Biological Evaluation of Macaroni Production From Some New Varieties of Durum Wheat Cultivated In Sinai Fortefied With Ginger, Moghat And Pumpkin Seed Dry Powder

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Abstract: This study was conducted for the production of pasta from durum wheat semolina of the items of the three (Amar, Sohag, Banyswif)supported powders of some medicinal plants, namely(ginger root dry powder, moghat root dry powder, pumpkin seeds dry powder) recalled for the production of healthy pasta nutritional value and high medicinal has supported the proportions 5 %,10%,15% of the powder full of plants. The study recommends the following. Results showed that supplementation with 5 % powder, ginger root, strengthening by10%of the powdered roots of moghat and consolidation by 15%, powder seeds of pumpkin in different kinds of semolina led to improve the quality of product, which reflected its effect on increasing the rates of digestion and the rate of net benefit from that protein in experimental animals. Experiments have also shown the positive impact of the additions of various components of serum in experimental animals, such as low level of triglycerides and total cholesterol level as well as low glucose and high hemoglobin and total protein. The study revealed that the best additions are ratios described above and to the possibility of overcoming some health problems such as anemia osteomalacia and hardening of the arteries. This is indicated by increasing the additions of the elements containing the powder seeds of pumpkin and powdered ginger root, as well as powder roots of moghat a high proportion of volatile oils, one of the antioxidants that work to purify blood of free radicals and increase vitality.

Keywords: Biologival evaluation, Macaroni, Durum Wheat, Ginger Seed Dry Powder, Moghat Seed Dry Powder

INTRODUCTION

Wheat and Wheat products are long recognized as major staple, and a source of calories and significant quantities of other nutrient (vitamins, minerals and dietary fiber) in people diets (Sidhu *et al.,* 1999). Whole grains provide wide range of nutrients and biological active constituents such as vitamin B and vitamin E and minerals such as selenium, zinc, copper, magnesium and photochemical such as phenol compounds, which synergistically contribute to reduce the incidence of various chronic diseases.

Adam *et al.* (2003) stated that wheat is the most important cereal crop production and consumption in the world.

Malcolmson *et al.* (1993) found that durum wheat contained protein and ash from 11.8-18.3% and 1.52-1.80% while for semolina they were 10.3-17.3 and 0.62-0.78%, respectively.

Pirman *et al.* (2007) Torres *et al.* (2007) studied the biological pasta and a reasonable level of vitamin B1, vitamin B2 and vitamin E. biological assessment of cooked pastas indicated that the true protein digestibility did not change after the fortification of semolina but protein efficiency ratio increased sharply in the pasta supplemented with alpha-galactoside-free lupine flours. This investigation their fore was carried out to study the production of healthy pasta formula made from semolina varieties and additives such as ginger, moghat and pumpkin seed dry powder which were intended for people suffering from obesity and over weight.Thus production high nutritional values of healthy pasta.and studying the effect of these additives on the nutritional and biological characteristics of healthy pasta.were attention of healthy were faced in rates experiments such as Anemia,Rickets and Osteomalacia.There were found that decreased the levels of total cholesterols,triglyceride,glucose and increased total protein and hemoglobin.

Biological evaluation:

Adanlawo and Dairo (2007) reported that nutrient and anti-nutrient constituents of ginger and the influence of its ethanolic extract on some serum enzymes in albino rats. The study conclusively showed that ethanolic extract of ginger root did not have any debilitating effect on tissues such as the brain, liver, stomach, small intestine, kidney and the serum.

Cervantes-Ramirez and Cromwell (1997)found that of 91% low-tannin grain sorghum, 5% decupled SBM, 0.57% HCl-Lys, 0.15% Thru (10.5% CP with Leys and Thru added Experiments were conducted to determine whether deficiencies of certain minerals (K,Mg)or B-vitamins (choline, biotin, folic acid), which are more abundant in soybean oil meal (SBM) than in sorghum grain, were responsible for limiting maximum rate and efficiency of gain in two pigs. 28-day experiments, The results suggest that K, Mg, choline, biotin and folic acid are adequate in a grain sorghum-SBM diet containing 10.5% CP, and are not the factor(s) responsible for limiting maximum growth in pigs fed on a low-protein, amino acid-fortified diet.

Ghayur and Gilani (2005) found that ginger lowers blood pressure through blockade of voltage-dependent calcium channels. Ginger, a well-known spice plant, has been used traditionally in a wide variety of ailments including hypertension. They report here the cardiovascular effects of ginger under controlled experimental conditions. These data indicate that the blood pressure-lowering effect of ginger is mediated through blockade of voltage dependent calcium channels.

