Results and Discussion

1- Chemical composition of raw materials

The chemical composition of raw materials were calculated in Table (5) for semolina, farina, wheat flour 72%, SDF, whey powder, wheat shortes, dried turmeric, dried parsley and dried beet root, respectively which content the noodles processing and pasta for moisture, protein, fat, fiber, carbohydrates and ash.

From the data presented in Table (5) it could be noticed that the protein percentage were 11.2, 12.1, 13.07, 14.2, 17, 16.8, 7.1, 18.5 and 1.2%, respectively. Where as crude lipids percentage were 1.1, 0.79, 0.99, 1.3, 1, 4.2, 10.3, 4 and 0.1%, receptively. Ash percentage were 0.82, 0.44, 0.48, 3.72, 0.19, 8.2, 6, 12.5 and 5.5%, receptively.

Total carbohydrates percentage were 74.48, 74.84, 72.99, 65.48, 78.21, 53.7, 62.4, 47.2 and 84.8%, receptively

Fiber percentage were 0.31, 0.33, 0.37, 1.1, zero, 8.2, 6.1, 11.3 and 1.2% receptively from the previous results, it could be revealed that whey powder contained the highest percentage of protein while the lowest percentage was observed in semolina, where as the highest content of ash was observed in parsley and the lowest content was observed in whey powder. Total lipids were high in turmeric where as lipids in beet root less than 1%. In the same table it also could be concluded that the SDF was higher in protein, fat, fiber and ash contents where as whey powder and shortes were high in protein.

Chemical composition of raw materials of special pasta: -

In the present study, SDF and shortes byproducts high fiber content were utilized in replacing part of wheat flour 72% in the processing of healthy pasta. Different by product i.e. SDF and shortes were analyzed

for moisture, protein, fat, fiber and ash. The obtained results are shown in Table (5) and Fig. (2).

The results presented in Table (58) show that byproducts i.e. SDF and shorts were high in protein, fat, fiber and ash. (16.8, 14.2), (4.2, 1.3), (8.2, 1.1), (8.2, 3.72) respectively shortes have the highest content of protein (16.8%) followed by SDF (14.2%).

The analysis of other additives used showed that. Turmeric, parsely and beet root were analyzed for moisture, protein, fat, fiber and ash.

The results presented in Table (5) show that turmeric contained the highest percentage of fat (10.3%) followed by parsley 4%.

Mean while parsely contained the highest percentage of protein and fiber (18.5% and 11.3%) followed by turmeric (7.1% and 6.1%). Parsely contained the highest percentage of ash 12.5% followed by turmeric 6% followed by beet root 5.5%.

From the same table, it could be noticed that the addition of 3% turmeric powder or 3% parsely powder or 3% beet root powder to the flour blends control caused an increase in protein, fat, fiber and ash.

Table (5): chemical composition of raw materials.

Ingredients	Moisture	Protein	Fat	Fiber	carbohydrate	Ash
Semolina	11.79	11.2	1.1	0.31	74.48	0.82
Farina	11.5	12.1	0.79	0.33	74.84	0.44
Wheat flour 72%	12.1	13.07	0.99	0.37	72.99	0.48
SDF *	14.2	14.2	1.3	1.1	65.48	3.72
Whey powder	3.6	17	1	0	78.21	0.19
Wheat shortes	8.9	16.8	4.2	8.2	53.7	8.2
Dry turmeric powder	8.1	7.1	10.3	6.1	62.4	6
Dried parsley powder	6.5	18.5	4	11.3	47.2	12.5
Dried beet root powder	7.2	1.2	0.1	1.2	84.8	5.5

(On dry weight basis)

*SDF : Second durum wheat flour fraction No. 2.

Results in Table (6) and Fig. (3) show that turmeric, parsley and beet root contained 37, 42, 79mg / 100 gm dry matter of sodium where as wheat flour 72% and shortes contained 18 and 8 mg / 100gm dry matter of sodium respectively.

From the same Table, it could be noticed that turmeric had the highest content of potassium (2312) mg/100 gm dry matter but wheat flour 72%, SDF, shortes, parsley and beet root contained (655, 0.35, 181, 501 and 312) mg / 100 gm dry matter respectively. On the other hand, wheat flour 72% and turmeric contained the highest amount of magnesium (286 and 201) mg / 100 gm dry matter respectively.

Mean while SDF had 48, 10 and 25 mg. / 100 gm for calcium, sodium and zinc respectively.

Results also show that, Turmeric and parsley had the highest amount of calcium (174 and 121 mg / 100 gm) respectively, However beet root contained the lowest amount (14.5 mg / 100 gm) of calcium. SDF contained the highest amount of iron 223.8 mg / 100 gm.
Turmeric contained the highest amount of phosphorus 279mg/100gm.
From the same table, it noticed that the addition of 3% turmeric powder or 3% parsely powder or 3% beet root powder to the flour blends control caused an increase in (Ca, Fe, Mg, P, K, Na and Zn).

Table (6): Mineral content of some raw materials used in special pasta.

Ingredients	Ca	Fe	Mg	P	K	Na	Zn
Wheat flour72%	45	1.27	286	147	655	18	3
SDF*	48	233.8	12	0.3	0.35	10	23.6
Shortes	36	2.4	95	82	181	8	25
Turmeric (dry)	174	39	201	279	2312	37	3.5
Parsley (dry)	121	4.5	52	38	501	42	0.64
Beet root (dry)	14.5	0.8	23	52	312	79	0.29

(on dry weight basis)

*SDF: second durum flour fraction No.2

*All values mg / 100 gram / protein.

a- Rheological properties of dough

Farinograph test was carried out determine the rheological properties of dough from semolina, farina, wheat flour 72%, durum wheat flour No.2 every one alone and its blends by (1:1) percentage. The obtained readings of the farinograms parameters, i.e. water absorption, mixing time, dough development time, dough stability were shown in Table (8) and Fig. (4).

From the results presented in Table (8) and Fig. (5 and 6) it could be noticed that the percentage of water absorption values were 57, 61.5, 56, 69.8, 59.2, 56.2, 63, 58.5, 57.1 and 63.3 for sample dough of semolina, farina, wheat flour 72% and SDF, recpectively.

SDF had the highest water absorption value 69.8 and the lowest value of stability (2.5) where as wheat flour 72% extraction had the lowest water absorption value (56) and lowest value of mixing time. Mixing time values were (1.5, 2.5, 1, 1.5, 2, 1, 2, 1.5, 1and 1) for the same samples dough respectively as described in Table (8).

Dough stability values were (6.5, 7.5, 3.5, 2.5, 7, 4.5, 5.5, 6, 9 and 3) for the same samples dough respectively as described in Table (8) and Fig. (4, 5 and 6).

These results indicated that quantity in water absorption of flour samples may be attributed to the differences in protein content and quality.

Table (6): Effect of dough noodles formula on farinograph parameters.

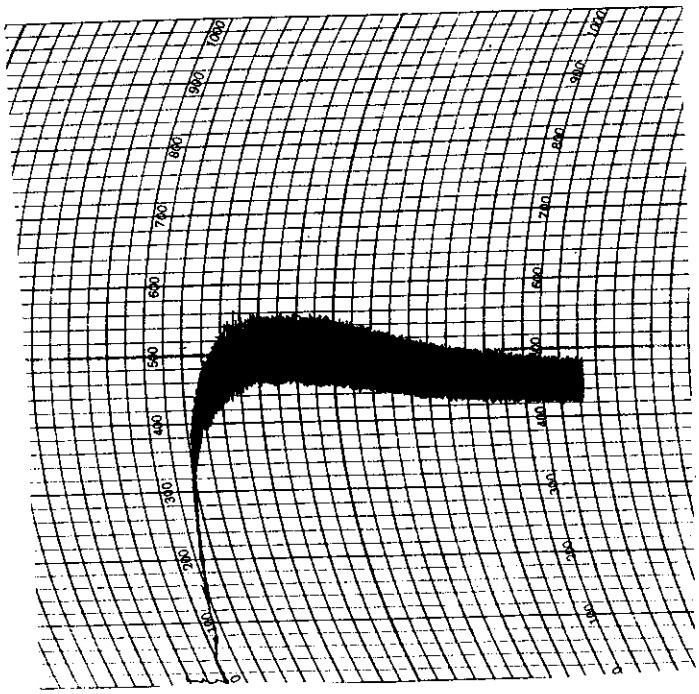
Ingredients	Code	Farinograph parameters			
		W. A.	M. T	DEV. T.	Stability
Semolina (S)	1	57	1.5	3.5	6.5
Farina (F)	2	61.5	2.5	5.5	7.5
Wheat flour 72% (WF)	3	56	1	2	3.5
*SDF	4	69.8	1.5	2.5	2.5
S+F (1:1)	5	59.2	2	4	7
S+WF 72% (1:1)	6	56.2	1	2	4.5
S+SDF (1:1)	7	63	2	4	5.5
F+WF 72% (1:1)	8	58.5	1.5	3	6
F+SDF (1:1)	9	57.1	1	5	9
WF 72% + SDF (1:1)	10	63.3	1	1.5	3

*** SDF: second durum wheat flour No. 2.**

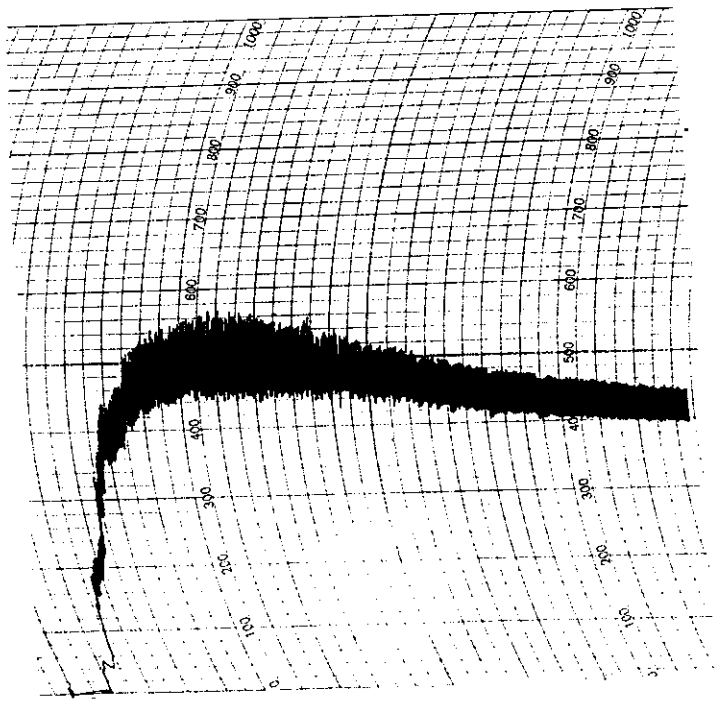
W.A: water absorption

M. T.: Mixing time.

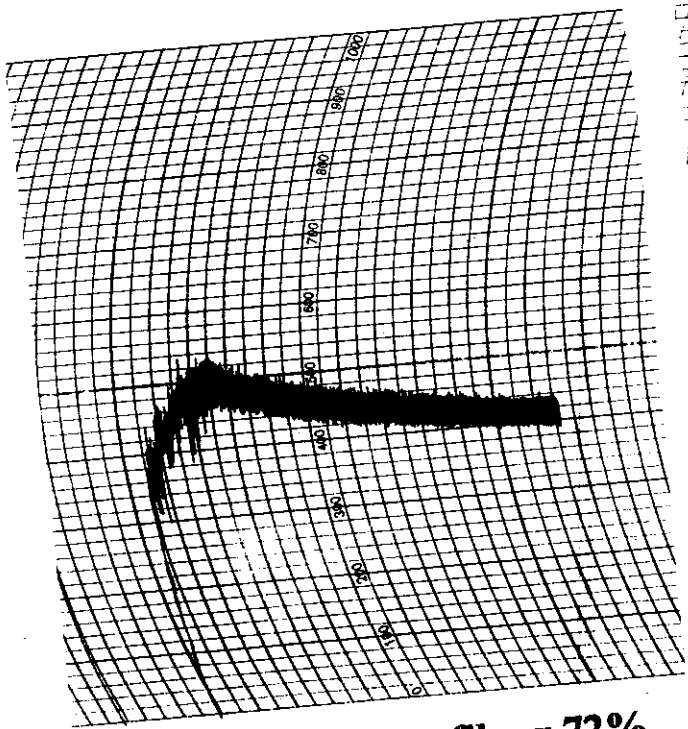
DEV. T.: Dough development time.



