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EFFECT OF ADDITION OF MALT FLOUR AND PALM OIL ON THE RHEOLOGICAL PROPERTIES OF BREAD DOUGH.

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ABSTRACT

The present study aims to investigate the effects of the addition of malt flour with 1, 2, 3, 4, 5% and palm oil with 2, 3, 4, 5% on the rheological properties of wheat flour dough.

From the obtained resutts, it was cleared that addition of malt flour to dough decreased water absorption, stability time, arrival time and dough development. While increased weakening of the dough. So addition palm to dough decreased water absorption, arrival time, dough development and stability time while increased weakening of the dough. Also it was cleared that addition malt flour to dough decreased extensibility, resistance to extension, proportional number and energy. So addition palm oil to dough increased extensibility and proportional number, while decreased resistance to extension and energy.

INTRODUCTION

Cereal grains form a staple food of the majority of the people in the developing countries and provide between 70-80% of total calories (252 calories / 100gm) and more than 66% of protein in the diet (Juneja et al., 1980) .

Wheat is am important cereal because it can be used for preparation of many products, bread is one of the least expensive most important staples in the world. Because of their high popularity and large consuming, bakery products (including bread) could be a vehicle to improve the quality and nutritive value. Bread considered the one of the simplest foods manufactured, and its characteristics may differ from country to country (Abreu et al., 1994) .

Addition of malt to bread produces low mol. wt. dextrins from starch by hydrolysis. Its effect on starch reteogradation are considered anti-staling agents for retardation of bread staling (Duran et al., 2001).

In breads, only one type of enzyme is added either after milling the flour or added at bakery to help in fermentation. This is called alpha-amylase. Also, α - amylase is one of the major enzymes used for bread making because sound wheat flour contains less α-amylase than β-amylase (mathewson, 1998).

Malt flour can be used as enzymes supplements because malt is rich in α-amylase, and β-amylase (Mc. Gregor and morgan, 1986).

Effects of α-amylase from cereal, fungal and bacterial sources on rheological properties of health bread dough during dough resting. Bacterial amylase was added at 10 or 20 SKB units / 100 g. dynamic rheometry showed that α- amylase addition resulted in the change of rheological

properties of dough during resting. Changes noted were affected by α -amylase source, with greater decrease noted from barley malt compared with fungal α -amylases particularly after 85 min rest time. (Dogan 2002).

The present study aims to investigate the effects of the addition of malt flour and palm oil on the rheological properties of wheat flour dough.

MATERIALS AND METHODS

Materials:

a)A local wheat variety (Triticum sativum) cultivar " Shakha 61" obtained from the Agricultural Research Center, Giza, Egypt; and was milled for 82% extraction using Bohler Laboratory pneumatic flour mill.

b)Palm oil was obtained from Misr-Gulf oil processing co;

c)Malt flour was obtained from Al-Ahram Beverages Co; Giza, Govenorate, Egypt.

Methods:

Preparation of the flour blends:

The flour blends were prepared according to the ratio outlined in table (1).

Table (1): wheat flour 82% extraction and its mixtures for balady bread making.

Sample (mixtures) No.	Wheat flour 82% extraction	Malt flour	Palm oil
1	100	-----	-----
2	99	1	-----
3	98	2	-----
4	97	3	-----
5	96	4	-----
6	95	5	-----
7	98	-----	2
8	97	-----	3
9	96	-----	4
10	95	-----	5

Rheological measurements of dough samples:

The rheological measurements were carried out for each of above mensioned flour portions under investigation using farinofraph and extensograph tests at rheological lab., department of bread and dough food technology researches institute, Giza, Egypt.
As describes by A.A.C.C. methods (1995).

RESULTS AND DISCUSSIONS

Effect of replacement of wheat flour (82% extraction) by different levels of malt flour on farinograph parameters:

Table (2) shows the effect of replacement of wheat flour (82% extraction) by different levels of malt flour on farinpgraph parameters. From the results presented in table (2).