Giguere *et al.* (2005)found that rapid, sensitive and versatile determination of selenium in different biological samples. The reliable assessment of selenium in biological samples is generally technically difficult to achieve and requires a large amount of material. The technique was found to be fast, sensitive and robust for a reliable determination of Se in small amounts (<50 mg or 100 micro L) of biological samples breads.

Ibrahim *et al.* (1997)found that biological evaluation of mucilages from roots and seeds of Moghat.as well as the hypoglycemic effect of the mucilages. The root mucilages had remarkable hypoglycemic activity, decreasing the blood glucose level in male Sprague-Dawley albino diabetic rats by 54.5% within 15 days .Pirman *et al.* (2007) Torres *et al.* (2007) studied the biological pasta and a reasonable level of vitamin B1, vitamin B2 and vitamin E. biological assessment of cooked pastas indicated that the true protein digestibility did not change after the fortification of semolina but protein efficiency ratio increased sharply in the pasta supplemented with alpha-galactoside-free lupine flours (2.07 and 1.92 for Emir and Troll lupine varieties, respectively) in comparison with the control pasta (1.11).It is concluded that the alpha-galactoside-free lupine flours are an adequate ingredient to improve the nutritional quality of pasta products without adding flatulent oligosaccharides.

MATERIALS AND METHODS

Semolina as a control was obtained from local market. New varieties of semolina were obtained from the farm of the plant production department in Environmental Agric. Sic. Fact. of Arish, Suez Canal, University.Ginger dry powder, Moghat dry powder and Pumpkin seed dry powder were obtained from local market, in Arish Sinai.

Pasta samples were processed in the Food Technology Research Institute Laboratory, Agricultural Research Center. The ingredients used in pasta preparation were control semolina, Amar semolina, Sohag semolina and Banyswif semolina and pasta were prepared according to Bean *et al.* (1974).

Healthy pasta was prepared by adding some medicinal plants such at5%ginger,10%moghat and15% pumpkin seed dry powder to the raw materials which was used for this samples, the healthy pasta was prepared it consists of control semolina, New varieties semolina and some additives each different dough blend of healthy pasta was prepared by partial replacement of durum semolina, The formula of this blends are shown in Table (1).

Healthy pasta was as processed in macaroni machine (Model Marcato. Atlas), made in Italy. The pasta products made from these samples 1, 2, 3, and 4 grade were formed out of dough strands extruded at a pressure of 90 kg/cm^2. The pasta was dried at temperature of 45°C for 10 hr. (Fabriani *et al.* 1967) then packed in polyethylene bags and stored at room temperature until analysis.

Determination of minerals:-

Zinc, iron, calcium, potassium, sodium, phosphorus and magnesium were determined in the all raw materials before and after cooking by using a Pye Unicom sp. 1900 atomic absorption spectroscopy technique as described by AOAC (2005).

Statistical analysis:

All data collected from results of sensory evaluation of the different blends of healthy pasta production, rat feeding Biological assays and rat blood chemistry test were subjected to Applying analysis of variance using (Microsoft office-excel2003).

Biological assays:

Experimental animals:

A total of 87 weanling male albino rats(Sprague dowley strain),4 weeks old, weighed 35-45 g were housed in Feed Laboratory of Faculty of Moshtohor Veterinary Medicine, Banha Univ. The animals were kept under normal healthy laboratory conditions.

Experimental design:

This study aimed to compare the effect of 13 group's of different blends of healthy pasta production. A total of 87 weanling male albino rats (Sprague dowley strain), 4 weeks old, weighed 35-45 gm., were divided randomly into 13 groups each group contains 6 rats. The control group was fed on the basal diet the composition of standard diet was 23.5 g of casein 85% protein to represent a level of 20% protein. Diet was prepared according to Ain (1977); 61.3 g of starch; 4 g of salt mixture ; 10 g of oil; 1 g of Vitamin mixtures ; 0.2g of choline chloride. The dried healthy pasta samples were added instead of casein, and at the expense of starch to give high protein level. All other groups of rats were fed the experimental diets for four weeks (tap water was supplied). As follows:

- **Groups** (1, 2, 6 and 10) control fed on pasta made from control semolina (F1), Amar semolina (F2), Sohag semolina (F12) and Banyswif semolina (F22) without additives respectively.
- **Groups** (3,4 and 5)fed on healthy pasta prepared from Semolina Amar(F3,F7,F11)fortified with ginger, moghat, and pumpkin seed dry powder at level of 5%, 10% and 15% respectively.
- **Groups** (F13, F17 and F21) fed on healthy pasta prepared from Sohag semolina fortified with ginger, moghat, and pumpkin seed dry powder at level of 5%, 10% and 15% respectively.
- **Groups** (F23, F27 and F31) fed on healthy pasta prepared from Banyswif semolina fortified with ginger, moghat, and pumpkin seed dry powder at level of 5%, 10% and 15% respectively.