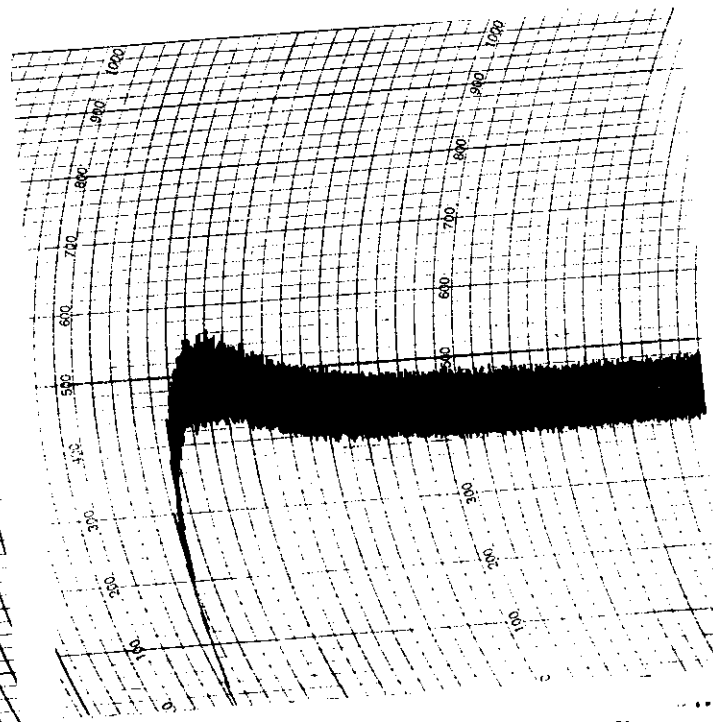
Farinograms of durum semolina



Farinograms of farina

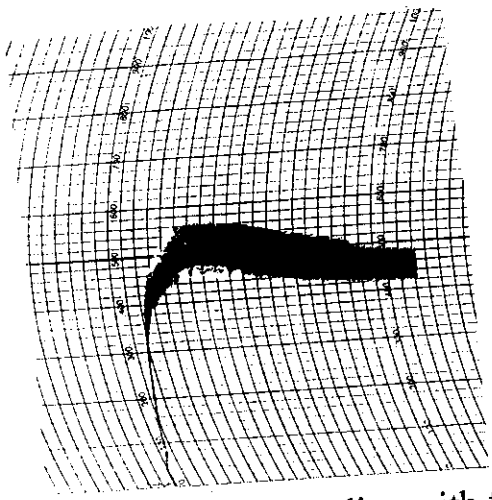


Farinograms of wheat fllour 72%

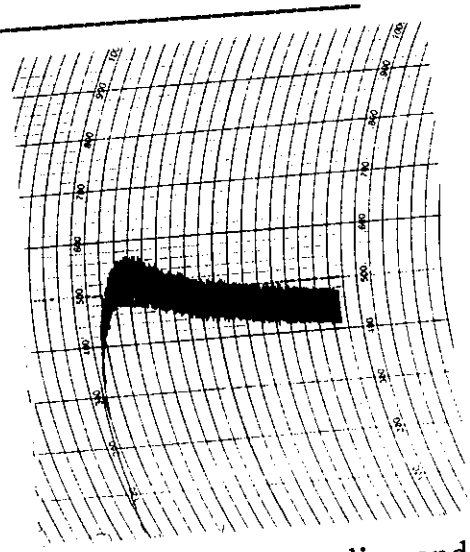


Farinograms of second durum flour No.2 (SDF)

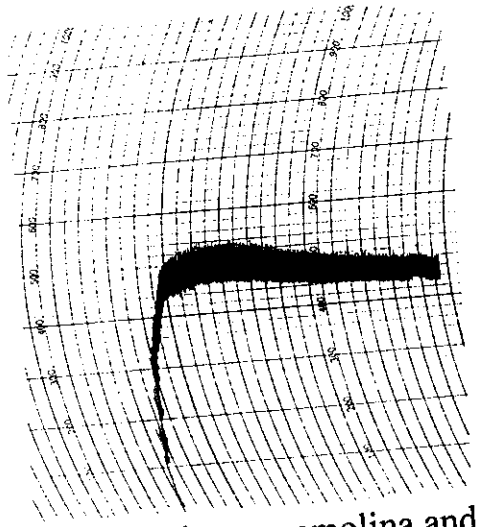
Fig.(5)FARINOGRAMS OF RAW MATERIALS



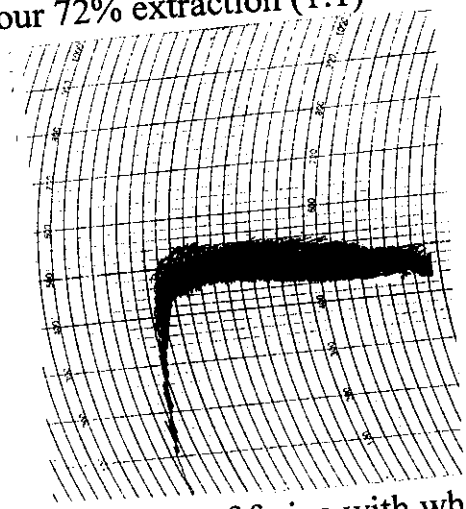
Farinograms of durum semolina with farina (1:1)



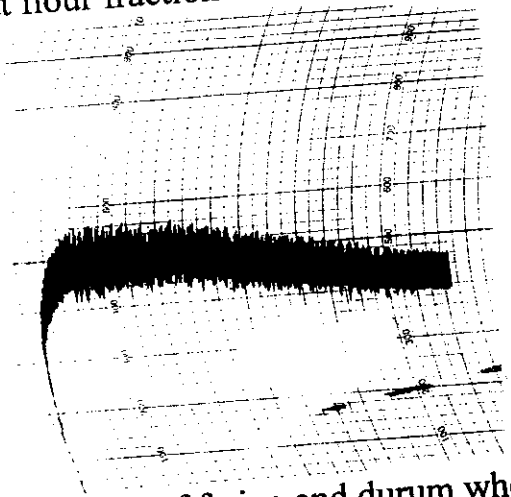
Farinograms of durum semolina and wheat flour 72% extraction (1:1)



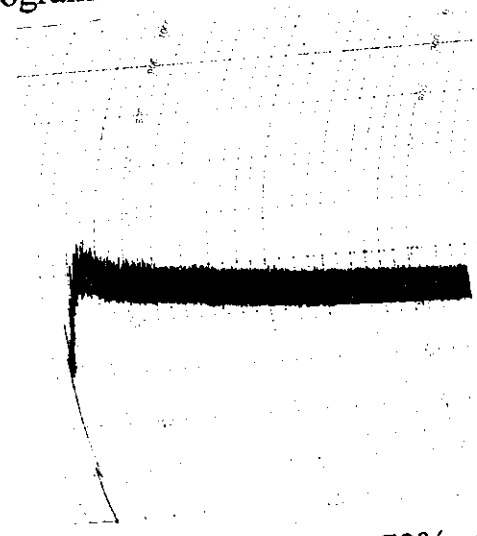
Farinograms of durum semolina and durum wheat flour fraction No.2 (SDF) (1:1)



Farinograms of farina with wheat flour 72% (1:1)



Farinograms of farina and durum wheat flour fraction No.2 (SDF) (1:1)



Farinograms of wheat flour 72% extraction and durum wheat flour fraction No.2 (SDF) (1:1)

Fig. (6) FARINOGRAMS OF DIFFERENT BLENDS

b- Cooking quality of noodles: -

The cooking quality studied for weight increase, volume increase and cooking loss (amounts of residues retained in the cooking water) and Organoleptic of the cooked Noodles.

Results in Table (7) and Fig. (7) shown that effect of adding 0.02% ascorbic acid for noodles blends caused increased in weight and volume for all samples compared with control (W.F. 72%).

The values were 70% increase in weight and 150% increase in volume for control and (140% and 180%), (80 and 165), (73 and 155), (89 and 160), (95 and 173), (90 and 165), (100 and 170), (79 and 160), (85 and 163) and (80 and 160) for weight and volume respectively. In ten samples shown in Table (7).

Noodles made from semolina had the highest increase in weight 140% and 180% in volume and lower cooking loss 9.5 compared with all samples.

These results agreement with ***Matuse et al.*** **(1972)** who reported that the volume increase was closely related to weight increase.

From the same Table and Fig. 7 cooking loss values were 9.5, 14, 11, 13, 11.5, 10.5, 11, 12.5, 13.5, 12.5, and 12 for all samples and control. The difference in cooking quality properties between noodles samples could be attributed to the protein content, since samples with low protein are cooked more rapidly than those rich in protein and so as the protein content increase. The time required for the water to penetrate the protein network and gelatinize of the starch granules increased ***Oh et al.*** **(1985).**

Moss et al. (1987) suggested that protein nutrients in the low protein sample allowed the water to penetrate into the noodle more rapidly and thus allow the starch to absorb more water, so that the central starch granules are optimally gelatinized before surface break down occurs.

Table (7): Weight, volume and cooking loss of Noodles with adding 0.02% ascorbic acid.

Code No.	Noodles blends	*weight cooked	Percentage of weight increase	**Volume cooked	Percentage of volume increase	Cooking loss %
	Control (W.F.)	170	70	250	150	12
1	S	240	140	280	180	9.5
2	F	180	80	265	165	14
3	WF 72%	173	73	255	155	11
4	*** SDF	189	89	260	160	13
5	S+F (1:1)	195	95	273	173	11.5
6	S+WF 72% (1:1)	190	90	265	165	10.5
7	S+SDF(1:1)	200	100	270	170	11
8	F+WF 72% (1:1)	179	79	260	160	12.5
9	F+SDF (1:1)	185	85	263	163	13.5
10	WF+SDF (1:1)	.180	80	260	160	12.5

* Weight of uncooked samples were 100 g for each sample

** Volume of uncooked samples were 100 mL for each sample.

S : Semolina

F : farina

WF 72%: wheat flour 72%

*** SDF : second durum flour fraction No. 2.

From data in Table (8) and as shown in Fig. (8) the addition of 2% whey powder increased in noodles weight and volume.

Weight values were (150, 80, 110, 125, 90 and 70) for semolina, wheat flour, semolina with farina (1:1), semolina with SDF (1:1), wheat flour with SDF (1:1) and control (wheat flour without 2% whey powder). The same trends were observed with volume values.