It can be noticed that replacement of wheat flour (82% extraction) by levels of 1, 2, 3, 4 and 5% malt flour decreases water absorbtion from 69.1% in control sample to 66.1, 65.7, 65.2, 64.2 and 64.0% respectively. The results revealed also that arrival time increased from 1.0 min. in control sample to 1.5 min in the different levels of malt flour. Also, dough development time of control was similar at levels 1, 2 and 4% of malt flour and increased 2.5 min at levels 3 and 5% of malt flour. Stability time decreased from 4.0 min in control sample to 3.5, 3.0, 3.5 and 3.5 min. at levels 1, 2, 3, and 5% of malt flour, respectively. No difference in stability time was recorded at level 4% malt. Weakening of the dough increased by increasing the level of malt flour level of 5% malt recorded the highest weakening of the dough.

These results confirm with Maeda *et al.*, (2003) and Emam, (2005).

Table (2): Effect of addition of malt flour as partial substitute to wheat flour (82% extraction) on farinograph parameters.

Parameters / Blends	Water absorption %	Arrival time (min)	Dough development (min)	Stability time (min)	Weakening of the dough (b.u.)
100% wheat flour	69.1	1.0	2.0	4.0	110
99% wheat flour + 1% malt	66.1	1.5	2.0	3.5	160
89% wheat flour + 2% malt	65.7	1.5	2.0	3.0	150
97% wheat flour + 3% malt	65.2	1.5	2.5	3.5	150
96% wheat flour + 4% malt	64.2	1.5	2.0	4.0	160
95% wheat flour + 5% malt	64.0	1.5	2.5	3.5	170

Effect of replacement of wheat flour (82% extraction) by different levels of palm oil on farinograph parameters:

The results presented in table (3) showed the effect of palm oil at replacement levels 2, 3, 4, and 5% wheat flour (82% extraction) on farinograph parameters.Water absorption of control sample was 69.1% and it was 65.2, 64.7, 62.5 and 61.3% at replacement levels of palm oil 2, 3, 4, and 5%, respectively. Arrival time of control sample was 1.0 and it was 1.0, 0.5, 0.5, and 1.0 min at replacement levels of palm oil 2, 3, 4, and 5% respectively. Also, dough development decreased from 2.0 min in control sample to 1.5, 1.0, 1.0, and 1.5 min at levels 2, 3, 4, and 5% respectively. Stability time decreased from 4.0 min in control of sample to 3.0, 3.0, 3.5, and 3.5 min at levels of 2, 3, 4, and 5% of palm oil respectively. Weakening of the dough increased by increasing the level of palm oil recorded the high weakening if the dough.

Table (3): effect of addition of palm oil as partial substitute to wheat flour (82% extraction) on farinograph parameters.

Parameters / Blends	Water absorption %	Arrival time (min)	Dough development (min)	Stability time (min)	Weakening of the dough (b.u.)
100% wheat flour	69.1	1.0	2.0	4.0	110
98% wheat flour + 2% palm oil	65.2	1.0	1.5	3.0	135
97% wheat flour + 3% palm oil	64.7	0.5	1.0	3.0	130
96% wheat flour + 4% palm oil	62.5	0.5	1.0	3.5	110
95% wheat flour + 5% palm oil	61.3	1.0	1.5	3.5	115

Effect of replacement of wheat flour (82% extraction) by different levels of malt flour on extensogram parameters:

The results presented in table (4) showed the effect of malt flour at replacement levels 1, 2, 3, 4, and 5% to wheat flour (82% extraction) on extensogram parameters. Dough extensibility of control sample was 140 mm and it was 122, 140, 138, 127 and 143 mm at replacement levels of 1, 2, 3, 4, and 5% respectively. Resistance to extension of blends increased from 250 B.u. in control sample to 260 B.u. at replacement level 1% of malt flour, then it decreased to 165, 175, 165, and 210 B.u. at replacement levels 2, 3, 4, and 5% of malt flour. Proportional number of blends increased from 1.79 in control sample to 2.13 at replacement level 1% of malt flour, then, it decreased to 1.18, 1.27, 1.30 and 1.47 at replacement levels 2, 3, 4, and 5% of malt flour. Energy of blends decreased from 48 cm^2 in control sample to 39, 25, 30, 28, and 40cm^2 at replacement levels 1, 2, 3, 4, and 5% of malt flour.