The rats were placed individually in special metabolic cages, and fed on experimental diets and water ad Labium. The animals were moved; faeces was collected during the last three days and dried, then kept in plastic containers for nitrogen determination. Five rats of each groups were scarified using chloroform and dried in air oven at 70°C for three days or constant weight, then ground to a fine powder after defeating and kept in plastic container at(-20c) Nitrogen in both

carcass and faeces was determined using macro kjeldahl method according to **AOAC (2005).**

Table (1): Formulas of different healthy pasta blends.

Formula No.	Commercial semolina (%)	Amar semolina (%)	Sohag semolina (%)	Banyswif semolina (%)	Ginger dry powder (%)	Moghat dry powder (%)	Pumpkin seed dry powder (%)
F1	100	-	-	-	-	-	-
F2	-	100	-	-	-	-	-
F3	-	95	-	-	5	-	-
F4	-	90	-	-	10	-	-
F5	-	85	-	-	15	-	-
F6	-	95	-	-	-	5	-
F7	-	90	-	-	-	10	-
F8	-	85	-	-	-	15	-
F9	-	95	-	-	-	-	5
F10	-	90	-	-	-	-	10
F11	-	85	-	-	-	-	15
F12	-	-	100	-	-	-	-
F13	-	-	95	-	5	-	-
F14	-	-	90	-	10	-	-
F15	-	-	85	-	15	-	-
F16	-	-	95	-	-	5	-
F17	-	-	90	-	-	10	-
F18	-	-	85	-	-	15	-
F19	-	-	95	-	-	-	5
F20	-	-	90	-	-	-	10
F21	-	-	85	-	-	-	15
F22	-	-	-	100	-	-	-
F23	-	-	-	95	5	-	-
F24	-	-	-	90	10	-	-
F25	-	-	-	85	15	-	-
F26	-	-	-	95	-	5	-
F27	-	-	-	90	-	10	-
F28	-	-	-	85	-	15	-
F29	-	-	-	95	-	-	5
F30	-	-	-	90	-	-	10
F31	-	-	-	85	-	-	15

Biological evaluation:

Biological evaluation of the different diets was carried out by determination of body weight gain (B.W.G.), food efficiency ratio (F.E.R.), and protein efficiency ratio P.E.R according to the method described by Baily.N.T. (1959).

Biological assay:

All collected blood samples were centrifuged to obtain serum and stored at-20°C until assayed, as mentioned before.

Determination of serum total protein:

Serum total protein was determined by Beret method described by **Henry (1964).**

Determination of hemoglobin (Hb):

Determination of hemoglobin (Hb) was performed at the Biological Laboratory of Faculty of Moshtohor Veterinary of Medicine, Banha Univ. according to the method of Jain (2000).

Determination of serum glucose:

Blood glucose was determined according to the procedure described by **Trinder(1969).**

Lipid profile:

Determination of serum cholesterol:

Serum total cholesterol was determined according to the method described by Chan and Richamand (1974)

Determination of triglycerides:

Triglycerides were determined according to the method described by Fossati and Principe (1982).

RESULTS AND DISCUSSION

In order to produce healthy pasta formulas by replacing part of its semolina content. Semolina from different Durum wheat varieties which were cultivated and named as (Amar semolina, Sohag semolina and Banyswif semolina) were formulated with some additives such as ginger,moghat and pumpkin seed dry powder in the current investigation. The replacement percentage was 5, 10 and 15% for each semolina varity using ginger, moghat and pumpkin seed dry powder. The obtained results were presented and discussed as follows:

Biological evaluation on healthy pasta from different semolina formula:

Food intake body weight gain,Feed Effeciency Ratio (FER) and Protein Efficiency Ratio (PER) among rats fed on healthy pasta from different semolina formula.

