UTILIZATION FROM QUINOA SEED AS NON-TRADITIONAL SOURCE IN PREPARATION OF SOME BAKERY PRODUCTS

By

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B.Sc. Agric.Sc. (Food Sciences and Technology), Ain Shams University, 2010

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ABSTRACT

Emad Moawad Mohamad Moawad: Utilization from Quinoa Seed as non-Traditional Source in Preparation of Some Bakery Products.Unpublished M.Sc. Thesis, Department of food Science, Faculty of Agriculture, Ain Shams University, 2018.

This study was carried out to investigate the effect of partial substitution (5, 10 and 15 %) or (20 and 25 %) of wheat flour (72% ext.) by whole quinoa flour (QF) on quality parameters of pan bread or biscuit, respectively. Production of free -gluten biscuit from QF was also studied. Quinoa flour contained the highest percentages of protein, lipids, ash and crude fiber. Also, QF contained the highest amount of essential amino acids. From the results, it could be seen that, water absorption and degree of softening increased by increasing the substitution levels of QF, but stability, resistance to extensions and energy of dough decreased. The addition of QF adversely affected the specific volume of pan bread. The lightness (L*) and yellowness (b*) of pan bread decreased, but redness (a*) increased gradually by increasing QF. Evaluation of the organoleptic properties of pan bread revealed that no significant differences ($P \leq 0.05$) between control sample and pan bread samples contained QF for taste and summitry form. The pan bread contained QF had higher score for crust color, pore size and overall acceptability than control sample. Hardness (g) of pan bread increased and springiness decreased gradually during storage of pan bread at (25˚c ±2). The rate of staling of pan bread contained QF was lower than control sample. Using of QF at 20 and 25 % gradually increased the weight, diameter and spread ratio of prepared biscuit samples as substitution level increased. The crust color of biscuit samples had significantly lower lightness (L*) and Redness (a*) values compared to control sample. On the other hand, the crust of biscuit samples made from weak wheat flour and containing 20% QF showed higher (b*) values compared to other samples, while crust of biscuit samples (control) made from strong wheat flour showed higher (b*)

values compared to other samples. No significant ($P \leq 0.05$) differences were observed in sensory attributes for biscuits containing 20 or 25 % QF compared to the control sample. Higher values of hardness were recorded biscuit sample made from 25% QF. The height (mm) of biscuit samples were slightly decreased by increasing the level of addition of QF. On the other hand, the higher values of distance (mm) and peak time (s) were recorded in biscuit containing 25 % QF. Gluten-free biscuit made from 100 % QF contained the highest percentage of protein, lipids, ash and crude fiber compared to those of corn and rice-quinoa composite flour. The addition of corn and rice flour was adversely affected the thickness, diameter and spread ratio. The highest spread ratio was noticed of the biscuit made from 100% QF. It is worth mentioning that the biscuit made from 100 % QF or that of corn and rice – quinoa composite flour gave the biscuit with sensory acceptable. On the other hand, it could be noticed that the free -gluten biscuit containing 70% quinoa flour was darker in compared to other samples.

Key words: Wheat flour, Quinoa flour, Corn flour, Rice flour, Rheological properties, Pan bread, Biscuit, Free-gluten biscuit.

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LIST OF ABBREVIATIONS

a*	Redness
AA	Amino acid
AASP	Amino acid scoring pattern
AC	Antioxidant capacity
AIB	American Institute for baking
ANOVA	Analysis of variance
b*	Yellowness
BU	Brabender Units
BV	Biological Value
Ca	Calcium
CD	Celiac disease
CF	Corn flour
Cm	Centimeter
Co.	Company
CO2	Carbon Dioxide
C.PER	Calculated Protein Efficiency Ratio
CS	Chemical Score
DDT	Dough development time
DPPH	2,2-Diphenyl-1-picrylhydrazyl
E	Extensibility
EAA	Essential amino acids
EAAI	Essential Amino Acid Index
e.g.	For example
et al.	And others
ext.	Extract
FAO	Food and Agriculture Organization
Fe	Iron
FRAP	Ferric ion reducing antioxidant power
g	Gram
GF	Gluten-free