/100 g for bread produced by using 80% wheat flour + 20% corn flour (C2). Bread of T6 had highest content of K, Mg Ca, Na, P, Mn, Fe Cu and Zn compared with C2 and other treatments. This is may be due to the content of defatted soybean flour that had the highest content of Zn (8.33), Cu (3.71), Fe (19.34), and Mn (3.86) mg/100 g,. Whey powder had higher content of potassium (2210 mg/100 g), while skim milk had higher content from phosphorus (1020 mg/100 g) and calcium (1290mg/100 g). •Most treatments of bread has highest content of minerals. This may be due to the different additives were added, •Data showed that Ti and T2 had lower content of minerals, Microbiological examination : •Total bacterial count increased with increasing storage period for bread produced by using wheat flour (Cl) and bread produced by using 80% wheat flour + 20% corn flour (C2). The log number of total bacterial count ranged from 4.83 at zero time and was 7.2 of bread produced by using Cl after 6 days. There was significant difference between bread samples during storage period, •Total bacterial count was decreased in all treatments in zero time of storage compared with bread produced by using 80% wheat flour plus 20% corn flour (97% ext. rate) (C2). Also, the total bacterial count was lower in all treatment throughstorage periods, •The decrease of total bacterial count may be due to the different additives especially chemical additives, •The log number of total bacteria count in C2 at first, second, fourth and sixth days were 0.59, 0.18, 0.15 and 0.28%, respectively compared to Cl, •Log number of total bacterial count was decreased for bread produced by using T6. It was 2.49, 2.36, 2.19, 1.92 and 1.95 at zero time, first, second, fourth and sixth days, respectively, •After first day log number of total bacterial count was lower of sample T2 and T6. This is may be due to the effect of calcium chloride and calcium phosphate.•Total moulds and yeasts increased with increasing storage periods for C 1 and C2. The log number of total moulds and yeasts was ranged from 2.23 for C2 at zero time to 4.26 for The log number of moulds and yeasts

for treatment of C2 was low comparing with Cl. This is may be due to added the addition of corn flour •The log number of molds and yeasts of bread sample of Cl at zero time was 2.28, by adding corn flour, the log number become 2.23. By increasing storage period, the log number of molds and yeasts was increased, •Total moulds and yeasts increased with increasing storage period for C2 and all treatments. The log number of moulds and yeasts were ranged from 2.15 for Ti at zero time to 4.20 for T5, •The log number of moulds and yeasts for all treatments were significantly low by comparing with C2. •The log number of moulds and yeasts of C2 at zero time was 2.23 but T6 was 2.15. This is due to that the sample of (T6) content chemical additive.•It also showed that by increasing storage period the lognumber of moulds and yeasts was increased with the log number of T6 compared the C2. •The percentage changes of log number of T1 was 3.59, 3.25,3.07, 2.59 and 1.89 at zero time and after first, second, fourth and sixth days, respectively. Organoleptic evaluation : •Sensory evaluation is important criteria in evaluating bread quality and bread acceptability. These sensory properties included taste, texture, crumb distribution, odor, appearance, crust color, roundness, layer separation and overall acceptability. •The addition of 20% corn flour had an effect of the quality parameters than that bread produced by using wheat flour without additives (C1). •General appearance of balady bread produced from wheat flour and different additives indicated that there was a significant differences between bread of C 1 and C2. It was 7.76% and 6.31%, respectively, •Taste, texture, crumb distribution, odor, appearance crust color, roundness separation of players and overall acceptability were 15.72, 12.44, 12.40, 7.60, 7.76, 7.53, 4.54, 3.79 and 7.79, respectively. for bread produced by using wheat flour. While, bread produced by using 80% wheat flour plus 20% corn flour improved texture (12.51) and odor (7.68) compared with bread produced from 100% wheat flour (C1), •Crust color of bread of T4 had higher score than that of bread C2. It was 6.69 for bread C2, while it was 7.50 for bread of T4. This is may be due to the lactose of whey powder and milk powder, which interacts with amino acid of defatted soybean flour, •Taste and overall acceptability of all treatments had a significant difference compared with control 2 (C2) except for sample of Ti, Data indicated that a significant difference in taste and overall acceptability between C 1 and C2. While no significant difference in other characteristics between Cl and C2. Staling determination of bread produced from wheat flour (82%) mixed with different additives : Determination of alkaline water : •The alkaline water retention capacity (AWRC) of balady bread produced from wheat flour 82% with different additives at zero, 24, 48 and 72 hrs after baking. The data revealed that a decrease in AWRC took place with some of additives added to the flour •Data observed that, the rate of AWRC of bread made from 80% wheat flour + 20% corn flour after 8 hrs was lower comparing with the rate of AWRC of balady bread (C1). The rate of decrease for bread produced by using T2 was 11.02%, while, the rate of decrease for bread Cl was 4.01%. After 24 hr, the rate for AWRC of bread of T2 was 21.30% compared with 15.09% of bread Cl, •Alkaline water retention capacity (AWRC) is a simple and quick test to follow staling of bread. from the alkaline water retention capacity which reflect the swelling power of the starch granules and in other words staling or retrogradation. It could be concluded that the presence of slight amounts of oil delayed the staling and improved somewhat the freshness of the produced baked products, icated that, the alkaline water retention capacity as swelling power (S.P.) of balady bread stored at zero, 8, 24, 48 and 72 hr after baking are also shown. The data revealed that a decrease in AWRC took place with the addition of corn flour and other additive.•Data show that Cl is the best treatment than that of C2. This is due to the percentage of adding corn flour. After zero time all samples increased in AWRC than that of control 2 (C2). This is due to the defatted soybean flour, whey powder and milk powder, •The loss of freshness of Cl was 31.82 and for C2 was 43.71. The results of freshness of all samples are better than that of C2. This is may be due to the adding defatted soybean flour, skim milk powder and whey powder, Moisture content of balady bread loaves : •Moisture content of loaves that varied between the studied samples. After baking (zero time), the moisture content of bread of wheat flour was 3 8.89% while, it was 38.11% for wheat + corn bread. The moisture content was determined after 2, 8, 24, 48 and 72 hrs. The loss of moisture content increased by increasing storage period, •After 24 hrs of baking the loss of moisture content of wheat balady bread from C 1 was 15.22% compared with 21.41% for wheat corn bread from C2.•After 48 hrs, the loss percentage increased ranged from 25.0 to 32.85 for wheat corn bread, above results it could be

noticed that the addition of corn flour caused more reduction in moisture content and this reduction was accompanied by increasing the stale rate of bread, •The rate of decrease in moisture content was lower in all bread treatments compared with bread C2. The different additives improved moisture content of bread samples during storage periods.