Cooking loss values were (10, 11.5, 12.5, 12, 14 and 12 for the same mentioned noodles, respectively as shown in Table (8) and Fig. (8).

Table (8): Weight, volume and cooking loss of noodles with adding 2% Whey powder

`Code No.	Noodles blends	* weight cooked	Percentage of weight increase	**Volume cooked	Percentage of volume increase	Cooking loss %
	Control (W.F.)	170	70	250	150	12
1	S	250	150	290	190	10
2	F	190	90	265	165	15
3	WF 72%	180	80	256	156	11.5
4	*** SDF	195	95	270	170	12.5
5	S+F (1:1)	210	110	280	180	12.5
6	S+WF 72% (1:1)	195	95	273	173	11.5
7	S+SDF(1:1)	225	125	284	184	12
8	F+WF 72% (1:1)	185	85	259	159	13
9	F+SDF (1:1)	200	100	268	168	14
10	WF+SDF (1:1)	190	90	265	165	14

* Weight of uncooked samples were 100 g for each sample

** Volume of uncooked samples were 100 mL for each sample.

S : Semolina

F : farina

WF 72%: wheat flour 72%

*** **SDF:** second durum flour fraction No. 2.

From the Table (9) and Fig. (9) it can be observed that addition of 4% whey powder produce the highest quality of noodles compared with other levels.

Cooking loss were decreased with 4% level than 6% and slightly with 2% whey powder this lead to produce a high quality noodles.

Values were (10, 11, 12.5, 12, 14 and 12) for semolina, wheat flour, semolina with farina (1:1), semolina with SDF (1:1) and control (wheat flour without 4% whey powder).

Noodles weight and volume were increased with increasing the level of whey powder, due to protein content of whey powder more absorbed water when added to raw materials.

Table (9): Weight, volume and cooking loss of noodles with adding 4% Whey powder.

Code No.	Noodles blends	* weight cooked	Percentage of weight increase	** Volume cooked	Percentage of volume increase	Cooking loss %
	Control (W.F.)	170	70	250	150	12
1	S	253	153	295	195	10
2	F	192	92	266	166	14.5
3	WF 72%	183	83	258	158	11
4	SDF	199	99	279	179	13.5
5	S+F (1:1)	217	117	288	188	12.5
6	S+WF 72% (1:1)	198	98	278	178	11
7	S+SDF(1:1)	229	129	289	189	12
8	F+WF 72% (1:1)	287	187	266	166	13
9	F+SDF (1:1)	209	109	274	174	14
10	WF+SDF (1:1)	198	98	269	169	14

* Weight of uncooked samples were 100 g for each sample

** Volume of uncooked samples were 100 mL for each sample.

S : Semolina

F : farina

WF 72%: wheat flour 72%

*** **SDF:** second durum flour fraction No. 2.

From data in Table (10) and as shown in Fig. (10) the addition of 6% whey powder increased the noodles weight and volumes but more than 2% and 4%.

Cooking loss values were (10.5, 11.5, 13.5, 13, 15 and 12) for semolina, wheat flour 72%, semolina with farina (1:1), semolina with SDF (1:1), wheat flour with SDF (1:1) and control (wheat flour without 6% whey powder).

Cooking loss were increase when using 6% whey powder compared with 4% this means production of low quality noodles.

Table (10): Weight, volume and cooking loss of noodles with adding 6% Whey powder

Code No.	Noodles blends	* weight cooked	Percentage of weight increase	** Volume cooked	Percentage of volume increase	Cooking loss %
	Control (W.F.)	170	70	250	150	12
1	S	260	160	300	200	10.5
2	F	195	95	269	169	15
3	WF 72%	185	85	263	163	11.5
4	SDF	201	101	280	180	14
5	S+F (1:1)	220	120	290	190	13.5
6	S+WF 72% (1:1)	200	100	282	182	12
7	S+SDF(1:1)	230	130	290	190	13
8	F+WF 72% (1:1)	290	190	270	170	13.5
9	F+SDF (1:1)	215	115	275	175	14.5
10	WF+SDF (1:1)	200	100	273	173	15

* Weight of uncooked samples were 100 g for each sample

** Volume of uncooked samples were 100 mL for each sample.

S : Semolina

F : farina

WF 72%: wheat flour 72%

*** **SDF:** second durum flour fraction No. 2.

The cooking quality studied for weight, volume and cooking loss of cooked noodles were determined and the obtained results presented in Table (11) and as shown in Fig. (11) indicated that effect of adding 0.02% ascorbic acid, 0.05% penzoyl peroxide and 4% whey powder for noodles formulas.

Values for weight were (166, 95, 85, 102, 120, 100, 133, 90, 115, 110 and 70) for all samples coded from 1 to 10 and control respectively. Values for volume were (200, 170, 163, 185, 195, 185, 195, 175, 180, 173 and 150) for all samples coded from 1 to 10 and control respectively. Cooking loss values were (9, 13, 10.5, 12.5, 11, 10, 10.5, 12, 12.5, 12 and 12) for all samples coded from 1 to 10 and control, respectively.

From these results, it could be noticed that the noodles prepared from semolina had highest values for weight and volume where as semolina had lowest values for cooking loss.

On the other hand, the lowest values were scored when preparing noodles from farina flour. It could be concluded from the previous data that high quality noodles from second durum flour. Fraction No.2 (SDF) fortifying with ascorbic acid, bleaching with penzoyl peroxide, enriched with whey powder, can be prepared.

These results were nearly found in agreement with those obtained by ***Miskelly (1984)*** who found that protein content of flour was the most importance affecting the color of noodles. He also reported that the flour with low protein content have noodles with fade color.

Table (11): weight, volume and cooking loss noodles prepared with addition of 0.02% ascorbic acid, 4% whey powder and 0.05% penzoyl peroxide.

Code No.	Noodles blends	*weight cooked	Percentage of weight increase	** Volume cooked	Percentage of volume increase	Cooking loss %
	Control (W.F.)	170	70	250	150	12
1	S	266	166	300	200	9
2	F	195	95	270	170	13
3	WF 72%	185	85	263	163	10.5
4	SDF	202	102	285	185	12.5
5	S+F (1:1)	220	120	295	195	11
6	S+WF 72% (1:1)	200	100	285	185	10
7	S+SDF(1:1)	233	133	295	195	10.5
8	F+WF 72% (1:1)	190	90	275	175	12
9	F+SDF (1:1)	215	115	280	180	12.5
10	WF+SDF (1:1)	210	110	273	173	12

* Weight of uncooked samples were 100 g for each sample

** Volume of uncooked samples were 100 mL for each sample.

S : Semolina

F : farina

WF 72%: wheat flour 72%

*** **SDF:** second durum flour fraction No. 2.

Data in Table (12) and as shown in Fig. (12) declared that No obtained effects of penzoyl peroxide on weight, volume and cooking loss of noodles prepared from different raw materials used in this investigation weight values were 145, 72, 104, 122, 85 and 70 for semolina, wheat flour 72% extraction, semolina with farina (1:1), semolina with second durum flour No. 2 (1:1), wheat flour 72% with second durum flour No. 2 (1:1) and control (wheat flour 72% without penzoyl peroxide).

Cooking loss values were 10.5, 11.5, 13, 12.5, 15 and 12 for the same treatments respectively.

Table (12): weight, volume and cooking loss noodles prepared with addition of 0.05% penzoyl peroxide.

Code No.	Noodles blends	*weight cooked	Percentage of weight increase	** Volume cooked	Percentage of volume increase	Cooking loss %
	Control (W.F.)	170	70	250	150	12
1	S	245	135	285	185	10.5
2	F	185	85	260	160	15.5
3	WF 72%	172	72	250	150	11.5
4	SDF	191	91	265	165	14
5	S+F (1:1)	204	104	270	170	13
6	S+WF 72% (1:1)	190	90	265	165	12
7	S+SDF(1:1)	222	122	279	179	12.5
8	F+WF 72% (1:1)	181	81	256	156	13.5
9	F+SDF (1:1)	196	96	260	160	14.5
10	WF+SDF (1:1)	185	85	260	160	15

* Weight of uncooked samples were 100 g for each sample

** Volume of uncooked samples were 100 mL for each sample.

S : Semolina

F : farina

WF 72%: wheat flour 72%

*** **SDF:** second durum flour fraction No. 2.

C- Organoleptic properties of noodles.

The noodles was tested by ten panelists with respect to noodle quality characteristics, color, surface appeal, hardness, stickness, smoothness, taste, and total score.

The score are given in Tables (13 & 14) and as shown in Fig. (from 13, 14, 15, 16 and 17). Color and surface appeal are major quality factors of the noodle. Supplemented with whey powder at all concentration levels were in general better than that of noodles
Processed from 100% wheat flour 72%, however, whey powder imported more amber yellowish color for noodle.

The panel scoring revealed that the noodle enriched with whey powder at 2%, 4%, and 6% the color was slightly improved there by.

Each of appearance, hardness, stickness, smoothness, and taste of noodles enriched with 6% whey powder were inferior to either the control the total score indicated that, the noodles enriched with 4% whey powder was superior followed by that fortified by 2%.

Table (13): Organoleptic properties of cooked Noodles prepared from different levels of whey powder.

quality	Score	control	Whey powder											
		WF 72%	2%	4%	6%	2%	4%	6%	2%	4%	6%	2%	4%	6%
			Semolina			Farina			Wheat flour 72%			SDF *		
Color	30	27	28	29	28.5	26	27	26	27	28	27	21	23	22
Surface appeal	20	17	19	19	19	15	16	15	17	18	17.5	18	18	18
Hardness	10	8	9	9	9	6.5	7	7	7.5	8	8	8	8	8
Stick ness	20	17	18.5	19	18.5	16	17	17	18	18	18	18	18	18
Smoothness	10	8.5	9	9	9	7	7	7	8	8	8	8	8	8
Taste	10	8	9	9.5	9	8	8	8	8.5	9	8.5	8	8	8
Total	100	85.5	92.5	94.5	93	78.5	82	80	86.5	89	87	81	83	82

(S): Semolina

(F): Farina

(WF): wheat flour 72%

(SDF *): second durum flour fraction No. 2.

Table (14) Organoleptic properties of cooked Noodles prepared from different levels of whey powder (CONT.).

