بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

QUALITY OF SOME BAKERY PRODUCTS AND ITS RELATION TO ENZYME ACTIVITY

By

EMAN KAMAL NABIH HANAFI

B.Sc. Agric. Sci. (Food Technology), Ain Shams Univ., 2008

M.Sc. Agric. Sci. (Food Science and Technology), Ain Shams Univ., 2014

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This thesis for Ph.D. degree has been approved by:

Dr. Ahmed Ibrahim El-Desouky Abdelhamid .....

Prof. and Head of Food Technology Dept., Faculty of Agriculture, Benha University.

Dr. Ibrahim Rizk Sayed Ahmed Rizk .....

Prof. Emeritus of Food Science and Technology, Faculty of Agriculture, Ain Shams University.

Dr. El-Sayed Ibrahim Yousif Abou Elsoud .....

Prof. Emeritus of Food Science and Technology, Faculty of Agriculture, Ain Shams University.

Dr. Magdy Gomaha El-Shemy .....

Prof. Emeritus of Food Science and Technology, Faculty of Agriculture, Ain Shams University.

Date of Examination: 28 / 7 / 2020

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Under the supervision of:

Dr. Magdy Gomaha El-Shemy

Prof. Emeritus of Food Science and Technology, Food Science Department, Faculty of Agriculture, Ain Shams University. (Principal Supervisor).

Dr. El-Sayed Ibrahim Yousif Abou Elsoud

Prof. Emeritus of Food Science and Technology, Food Science Department, Faculty of Agriculture, Ain Shams University.

Dr. Nessrien Mohamed Nabih Yasin

Prof. of Food Science and Technology, Food Science Department, Faculty of Agriculture, Ain Shams University.

ABSTRACT

Eman Kamal Nabih Hanafi: Quality of some Bakery Products and its Relation to Enzyme Activity. Unpublished Ph. D. Thesis, Department of Food Science and Technology, Faculty of Agriculture, Ain Shams University, 2020.

This study was to investigate the relationship between the enzymatic activity and the quality characteristics of both pan bread made by frozen dough which was prepared from different wheat flours (72 % ext.), as well as balady bread produced using wheat flour with 82% ext. and its blends with malt flour (MF) as dough improver at 1 and 2% levels.

Various physicochemical and rheological properties of flours were studied. α-amylase and xylanase activities were estimated for flour, dough and various produced breads. Thermal properties of pan bread doughs were measured from its freezing curves. The effect of storage at -18±2ºC for 70 days on the fermentation activity of pan bread doughs was monitored. Specific volume and crust color were evaluated after 1 h of pan bread baking. The baking characteristics for different balady breads were determined. Staling rates were calculated over 72 h of bread storage at 25±2°C. Sensory evaluation for the produced breads was also performed.

Data revealed that, the physicochemical parameters and the rheological characteristics were highly affected by the wheat variety and the extraction rate. Moreover, flour samples were significantly ($p \leq 0.05$) differed in their α-amylase and xylanase activities. Dough samples had higher enzyme activity compared to the wheat flours from which they were made. Using compressed yeast in the preparation of pan bread doughs resulted in a considerable decline of freezing point ($t_{f,}$). The end freezing point (t_e) ranged from -16ºC to -9ºC. A significant ($p \leq 0.05$) increase in α-amylase activity was recorded by extending the frozen storage period of dough up to 70 days at -18±2ºC, which was in consistent with the changes of pH values, while it declined significantly ($P \leq 0.05$) after bread baking.

Xylanase activity significantly ($p \leq 0.05$) increased during the first 14 days of frozen storage of the dough, then decreased gradually till the end of frozen storage period. Also, xylanase activity has the same behavior as α-amylase in pan breads. The longer the frozen storage time of dough at -18±2ºC, the higher decreasing in the residual enzymatic activity of pan breads. However, enzyme activities in the doughs and pan breads strongly depended on the flour and yeast types. Pan breads prepared from doughs with a high α-amylase activity had better specific volumes, crust color, crumb texture and overall acceptability. Moreover, with increasing the time of frozen storage of dough at -18±2ºC, there was a decrease on the fermentation activity, thus caused a reduction in specific volume. Pan breads obtained from the frozen doughs presented significantly ($p \leq 0.05$) lower L* and b* values, while higher a* values than breads obtained from unfrozen doughs. Weight loss and staling rates gradually increased during 72 h of bread storage at 25±2°C.

On the other hand, the addition of MF to 82% ext. wheat flour significantly ($p \leq 0.05$) influenced protein and wet gluten contents, as well as GI, FN, LN and water hydration properties. This effect was extremely dependent on the level of MF adding. Using MF in the preparation of balady bread dough significantly ($p \leq 0.05$) increased the weight, diameter and moisture content of produced breads, as well as produced breads with better appearance, crust color, crumb texture, odor, taste and water retention than control bread. Meanwhile, with increasing the storage time of all balady breads up to 72 h at 25±2°C, the alkaline water retention capacity and penetration unit values were significantly ($p \leq 0.05$) reduced. Such decrease was faster in control bread compared to those prepared using MF. After 72 h of storage, bread samples prepared using MF significantly ($p \leq 0.05$) had lower staling rates than control balady bread.

In conclusion, the quality characteristics of pan bread produced from frozen dough strongly affected by flour and yeast types, and the time of frozen storage of dough. Also, MF could be suggested as a dough improver for producing balady bread with high quality characteristics.

Key words: Wheat flour, Physicochemical properties, Rheological properties, Frozen dough, Freezing curve, α-amylase, Xylanase, Fermentation activity, Pan bread, Specific volume, Malt flour, Balady bread, Staling, Sensory evaluation.

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