Table (2) illustrate the mean food intake body weight gain,Feed Effeciency Ratio (FER) and Protein Efficiency Ratio (PER) among rats fed on healthy pasta fortified by different leveles of additives (Ginger,Moghat,Pumpkin seed dry powder).The results showed that the highest weight gain (40.55±6.8) and(35.76±6.98) were observed in the group of rats fed on healthy pasta fortified as15%Pumpkin seed dry powder.While the lowest value at F3 was recorded for the control group which fed on healthy pasta without additives.It could be noticed that these differences are mostly dute to the differences in Protine sources and hence in the amount of Protein consumed by rats as presented in Table(2).The study concluded that the best nutritional supplementation at 15% Pumpkin seed dry powder followed by5%ginger,Moghat and finely Semolina compared with Control.The use of 15%Pumpkin seed dry powder in the forteficiation of healthy pasta to overcome the problem of protien difficiency that most common in developing cantries.From the previous results.it could be concluded that fortification of heathy pasta with15%Pumpkin seed dry powder was the best usufeul one due to its avaliability and low cost if compared with any soureces of Protien according to Pirman *et al.* (2007) and Torres *et al.* (2007).

Test rats group which fed on healthy pasta from different semolina formula:

Table (3) shows that the level of glucose in serum was decreased in case of test rats group which fed on healthy pasta formula supplemented with additives such as Ginger,Moghat and Pumpkin seed dry powder at levels 5,10 and15%resepectively,compared with control. In the same resultes,presented in the same Table, it could be noticed increase of hemoglobin and total protein of all test rat group which feed on healthy pasta formula supplemented with additives such as Ginger,Moghat and Pumpkin seed dry powder at level 5,10and15%resepectively.Compared with control. However it can be noticed from the same table decerecing tryglecrides and total chlasterol in all test rats group compared with control.From data in the same table indicated that the addition of Ginger,Moghat and Pumpkin seed dry powder at levels 5,10and15% resepectively,led to decerecing tryglecrides and total chlasterol in tested the rats blood serum may be to resultes this materials certin about antioxdant such as selanium,zinc,and Pumpkin seed dry powder contain highest amount in unsaturated fatty acidits used as remdy for variaus oilment particulary as lereacment agenst warmit could be noticed that healthy pasta contained higest amount of mineral such as Fe,Zn and Se which important for food humans in feed to cure them from Animia however Fe,Zn and Se are very important to help the body to refining the blood from free radicals and vitally the blood and excess of Biologically.this resultes agreement withYoshida *et al.* (2005) and Torres *et al.* (2007).

Table (2): Food intake, body weight gain, feed efficiency ratio and protein efficiency ratio of healthy pasta formuola form different semolina formula.

Components	Formula No.	Food intake (g)	Body weight gain.gm	*F.E.R	**P.E.R
Control semolina	**F1**	198±4.4	26.00±3.50	0.131	1.31
Amar semolina	**F2**	198±4.4	26.00±3.50	0.131	1.31
Amar semolina at 5% ginger dry power	**F3**	204±5.0	32.76±8.83	0.160	1.60
Amar semolina at l0% moghat dry power	**F7**	206±3.0	35.76±6.98	0.173	1.73
Amar semolina at 15% pumpkin seed dry power	**F11**	207±8.5	40.55±6.80	0.195	1.95
Sohag semolina	**F12**	198±4.4	26.00±3.50	0.131	1.31
Sohag semolina at 5% ginger dry power	**F13**	204±5.0	32.76±8.83	0.160	1.60
Sohag semolina at l0% moghat dry power	**F17**	206±3.0	35.76±6.98	0.173	1.73
Sohag semolina at 15% pumpkin seed dry power	**F21**	207±8.5	40.55±6.80	0.195	1.95
Banyswif semolina	**F22**	198±4.4	26.00±3.50	0.131	1.31
Banyswif semolina at 5% ginger dry power	**F23**	204±5.0	32.76±8.83	0.160	1.60
Banyswif semolina l0% moghat dry power	**F27**	206±3.0	35.76±6.98	0.173	1.73
Banyswif semolina 15% pumpkin seed dry power	**F31**	207±8.5	40.55±6.80	0.195	1.95

Table (3): Glucose, hemoglobin, total proteion, tryglcerides, total cholesterol, (mg/100 ml) for groups of male albino rates fed on healithy pasta formuola form different semolina formula.