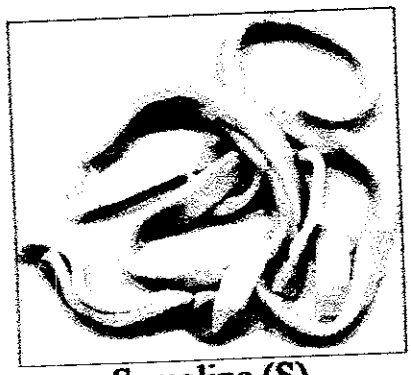
Quality	score	control WF 72%	Whey bowder 2, 4, and 6%																	
			2%	4%	6%	2%	4%	6%	2%	4%	6%	2%	4%	6%	2%	4%	6%	2%	4%	6%
			S+F (1:1)			S+WF 72% (1:1)			S+SDF (1:1)			F+WF 72% (1:1)			F+SDF (1:1)			WF72%+ SDF (1:1)		
Color	30	27	24	25	24	28	28.5	28	23	24	23	25	25.5	25.5	23.5	23.5	23.5	24	25	24
Surface appeel	20	17	17	17	17	18	18	18	17.5	17.5	17.5	16	17	16	16.5	17	17	18	18	18
Hardness	10	8	6.5	7	7	8.5	8.5	8.5	7.5	8	8	7	7	7	7	7.5	7	8.5	8.5	8.5
Stickness	20	17	17	17	17	18	18	18.5	17.5	17.5	17.5	17	17.5	17	17	18	17.5	18	18	18.5
Smoothness	10	8.5	8	8	8	8.5	9	8.5	8	8	8	7	7	7	7	7	7	8	8	8
Taste	10	8	9	9	9	9	9	9	8	8	8	9	9	9	8	8	8	9	9	9
Total	100	85.5	81.5	83	82	90	91	90.5	81.5	83	82	81	82	81.5	79	81	80	85.5	86.5	86

(S): Semolina

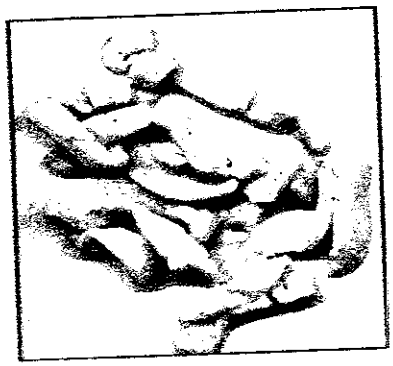
(F): Farina

(WF): wheat flour 72%

(SDF): second durum flour fraction No. 2.



Semolina (S)



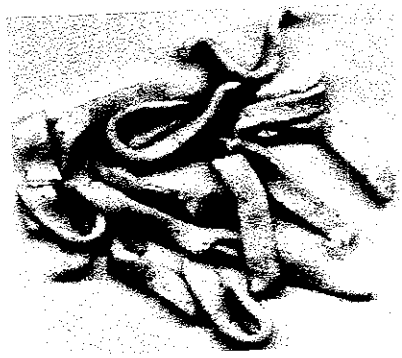
Farina (F)

(WF72%)

(SDF)

F+S(1:1)

S+WF72%(1:1)



S+SDF (1:1)

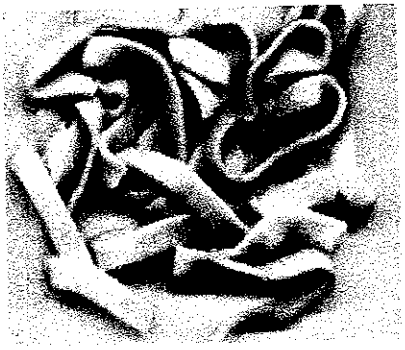
SDF+WF72%(1:1)

F+SDF (1:1)

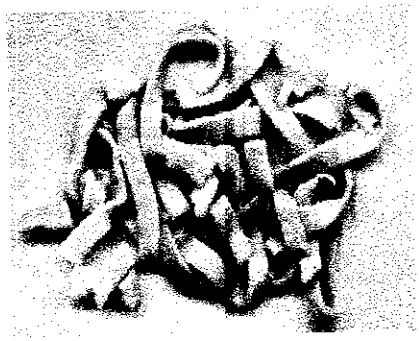
F+WF72% (1:1)

Fig. (13): Noodles prepared from semolina, farina, wheat flour 72%, durum flour No.2 and its blends.

(Control)

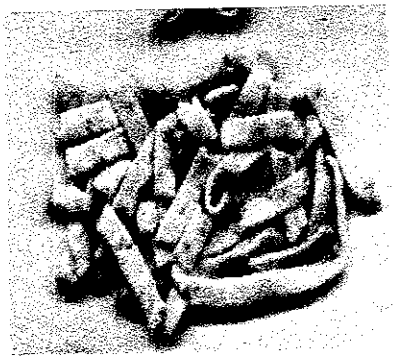


(S+2% whey powder)

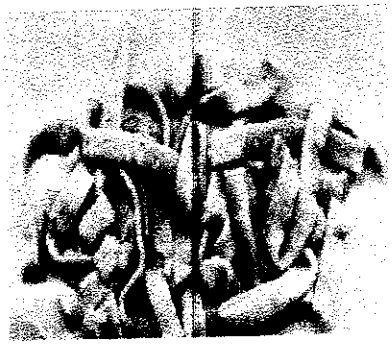


(S+4% whey powder)

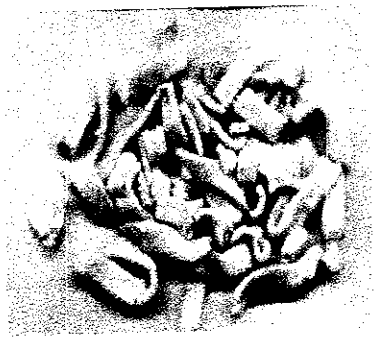
(S+6% whey powder)



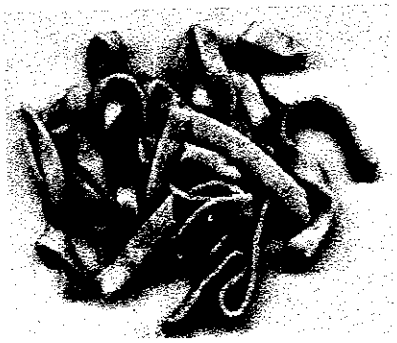
(F+2% Whey powder)



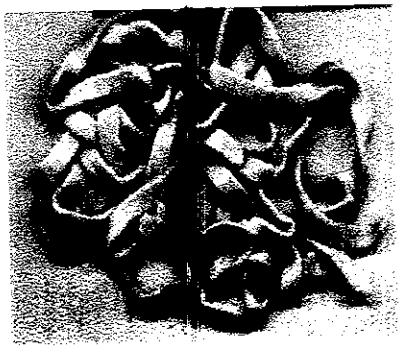
(F+4%whey powder)



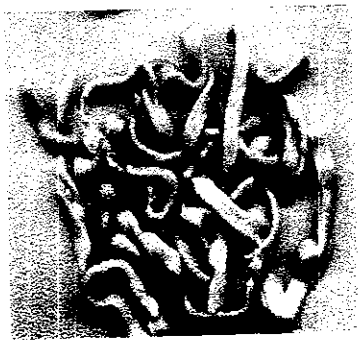
(F+6%whey powder)



(WF72%+2%whey powder)

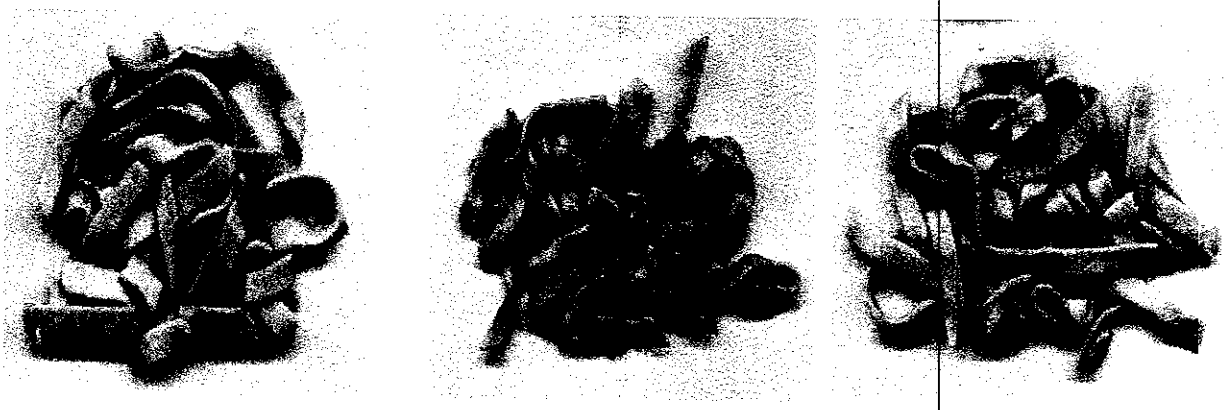


(WF72%+4%whey powder)

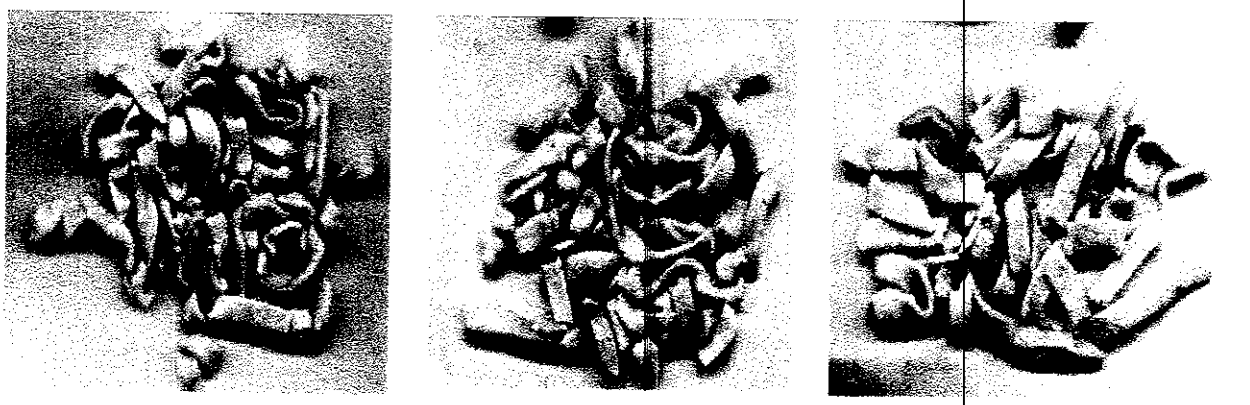


(WF72%+6%whey powder)

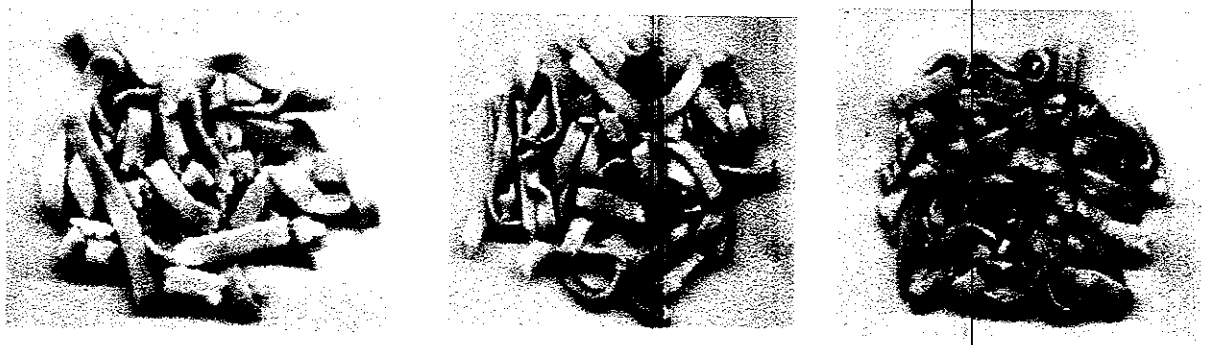
Fig. (16): Effect of adding whey powder 2%, 4% and 6% on noodles prepared from semolina, farina, and wheat flour 72%.