Table (4): Effect of addition of malt as partial substitute to wheat flour (82% extraction) on extensograph parameters.

Parameters / Blends	Extensibility (mm)	Resistance to extension (B.u.)	Proportional number	Energy (cm^2)
100% wheat flour	140	250	1.79	48
99% wheat flour + 1% malt	122	260	2.13	39
98% wheat flour + 2% malt	140	165	1.18	25
97% wheat flour + 3% malt	138	175	1.27	30
96% wheat flour + 4% malt	127	165	1.30	28
95% wheat flour + 5% malt	143	210	1.47	40

Effect of replacement of wheat flour (82% extraction) by different levels of palm oil on extensogram parameters:

The results presented in table (5) showed the effect of palm oil at replacement levels 1, 2, 3, 4, and 5% to wheat flour (82% extraction) on extensogram parameters.

Dough extensibility of control sample was 140 mm and it was 290, 290, 290, and 240 mm at replacement levels of palm oil 2, 3, 4, and 5%

respectively. Resistance to extension of blends decreased from 250 B.u. in control sample to 115, 125, 125, and 115 B.u. at replacement levels of palm oil 2, 3, 4, and 5% respectively. Proportional number of blends increased from 1.79 in control sample to 2.52, 2.32, 2.32, and 2.10 at replacement levels 2, 3, 4, and 5% of palm oil. Energy of blends decreased from 48 cm^2 in control sample to 24, 26, 23, and 21 cm^2 at replacement levels 2, 3, 4, and 5% of palm oil.

Table (5): Effect of addition of palm oil as partial substitute to wheat flour (82% extraction) on extensograph parameters.

Parameters / Blends	Extensibility (mm)	Resistance to extension (B.u.)	Proportional number	Energy (cm^2)
100% wheat flour	140	250	1.79	48
98% wheat flour + 2% palm oil	290	115	2.52	24
97% wheat flour + 3% palm oil	290	125	2.32	26
96% wheat flour + 4% palm oil	290	125	2.32	23
95% wheat flour + 5% palm oil	240	115	2.10	21

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" تأثير إضافة دقيق المولت وزيت النخيل على الخواص الريولوجية لعجينة الخبز"

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يهدف البحث إلى دراسة تأثير إضافة دقيق المولت بنسبة ١, ٢, ٣, ٤, ٥% وزيت النخيل بنسبة ٢، ٣، ٤، ٥% على الصفات الريولوجية للعجينة .

أولا : أوضحت النتائج المتحصل عليها من الفارينوجراف أنه نتيجة إضافة دقيق المولت بنسب مختلفة أدت إلى انخفاض نسبة الامتصاص ومدة العجن وثبات العجينة . بينما زادت مدة العجن للحصول على أقصى قوام وضعف العجينة . كذلك إضافة زيت النخيل بنسب مختلفة أدت إلى انخفاض نسبة الامتصاص وزمن الوصول وزمن تكون العجينة وثبات العجينة . بينما زادت ضعف العجينة .

ثانيا : والنتائج المتحصل عليها من الاكتنسوجراف أنه نتيجة إضافة دقيق المولت بنسب مختلفة أدت إلى انخفاض مطاطية العجينة والمقاومة للشد والرقم النسبي وطاقة العجينة الناتجة . كذلك إضافة زيت النخيل بنسب مختلفة أدت إلى زيادة المطاطية والرقم النسبي . بينما انخفضت المقاومة للشد والطاقة الناتجة .