Components	Formula No.	Glucose	Hemoglobin	Total protein	Triglycerides	Total cholesterol
Control semolina	**F1**	104.22±9.11	15.10±1.13	14.98±0.41	68.56±10.15	127.0±0.22
Amar semolina	**F2**	104.22±9.11	15.30±1.11	67.99±0.45	67.99±11.13	126.8±0.28
Amar semolina at 5% ginger dry power	**F3**	103.12±9.11	15.80±1.12	66.05±0.44	66.05±11.90	125.7±0.23
Amar semolina at l0% moghat dry power	**F7**	103.15±9.11	18.80±1.12	66.22±0.43	66.22±11.80	126.9±0.24
Amar semolina at 15% pumpkin seed dry power	**F11**	103.14±9.10	17.70±1.13	66.92±0.42	66.92±10.16	126.2±0.23
Sohag semolina	**F12**	104.11±9.10	15.40±1.12	66.96±0.41	66.96±11.11	126.7±0.28
Sohag semolina at 5% ginger dry power	**F13**	103.80±9.10	15.70±1.12	66.02±0.41	66.02±11.12	125.5±0.23
Sohag semolina at l0% moghat dry power	**F17**	103.90±9.10	17.60±1.11	66.18±0.40	66.18±11.80	126.7±0.24
Sohag semolina at 15% pumpkin seed dry power	**F21**	103.70±9.10	18.70±1.11	66.89±0.41	66.89±11.80	126.2±0.23
Banyswif semolina	**F22**	104.16±9.10	15.50±1.11	66.93±0.40	66.93±10.16	126.6±0.28
Banyswif semolina at 5% ginger dry power	**F23**	104.14±9.10	15.61±1.11	66.99±0.41	66.99±11.11	125.2±0.23
Banyswif semolina l0% moghat dry power	**F27**	104.15±9.10	17.59±1.20	66.15±0.40	66.15±11.70	126.4±0.24
Banyswif semolina 15% pumpkin seed dry power	**F31**	104.13±9.10	18.78±1.11	66.86±0.40	66.86±11.80	126.2±0.23

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التقيم الحيوى لإنتاج المكرونة من بعض أصناف قمح الديورم الجديدة المزرعة في سيناء والمضاف إليها مسحوق جذور الزنجبيل والمغات وبذور القرع العسلي

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*** المعهد العالى للسياحة والفنادق واللغات بالم بلاذا - العريش - مصر

أجريت هذه الدراسة للتقيم الحيوى لإنتاج المكرونة من سيمولينا قمح الديورم للأصناف الثلاثة (عمار -سوهاج- بني سويف والمدعمة بمساحيق بعض النباتات الطبية وهي (مسحوق جذور الزنجبيل – مسحوق جذور المغات – مسحوق بذور القرع العسلي) وذلك لإنتاج مكرونة ذات قيمة غذائية وطبية عالية وقد دعمت بنسب ٥% -١٠%- ١٥% من المسحوق الكامل للنباتات الثلاثة السابقة وتوصى الدراسة بالاتي :-

٣- أوضحت النتائج أن التدعيم بنسبة ٥% مسحوق جذور الزنجبيل، التدعيم بنسبة ١٠% من مسحوق جذور المغات و التدعيم بنسبة ١٥% مسحوق بذور القرع العسلي إلي أصناف السيمولينا المختلفة أدت إلي تحسين نوعية المنتج والذي انعكس تأثيره علي زيادة معدلات الهضم والقيمة الحيوية ومعدل صافي الاستفادة من ذلك البروتين لحيوانات التجارب كما أوضحت التجارب الأثر الايجابي للإضافات المختلفة على مكونات سيرم الدم في حيوانات التجارب مثل انخفاض مستوي الجلسريدات الثلاثية ومستوي الكولسترول الكلي – وكذا انخفاض الجلوكوز وارتفاع الهيموجلوبين و البروتين الكلى وكشفت الدراسة أن أفضل الإضافات هي النسب الموضحة سابقا وذلك لإمكانية التغلب علي بعض المشاكل الصحية مثل الأنيميا -لين العظام – وتصلب الشرايين. وقد دل علي ذلك زيادة محتوي الإضافات من العناصر بالإضافة إلي احتواء مسحوق بذور القرع العسلي و مسحوق جذور الزنجبيل وكذا مسحوق جذور المغات على نسبة عالية من الزيوت الطيارة وهي من المواد المضادة للأكسدة والتي تعمل علي تنقية الدم من الشقوق الحرة وزيادة الحيوية.