(SDF+2% whey powder) (SDF+4% whey powder) (SDF+6% whey powder)

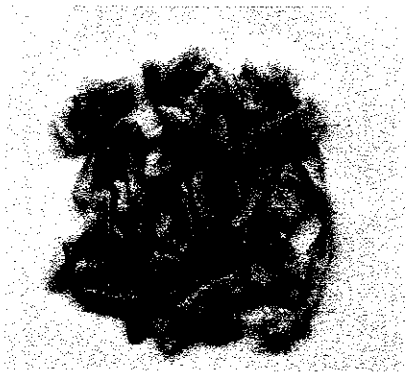


(F+S(1:1)+2%whey powder) (F+S(1:1)+4%whey powder) (F+S(1:1)+6%whey powder)

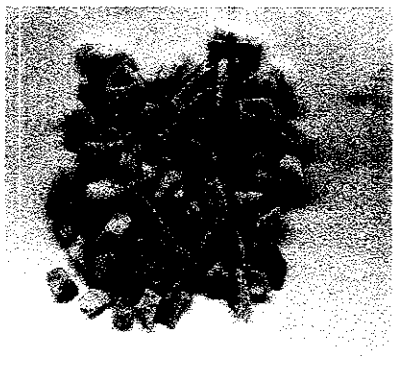


(S+WF72%(1:1)+2%whey powder) (S+WF72%(1:1)+4%whey powder) (S+WF72%(1:1)+6%whey powder)

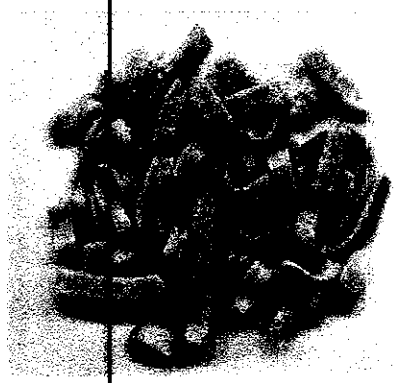
Fig. (15): Effect of adding whey powder 2%, 4% and 6% on noodles prepared from durum flour No.2, farina with semolina (1:1) and semolina with flour 72%(1:1).



(S+SDF(1:1)+2%whey powder)

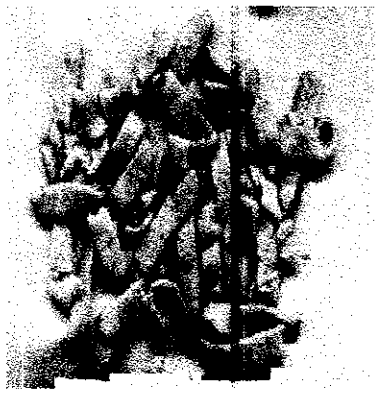


(S+SDF(1:1)+4%whey powder)



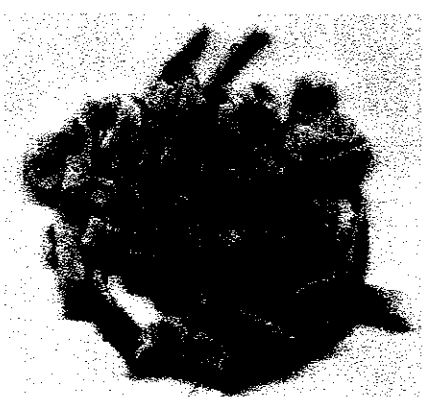
(S+SDF(1:1)+6%whey powder)

(F+WF72%(1:1)+2% whey powder)

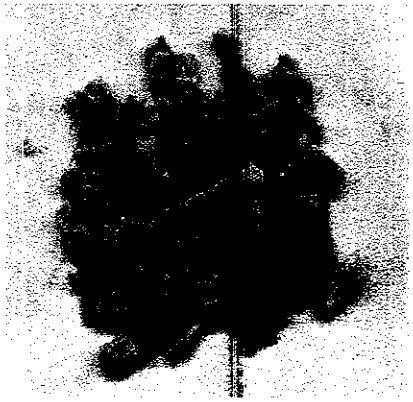


(F+WF72%(1:1)+4% whey powder)

(F+WF72%(1:1)+6% whey powder)



(F+SDF(1:1)+2%whey powder)

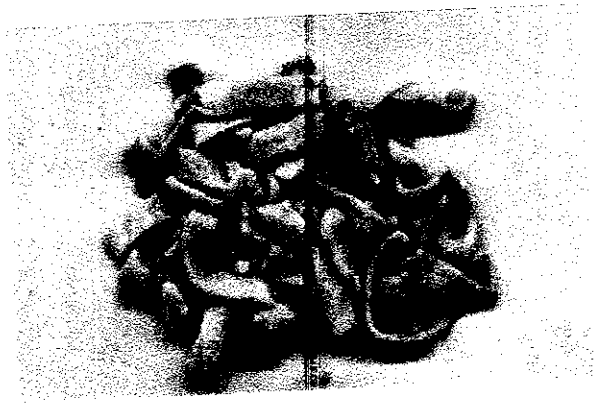


(F+SDF(1:1)+4%whey powder)

(F+SDF(1:1)+6%whey powder)

Fig. (14): Effect of adding whey powder 2%,4% and 6% on noodles prepared from semolina with durum flour No.2 (1:1), farina with flour 72%(1:1) and farina with durum No. 2.

(WF72%+SDF(1:1)+2%whey powder)



(WF72%+SDF(1:1)+4%whey powder)

(WF72%+SDF(1:1)+6%whey powder)

Fig. (15): Effect of adding whey powder 2%, 4% and 6% on noodles prepared from wheat flour 72% with durum flour No.2(1:1).

Data illustrated in Tables (15 & 16) declared that the organoleptic properties of cooked noodles prepared from different formulas addition of 0.02% ascorbic acid, 0.05% penzoyl peroxide and whey powder at the levels of 2%, 4% and 6% Noodles were tested by ten panelists with respect to noodles quality characteristics, color, surface appeal, hardness, stickness, smoothness, taste and total score.

Parameters are given in Tables (15 & 16) for color, surface appeal, hardness, stickness, smoothness taste and total score are major quality factors of different formulas of noodles supplemented with 0.02% ascorbic acid, 0.05% penzoyl peroxide and whey powder at level of 2%, 4% and 6%. Were in general better than that of noodles processed from 100% wheat flour 72% extraction (control), however, whey powder imported more amber yellowish color for noodle.

The panel scoring revealed that noodles color enriched with whey powder at any concentration under investigation was improved. Each of appearance, hardness, stickness, smoothness and taste of noodles enriched with 6% whey powder were inferior to either the control or other levels on the other hand the noodles enriched with 4% whey powder was superior followed by that fortified with 2% whey powder.

Table (15): Organoleptic properties of cooked noodles prepared with addition of 0.02% ascorbic acid, 0.05% penzoyle peroxide and 2%, 4% and 6% whey powder.

quality	Score	control WF 72%	0.02% ascorbic acid + 0.05% penzoyl peroxide + whey powder 2%, 4% and 6%											
			S			F			WF 72%			SDF		
			2%	4%	6%	2%	4%	6%	2%	4%	6%	2%	4%	6%
Color	30	27	28.5	29	29	27.5	28.5	28	27.5	28.5	28	26	27	26.5
Surface appeal	20	17	19	19.5	19	17	18.5	17.5	17.5	18.5	18	18	18	18
Hardness	10	8	9	9.5	9	7.5	8.5	8	8	9	8.5	8.5	9	8.5
Stick ness	20	17	18.5	19.5	19	17	18.5	17.5	18	18	18.5	18.5	19	18.5
Smoothness	10	8.5	9	9.5	9	7.5	8.5	8	8	8	8	8	9	8.5
Taste	10	8	9	9	9	9	9	9	8.5	9	8.5	8	9	8.5
Total	100	85.5	93	96	94	85.5	91.5	88	87.5	92	89.5	87	91	88.5

(S): Semolina

(F): Farina

(WF): wheat flour 72%

(SDF): second durum flour fraction No. 2.

Table (16) Organoleptic properties of cooked noodles prepared with addition of 0.02% ascorbic acid, 0.05% penzoyle peroxide and whey powder 2%, 4% and 6%

(Cont.).

Quality	score	control WF 72%	0.02% ascorbic acid , 0.05% penzoyl peroxide and Whey powder 2%, 4% and 6%																	
			2%	4%	6%	2%	4%	6%	2%	4%	6%	2%	4%	6%	2%	4%	6%	2%	4%	6%
			S+F (1:1)			S+WF 72% (1:1)			S+SDF (1:1)			F+WF 72% (1:1)			F+SDF (1:1)			WF72%+ SDF (1:1)		
Color	30	27	27	28	27.5	28	29	28.5	26.5	27.5	27	27	27	27	28	28	28	28	28	28
Surface appeel	20	17	18	18	18	18	18	18	19	19	19	17	18	17.5	17	18	17.5	18	19	18.5
Hardness	10	8	8	8	8	8.5	8.5	8.5	9	9	9	7.5	8.5	8	8.5	9	8.5	8	9	8.5
Stickness	20	17	18	18	18	18	19	18.5	18	19	18.5	17.5	18.5	18	17.5	18	17.5	18	19	18.5
Smoothness	10	8.5	8.5	9.5	9	8.5	9	9	9	8.5	9	8	8	8	8	8.5	8	8	8	8
Taste	10	8	8	9	8.5	9	9	9	8	9	8.5	9	9	9	9	9	9	9	9	9
Total	100	85.5	87.5	90.5	89	90	92.5	91.5	89.5	95	91	86	89	87.5	88	90.5	88.5	89	92.5	90.5

(S): Semolina

(F): Farina

(WF): wheat flour 72%

(SDF): second durum flour fraction No. 2.

Total score of noodles prepared from different raw materials in addition of 0.02% ascorbic acid were shown in Table (17).

Values were 92, 88, 87, 86.5 and 85.5 for noodles prepared from semolina, semolina with farina (1:1), wheat flour with SDF (1:1) and control (wheat flour without addition of 0.02% ascorbic acid).

Noodles prepared from farina flour with wheat flour 72% (1:1) and 100% farina flour were decreased in total score compared with control. This finding may be due to the effect of ascorbic acid on gluten strength.

These results agreement with ***Walther and Grosch (1987)*** who reported that the effect of dehydro-L ascorbic acid (DHA) may be due to the removal of glutathione (GSH) in wheat flour, which would diminish dough strength by SH-SS inter change reaction with gluten molecules in the dough.

Table (17): Organoleptic properties of cooked Noodles prepared with addition of 0.02% ascorbic acid.

Quality	Score	control	0.02% ascorbic acid value									
			S	F	WF72%	SDF	S+F (1:1)	S+WF72% (1:1)	S+SDF (1:1)	F+WF (1:1)	F+SDF (1:1)	WF 72% +SDF (1:1)
Color	30	27	29	27	27	25	27.5	28	27	27	26	26
Surface appeel	20	17	19	17	18	18.5	18	19	18	17.5	18.5	18
Hardness	10	8	8.5	7	8	8.5	8	8	8	7.5	8	8
Stickness	20	17	18.5	16.5	17	17	17	17.5	18	16.5	18	17.5
Smoothness	10	8.5	8	7	7.5	8.5	7.5	8	8.5	7	7.5	8.5
Taste	10	8	9	9	9	8.5	9	8	8.5	9	9	8.5
Total	100	85.5	92	83.5	86.5	86	87	88.5	88	84.5	87	86.5

Control: wheat flour 72% without ascorbic acid .

S : Semolina

F : Farina

WF: wheat flour 72%

SDF: Second durum flour fraction No. 2.

From data tabulated in Table (18) and Fig. (18) the main effect of penzoyl peroxide was on the color of second durum flour fraction No.2 (SDF), value was 28 for color noodles prepared from SDF with penzoyl peroxide compared with 25 for the same noodles prepared from SDF without penzoyl.

Table (18): Organoleptic properties of cooked Noodles prepared with addition of 0.05% penzoyl peroxide.

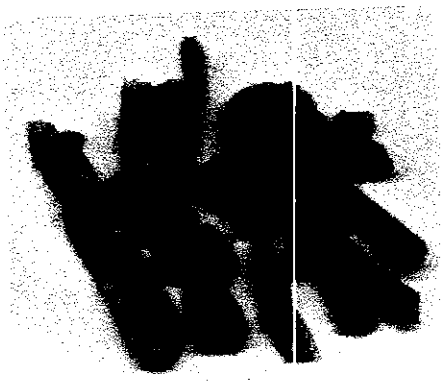
Quality	Score	Control WF 72%	100% SDF	0.05% penzoyl peroxide			
				S+SDF (1:1)	F+ SDF (1:1)	WF72% + SDF (1:1)	100% SDF
Color	30	27	25	28	27	28	28
Surface appeel	20	17	17	17.5	17	17.5	16.5
Hardness	10	8	8	8.5	7	8	8
Stickness	20	17	18	18.5	17	18	17
Smoothness	10	8.5	9	9	8	9	8.5
Taste	10	8	8	8.5	9	8.5	8
Total	100	85.5	85	90	85	89	86

S: Semolina durum.

F : Farina.

WF: wheat flour 72% extraction.

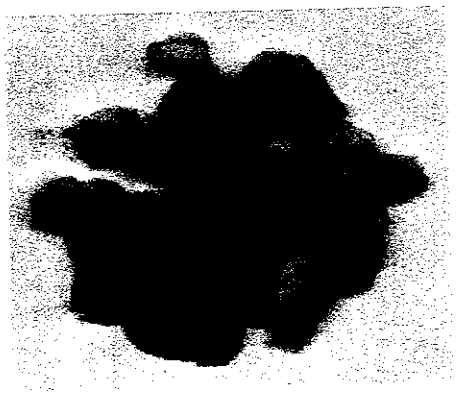
SDF : second durum flour fraction No. 2



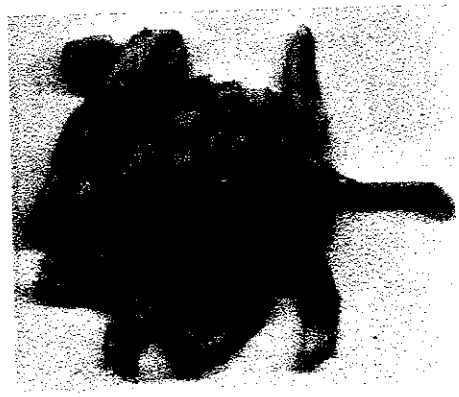
Control (Durum flour No.2)

Durum flour No. 2 with farina
(1:1) treated by penzoyl peroxide

Durum flour No. 2
treated by penzoyl peroxide



Semolina with durum flour No.2
(1:1) treated by penzoyl peroxide



Semolina with wheat flour 72%
(1:1) treated by penzoyl peroxide

Fig. (17). Effect of adding penzoyl peroxide on noodles prepared from durum flour No.2 and blends with semolina, farina and wheat flour 72%.

Organoleptic properties of nocdles prepared from different raw materials declared that in Table (19) and as shown in Fig (19), the highest total score were regested for semolina followed by other raw materials containing semolina and finally with combination of wheat flour and farina flour at ratio of (1:1).

Table (19): Total score of cooked noodles prepared with 0.02% ascorbic acid, 0.05% penzoyl peroxide and 4% whey powder either individual or combination of them.

Ingredients	code	Asc	Benz. H.	Whey powder			Whey powder + ascorbic + benzoyl hydroxide
				2%	4%	6%	4%
Control	--	85.5	85.5	--	--	--	--
Semolina	1	94	--	92.5	94.5	93	96
Farina	2	88	--	78.5	82	80	91.5
Flour 72%	3	90	--	86.5	89	87	92
*SDF	4	88.5	86	81.	83	82	91
1+2	5	89.5	--	81.5	83	82	90.5
1+3	6	92.5	--	90	91	90.5	92.5
1+4	7	90	90	81.5	83	82	95
2+3	8	91.5	--	81	82	81.5	89
2+4	9	88	85	79	81	80	90.5
3+4	10	89.5	89	85.5	86.5	86	92.5

* SDF: second durum wheat flour No. 2.

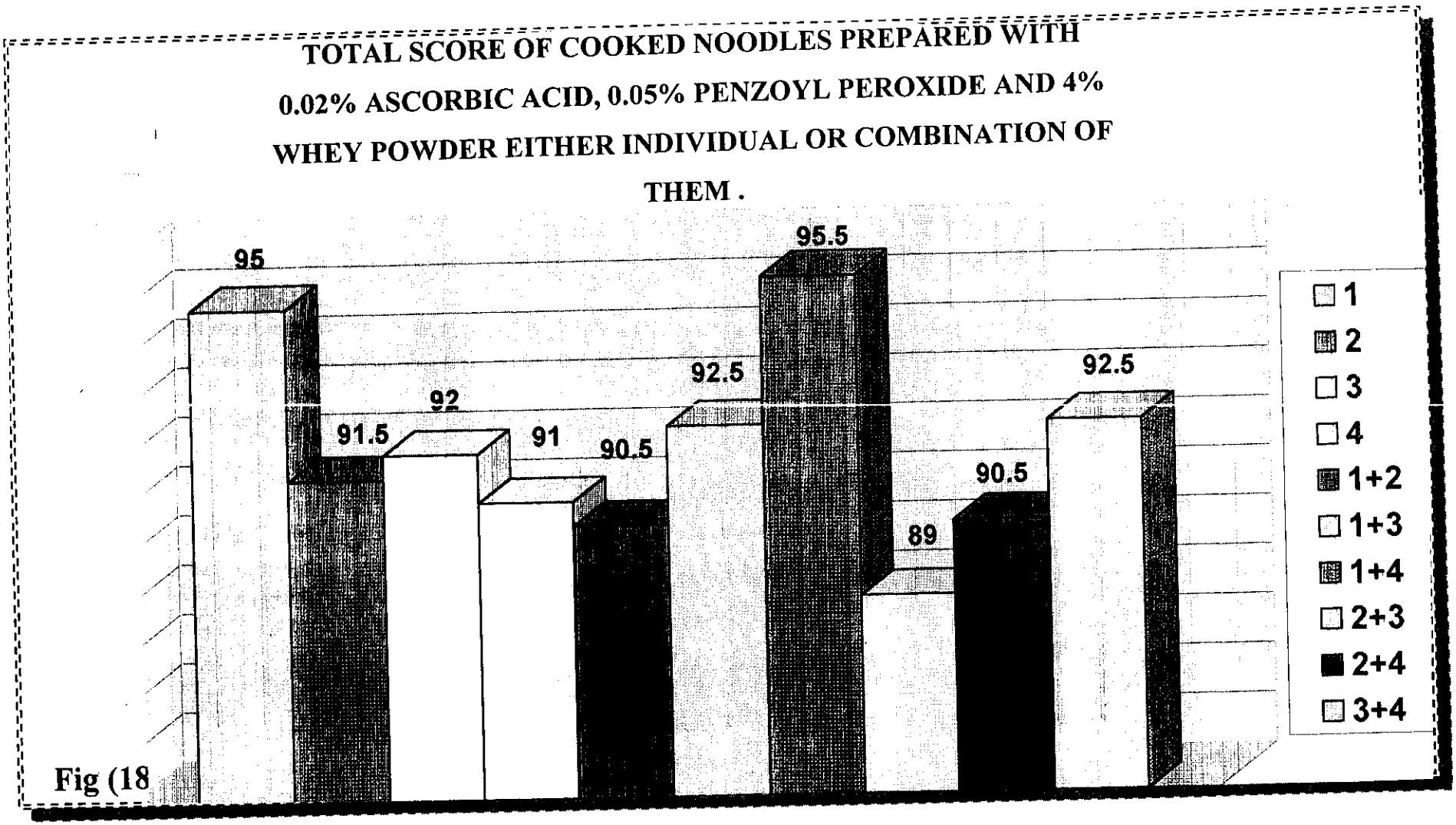

TOTAL SCORE OF COOKED NOODLES PREPARED WITH
0.02% ASCORBIC ACID, 0.05% PENZOYL PEROXIDE AND 4%
WHEY POWDER EITHER INDIVIDUAL OR COMBINATION OF
THEM .
95
91.5
92
91
90.5
92.5
95.5
89
90.5
92.5
1
2
3
4
1+2
1+3
1+4
2+3
2+4
3+4

Fig (18

2- Special pasta

Special pasta were prepared by adding fiber and /or natural color to raise the nutrition values.

The pasta mainly consist of 40% wheat flour 72% extraction, 30% second durum wheat flour fraction No.2 and 30% shortes.

The dried colored plant were added by ratio of 3% for each to raise a fiber content of pasta and accepted the product a yellow or red or green color.

Results in Table (20) showed the minerals content of special high fiber pasta.

From this Table it could be noticed that high fiber pasta with addition of 3% turmeric had a good quality product and containing high amount of minerals, the values were 49, 76, 51, 95, 698, 12.5 and 14.8 for Ca, Fe, Mg, P, K, Na and Zn respectively.

Special pasta with turmeric scored a high level of Ca, Fe, Mg, P especially K if compared with other treatments and control.

From the same data, it can be noticed that the best addition turmeric followed by parsley and finally beet root.

Table (20): Mineral content of special pasta.

Ingredients	Ca	Fe	Mg	P	K	Na	Zn
Control *	38	70	40	79	305	11	13
Control + Turmeric	49	76	51	95	698	12.5	14.8
Control +Parsley	45	71	46	80	450	19.7	13.9
Control +Beet root	40	70	42	83	385	21.3	13.3

Control*: prepared from 40% WF 72% + 30% SDF + 30% shortes.

a- Rheological properties of special pasta.

Table (21) and Fig. (21) declared the effect of different treatments on the farinograph parameters without adding colored plant. From the Table (21) it could be noticed that all blends at higher water absorption value compared with control (wheat flour 72%).

Moreover, water absorption was increased in different ingredients.

The water absorption values for the studied pasta blends were 61.8, 60.2, 59.6 and 58.4% for control, (30% shortes + 30 % SDF + 40% WF 72%), (50% WF 72% + 20% + shortes + 30% SDF), (30% SDF + 70%WF 72%) and (30% shortes + 72% WF) respectively, it could be due to a high fiber content in shortes which had a high percentage values of fiber 8.2% (Table 5).

These results agreed with those obtained by ***Skurray et al*** **1988** and ***AbdEl-Monien*** and ***Yassen*** **1993** who reported that addition of fiber sources caused an increase in the water absorption of the products this might be due to the higher water hydration capacity of fibers (***Chem et al,*** **1988**).

Haber et al **(1978)** and ***Khan*** **(1986)** also stated that supplementing semolina with legune flour caused an increase in water absorption of the dough.

Similar results were also reported by ***Abou-Zeid et al*** **(1990)** on the replacement of pasta with some fruit waste.

From the same table it can be observed that the mixing time, dough development time and dough stability were varied according to the percentage of source of fiber. It seems that mixing time and stability were decreased as the percentage of fiber increased.

These results agreed with those obtained by ***Abo-El-Naga*** **(1995)** who reported that addition of alpha cellulose to whole durum meal of Sohag 2 decreased stability.

Table (21): Effect of Farinograph parameters for pasta formula

ingredients	Farinograph parameters			
	W. A.	M. T	DEV. T	Stability
W.F.72%	56	1	2	3.5
20% shortes + 30% *SDF	60.2	1.5	2	2.5
30% shortes + 30% *SDF	61.8	2	2.5	2
30% shortes	58.4	1.5	2	2.5
30% *SDF	59.6	1	1.5	3.5

* **SDF :** second Durum wheat flour No. 2.

W.A : water absorption

M.T: Mixing time

DEV. T.: Development time

B- Special high fiber pasta

Table (22) showed the different blends of special high fiber pasta which the effect of raw ingredients on the Farinograph test were reported.

Data illustrated in Table (22) showed that all blends had higher water absorption values compared with control

Moreover, water absorption was also increased as the adding of additives (Turmeric, parsely and beet root) the water absorption values were 61.8 for control, and 62.2, 62.9 and 61.9 for additives respectively. From the same data also showed that the mixing time, dough development time and dough stability not changed (no effect was observed when addition of turmeric, parsely and beet root).

Table (24): Effect of dried colored plant powder to the pasta on farinograph parameters.

ingredients	Farinograph parameters			
	W. A.	M. T	DEV. T	Stability
Wheat flour 72%	56	1	2	3.5
Control : (C)	61.8	2	2.5	2
C+3% turmeric	62.2	2	2.5	2
C+ 3% parsley	62.9	2	2.5	2
C+ 3% beet root	61.9	2	2.5	2

C: control prepared from 40% wheat flour+ 30% shortes + 30% SDF

***SDF: second durum wheat flour No. 2**

W.A : water absorption

M.T: Mixing Time

DEV. T.: development time

b- Cooking quality of special pasta

The cooking quality of high fiber pasta, i.e. weight, volume and cooking loss were evaluated in this studied. High fiber pasta blends prepared by partial replacement of wheat flour 72% extraction rate with second durum wheat flour fraction No.2 (SDF) and wheat shorts as shown in Table (25) and Fig. (22) showed, the addition of both wheat shortes and (SDF) to wheat flour 72% extraction caused an increase in weight and volume of the produced high fiber pasta for all samples compared with the control (prepared from wheat flour 72% Only). Moreover, increasing the percent of replacement. Also increased the weight and volume. This finding may be due to high fibers and protein content in both (SDF) and wheat shortes which more water absorption.

The addition of 30% shortes to control caused the highest increase in the weight and volume by 110% and 190% respectively. These results are in agreement with those obtained by ***Moss et al.*** **(1987)** and ***GU-Sik and Sung – Kom*** **(1990)** They mentioned that the starch in the low protein sample was more swollen and the weight and volume of cooked noodles decreased as the protein content of flour increased.

Also, ***Dexter et al*** **(1994)** reported that, good quality macaroni products should absorb water at least twice of their original volume to swell. They also mentioned that the cooked weight and volume of substituted spaghetti were higher than those of control.

The cooking loss of the cooked pasta is greatly affected by the amount of total soluble solids in pasta. Therefore, the pasta samples were cooked for 10 minutes and cooking loss in pasta were determined in the cooking water as presented in Table (25).

Results in Table (25) showed that cooking loss were increased when adding fiber source. The values were 12, 13.5, 14, 13 and 15.5 for

control, (W.F. 72%), (50% W.F. 72% + 30% SDF + 20% shortes), (40% W.F. 72% + 30% SDF + 30% shortes), (70% W.F.72% + 30% SDF) and (70% W.F. 72% + 30% shortes), respectively.

These results are in agreement with those of ***Kordonwy and Youngs*** **(1985)** who reported that, bran containing spaghetti samples had higher cooking loss which could attributed to the high content of water soluble component.

Table (25): Weight, volume and cooking loss of cooked special pasta.

High fiber pasta	* Weight Cooked	Percentage of volume increase	** Volume cooked	Percentage of weight increase	Cooking loss %
Control (W.F)	170	70	250	150	12
W.F+30% SDF+20% shorts	200	100	285	185	13.5
W.F +30%SDF +30%shorts	210	110	290	190	14
W.F + 30% SDF 100%	185	85	255	155	13
W.F + 30% shortes	180	80	253	153	15.5

Control: pasta prepared from 100% Wheat flour 72% extraction only.

SDF: second durum wheat flour fraction No.2

WF: wheat flour 72% extraction

*weight of uncooked samples was 100 gm for each sample

** volume of uncooked samples was 100 ml for each sample

As shown in Fig. (23) and Table (26) the addition of plant pigments (Turmeric, Beet root, and parsley) caused an increase in weight and volume of produced high filer pasta for all samples. Compared with the control. Control prepared from 40% wheat flour 72% extraction + 30% SDF+ 30% wheat shortes. Moreover, increasing the percent of replacement increased the weight and volume.

The addition of parsley caused the highest increase in volume (210%) but beet root caused the highest increase in weight (130%). This may be due to the high fiber content of parsley (11.3%) (Table 5).

Abo El-.Naga **(1995)** mentioned that the cooked weight and volume of substituted spaghetti samples increased as the addition of dietary fiber increased.

From the same Table it could be noticed that cooking loss were increased when adding dried plant powder (turmeric, beet root and parsely) which the values were (14,14,14.5, 15, 14, 14.5, 14, 14.5, 16.5, 15.5 and 12) for all blends of pasta and control.

Table (25): Weight, volume and cooking loss of cooked healthy pasta (high fiber with additives).

High fiber pasta with additives	*weight cooked	Percentage of weight increase	** Volume cooked	Percentage of volume increase	Cooking loss %
W.F. 72%	170	70	250	150	12
Control (C)	210	110	290	190	14
Control+termeric 1%	200	100	290	190	14
Control+termeric3%	215	115	295	195	14.5
Control+termeric5%	205	105	293	193	15
Control+beetroot1%	220	120	295	195	14
Control+beetroot3%	230	130	300	200	14.5
Control+beetroot5%	225	125	297	197	14
Control+parsley1%	215	115	300	200	14.5
Control+Parsley3%	220	120	310	210	16.5
Control+parsley5%	218	118	305	205	15.5

Control: pasta prepared from (40% wheat flour 72% + 30% Second durum wheat flour fraction No.2 (SDF) + 30% wheat shortes), control

***weight** of uncooked samples was 100 gm for each sample

** **volume** of uncooked samples was 100 ml for each sample

Organoleptic properties of special pasta

High fiber pasta prepared from wheat flour 72% extraction (control) and 50% WF 72% + 30% Second durum flour fraction No.2 (SDF) +20% wheat shorts, 40% WF 72% + 30% SDF +30% wheat shorts, 70% WF 72% + 30% shortes and 70% WF 72% + 30% SDF were evaluated. Samples were evaluated Organoleptically by ten panelists for their color, surface appeal, hardness, stickness, smoothness, taste and total score as presented in Table (26) and as shown in Fig. (24 & 25).

Data illustrated in Table (26) showed no pig difference in the surface appeal, hardness, stickness, smoothness and taste between all samples processed from all blends under study, but highly difference in color were noticed between SDF and other samples, the color scores were 27 for control, 26 for 30% SDF +20% shortes, 25.5 for 30% SDF+30% shortes, 20 for 30% SDF. And 24 for 30% shortes.

Total score were 85.5 for control, 81 for 30% SDF+20% shortes, 80 for 30% SDF +30% shortes, 78 for 30% SDF and 76 for 30% shortes.

These results are in agreement with those obtained by ***Kordonowy and Young*** **(1985) and** ***Abo-El-Naga*** **(1995)** Who found that the best Organoleptic results was achieved when substitution of whole durum meal with alpha cellulose for spaghetti product.

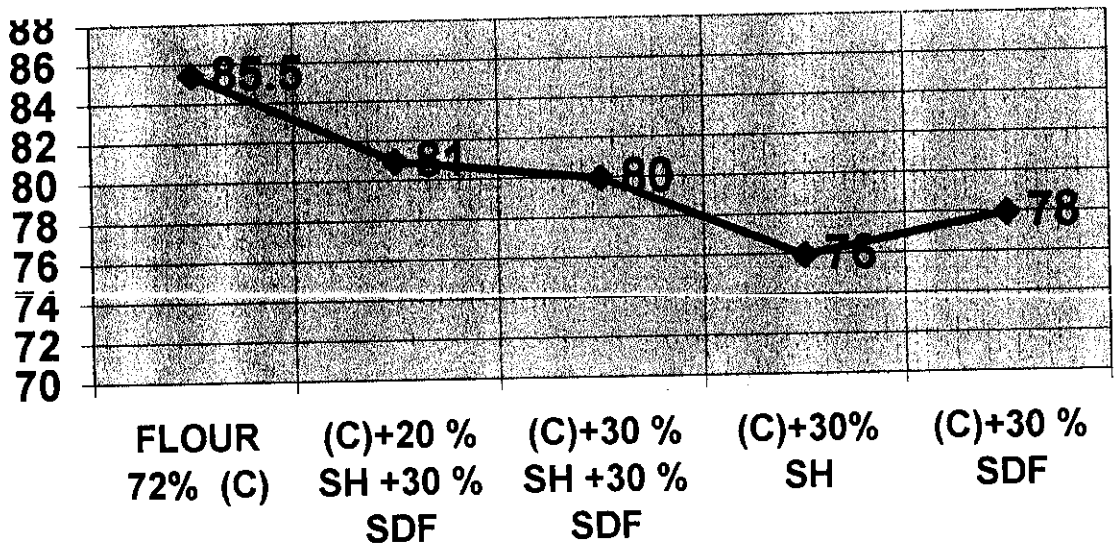
Similar finding were reported by ***Oh et al*** **(1985) and** ***kruger et al.*** **(1994).** They mentioned that pasta color originated from two main sources, fragments of bran and enzymatic browning products. Since polyphenol oxidase enzyme located largely in the bran, using flours with low extraction rate resulted in decreasing in uncooked noodles brightness and increasing the yellowness, They also found That Cooked noodles texture properties are not affected by flour extraction rate.

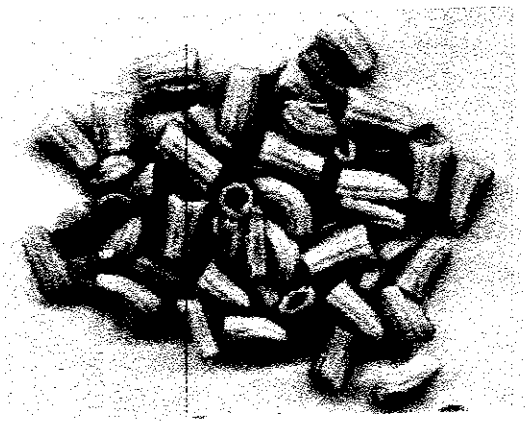
Table (26): Organoleptic properties of cooked special pasta

quality	score	Control (WF)	50%WF72%+30 %SDF+20 shortes	40% WF72% +30% SDF+ 30% shortes	70%WF 72% +30% SDF	70% WF72% + 30% shortes
Color	30	27	26	25.5	20	24
Surface appeal	20	17	16	16	16.5	15
Hardness	10	8	7	7	8.5	7
Stickness	20	17	17	16.5	17.5	16
Smoothness	10	8.5	8	7.5	8	7
Taste	10	8	7	7.5	7.5	7
Total	100	85.5	81	80	78	76

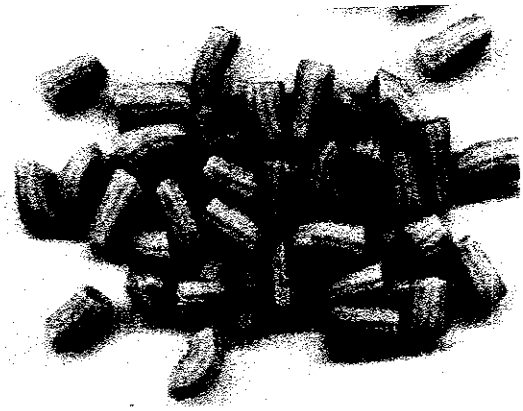
- **Control: pasta prepared from 100% wheat flour 72% extraction**
- **SDF: second durum wheat flour fraction No.2.**
- **WF: wheat flour 72% extraction.**

Fig. (24) TOTAL SCORE OF SPECIAL PASTA



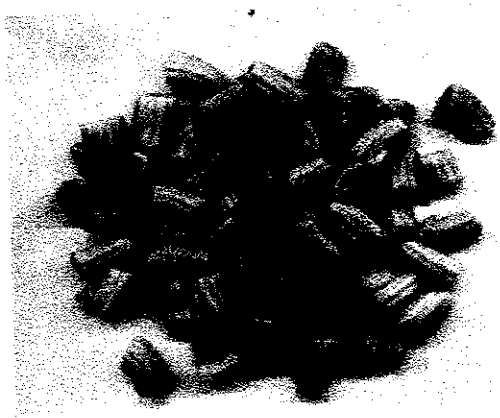


(WF72% (100%)

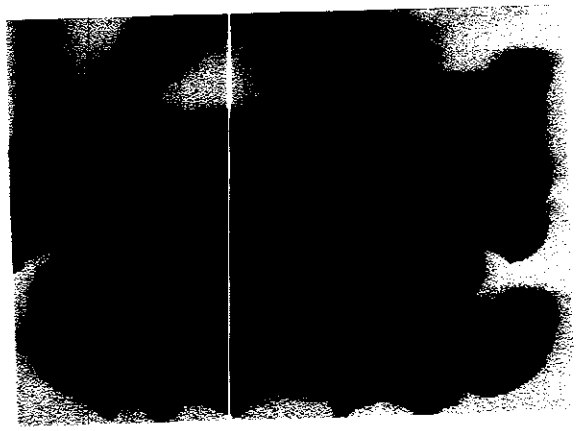


(50%WF72%+20% Shorts+30%SDF)

(40%WF72%+30% Shorts+30%SDF)



(70%WF72%+30%SDF)



(70%WF72%+30Shortes)

Fig. (25) High fiber pasta without additives

As shown in Fig. (27 & 28) and Table (28) the score values for surface appeal, hardness, stickness and smoothness of cooked high fiber pasta with additives included that all formulas were similar to the high fiber pasta without additives but highly difference in color were noticed between control and other samples.

The color score were 25.5 for control and 28,24 and 24 for turmeric, parsley and beet root, respectively.

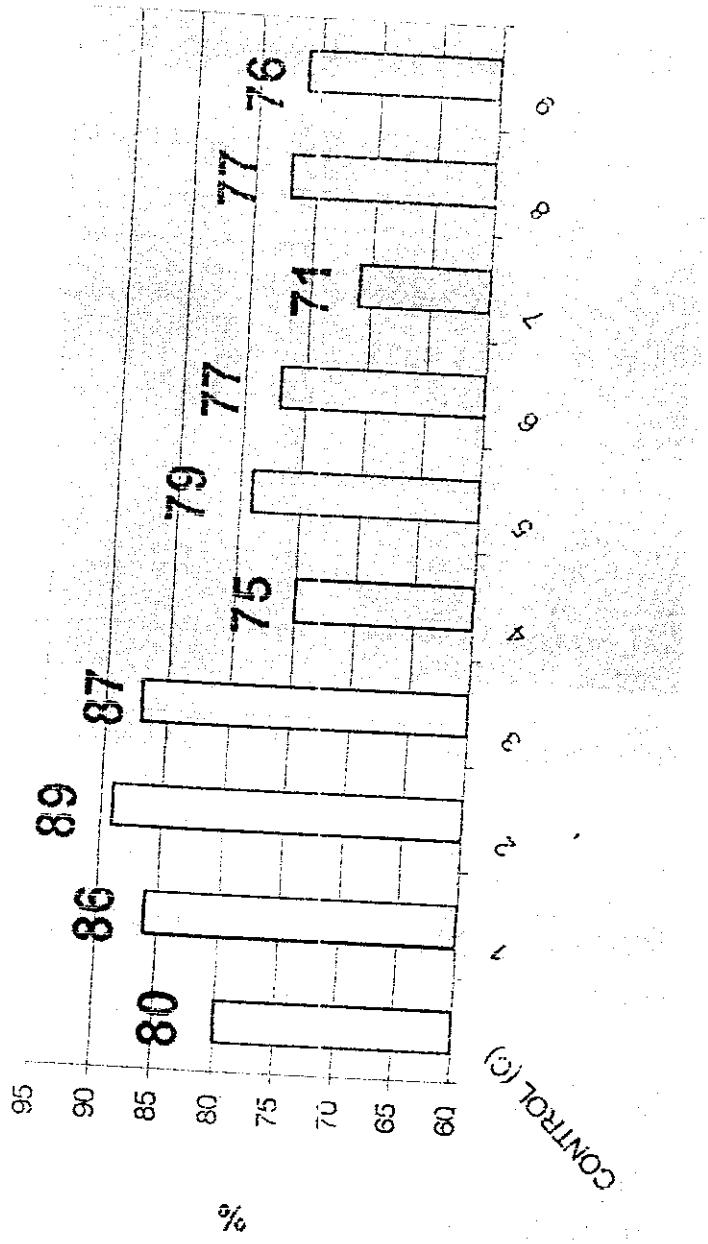
Also, highly difference in taste between control and other samples 7.5 for control, 9 for (control + 3% turmeric), 7.5 for (control + 3%parsley), and 7 for (control +3% beet root) also highly difference in total score were 80 for control, 89 for (control + 3% turmeric), 79 for (control +3% parsley) and 77 for (control +3% beet root).

Table (27): Organoleptic properties of cooked special pasta

quality	score	control	Control turmeric			Control+ parsley			Control+ Beet root		
			1%	3%	1%	3%	5%	5%	1%	3%	5%
Color	30	25.5	27	28	21.5	24	23	28	22	24	23
Surface appeal	20	16	17	18	13.5	14.5	14.5	17.5	14.5	15	15
Hardness	10	7	8	8	6	7	7	8.5	7	7	7
Stickness	20	16.5	17	18	16	16.5	16.5	17.5	16.5	17.5	17
Smoothness	10	7.5	8	8	7.5	8	8	8.5	8	8	8
Taste	10	7.5	8	9	6.5	7	7	7	7	7.5	7
total	100	80	86	89	71	77	76	87	75	79	77

***Control: high fiber pasta was prepared from 40% wheat flour 72% extraction + 30% SDF + 30% wheat shortes**

Fig. (26): TOTAL SCORE OF SPECIAL PASTA.



Control (high fiber pasta without additives)

Control + 3% Turmeric

Control + 3% Parsley

Control + 3% beet root

Fig. (28): Effect of adding Turmeric, parsley and beet root on healthy pasta.

Summary

Macaroni is widely known and used in many shapes and sizes. In Egypt. It is one of the important basic foods as source of carbohydrates.

Thus, attention must be paid tc the important of macaroni quality to comply with international development dealt with the manufacturing of such products.

It is generally accepted in Egypt that semolina from durum wheat is the material of choice for producing the highest quality pasta products. Pasta products can be processed from durum wheat semolina, farina, wheat flour 72% and its blends. Wheat flour is poor in the protein thus macaroni must be supplemented with rich protein source.

Noodles production

Chemical composition has been done (moisture, ash, protein, fat, carbohydrate, and fiber) to the raw materials from the obtained results increasing in protein percentage for whey powder (17%) followed by durum wheat flour No 2 (14.2%) and thus increase in fat, fiber and ash in Durum wheat flour No. 2 than others.

Noodles production

Supplemented with whey powder by 2%, 4% and 6% percentage. Noodles has been processed from wheat flour 72% Drum wheat semolina, farina, Durum wheat flour No 2 every one alone and its blends in (1:1) percentage. Noodles treated by addition of ascorbic acid in 0.02% percentage and benzoyl peroxide in 0.05% percentage as a bleaching agent. The addition of whey powder leads to the increase .

Concerning for cooking quality of noodles fortified with whey powder it has been observed when adding whey powder leads to the improvement in appearance, color and taste of noodles products . The

best results obtained from adding whey powder to Durum semolina even by 2%, 4%, 6% And in the next grade contents the addition of whey powder to a mixture of durum semolina and wheat flour 72% by (1:1) in any level of adding levels.

Special pasta production.

Special pasta means using fibers and some special important additives (turmeric, parsely and beet root): -

A- High fiber pasta production.

High fiber pasta processing from source rich in fiber wheat red shortes and durum wheat flour No 2 replacement for wheat flour 72% to produced low energy pasta and nutrition value. Four samples had been processed.

First sample contained 20% wheat red shortes + 30% durum wheat flour No 2

Second sample contained 30% wheat red shortes + 30% durum wheat flour No 2

Third sample contained 30% wheat red shortes only.

Fourth 30% SDF 100%

Wheat red shortes contains high percentage of cellulose, hemicelluolose and lignin by the comparison with second durum wheat flour No 2.

* From the obtained results it has been found that the best quality obtained when adding 30% wheat red shortes + 30% durum wheat flour No2.

High fiber pasta with additives production some dried plants powders with medical value and color effect like turmeric, parsley and beet root has been used: -

(1) Special high fiber pasta processed by adding turmeric powder.

Turmeric has been added by the percentage 1%, 3% and 5%. The best percentage was 3% Turmeric dry powder contain 7.1% protein, 10.3% fat, 10.1% moisture 6.1% fibers and its also contain some minerals such as calcium, Iron, Magnesium, Potassium, sodium, zinc and its percentage was in as follow mg/100g 174, 39,201, 279, 2312, 37,35 respectively.

(2) Special high fiber pasta processed by adding parsley.

Parsley has been added by 1%, 3% and 5% percentage the best percentage was 3% parsley dry powder. It considered a source of green color for pasta and its also raises nutrition value and medical value. Parsley dry powder contain 8.5% moisture, 18.5% protein, 4% fat and 113% fiber and it also contain some minerals such as calcium, Iron, Magnesium, Phosphor, Potassium, Sodium, Zinc and its percentage was in as follow mg / 100 gm 14.5, 0.8, 23, 52, 312, 79, 0.29 respectively

(3) Special high fiber pasta processed by adding beet root.

Beet root has been added by 1%, 3% and 5% percentage. The pest percentage was 3% beet root powder it considered a source of red color for pasta and its also raises nutrition value and medical value to pasta.

Beet root dry powder contained 8% moisture, 1.2% protein, 0.1% fat, 1.2% fiber and its also contain mineral such as Calcium, Iron, Magnesium, Phosphore, Potassium, Sodium, Zinc and its percentage was 14.5, 0.8m 23, 52, 312, 79, 0.29 mg/100 gm powder respectively.