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# Effect of Using Unripe Mango and Red Cabbage to Produce Noodles with High Nutritional and Vital Content

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## ABSTRACT

Unripe mango(UM) and red cabbage (RC)is an edible food that contain a high proportion of indigestible compounds which are included dietary fiber content. The objective of this study was to use their powder as an ingredient to make noodle with high nutritional quality and high antioxidants contents with lowering carbohydrates content .The effect of wheat flour substituted with unripe mango (UMP) or red cabbage powder(RCP)was investigated of the chemical and sensory attributed of noodle formulae. Five additional noodles formulas were prepared by substituting wheat flour (72%) with ,10 , 20 , 30 , 40 and 50 % from vegetable or fruit powder, and the optimal ratio of prepared noodles were investigated using sensorial properties comparing with the control noodles . Five fortified noodles prepared by partial substitution of wheat flour with fruits or vegetables powder and the results showed that unripe mango powder(UMP) have 45.2 % TSS, 2.28 % ash , 14.5 % moisture,4.36 % protein , 2.83 % fat , 3.49% crude fiber (CF) and 76.44% carbohydrates , while red cabbage powder (RCP)were recorded high values of K and Na (678.5 and 180 mg/100g) respectively . Cytotoxic impact of mango noodle formula demonstrated an inhibitory impact , 9.1% of colon cancer cells at 25 µg/ml of noodles extraction , 14.6% at 50 µg/ml , 54.3% at 100 µg/ml and their IC50 at 85 µg/ml , while after effects of 12.5 µg/ml of red cabbage noodles(RCN) extraction will occupy 4.5% of colon cancer cells and their IC50 will 96.4 µg/ml.

***Keywords***: noodle , mango , red cabbage , antioxidants , cancer cells , nutrients.

## INTRODUCTION

Antioxidant compounds are substances that may protect from oxidative damages by reactive oxygen species thereby minimizing the incidence of cancer diseases. Antioxidant compounds suppress the formation of reactive oxygen species and free radical reactions in the body *Wall (2006)* . The degree of phenolic (mg/100g-1 new weight) in RC was 31-43.Thay saw that TPC coming to up to 200 - 288 in some RC cultivar .Maria *et al.*,(2010).

Fresh mango is a decent wellspring of V- B6 (pyridoxine), V - C and V - E , mango natural products are wealthy in cancer prevention agents, for example, β - carotene (445µg/100 g natural product), and V- C (27.7 g/100 g organic product), additionally contains V- A (equal 38 µg/100 g fruit) ,V- E and V- B6 (0.134 mg/100 g organic product) .Dalit (2014).

The proximate chemical composition of UMP was investigated by *Narsing etal .(2008)* they reported that UMP consists of 7.6% moisture ,2.9% total ash,4.1% CP , 2% fat , 1.9% CF , TA 13.7 , carbohydrates 81.5% , Ca 129.6 mg/100g and 25.5 mg/100g.

Noodles are broadly burned-through all through the world and their worldwide utilization is second just to bread. Moment noodles are broadly devoured all through the world and it is a quickly developing area of the noodle business. This is on the grounds that moment noodles are helpful, simple to cook, ease and have a moderately long timeframe of realistic usability. Noodle items enhanced with CF may be sought after later on food pattern. Other than fiber, healthy benefits of noodles can be improved by adding other fundamental nourishing parts, for example, cell reinforcement, protein, nutrients and minerals. Joining of composite flour into noodles will bring about high caliber and sound noodles. Explores have been done by fusing vegetable powder (nut flour, garbanzo bean flour, rye flour, grain flour improved with β-glucan , and pumpkin powder .Lee *etal.*(2002)they also reported that sweet potato, potato and waxy corn have been used to improve eating quality of white salted noodle is common practice in Japan. However, there was no available literature on the study of yellow alkaline noodle utilizing natural product fiber as wellspring of fiber. Antacid salt can be utilized alone or in blend with various salts, contingent upon nearby inclination. The most generally utilized basic salts are sodium and potassium carbonates. Other soluble reagents, for example, sodium hydroxide and bicarbonates are additionally utilized in certain nations. The kind of soluble salt utilized likewise influence the nature of noodles,water is another fundamental fixing, which is essential for gluten development, which gives viscoelastic properties to mixture needed for noodle preparing. The measure of water required for noodle handling is streamlined to hydrate the flour and build up a uniform batter sheet. The ideal water assimilation for noodle is influenced by protein content, protein quality, harmed starch, and other actual properties of flour, the water ingestion level suggested for noodle preparing is around 30-38% dependent on WF. There was a critical decrease in textural qualities with expanding water ingestion .Hatcher *et al.*(2008c)

The essential crude material for making noodles is flour. Accordingly, its primary supplements are essentially

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equivalent to flour, including protein, sugars, minerals, and low fat. Taking the conventional fine dried noodles found on the lookout for instance, 100 g fine dried noodles contain 10.3 g protein, 75.6 g starches, ash 0.6 g fat, 129 mg K , 18.45 mg Na, 11.8mg Se . National health report (2015). The wheat flour utilized for making pasta and noodles isn't exactly high in protein (generally 10% to 15%) and comes up short on some fundamental amino acids, for example, lysine, threonine, and methionine.Li *etal*.(2012)adding exogenous fixings wealthy in protein and basic amino acids, both of plant or creature beginning, is an ideal method to get pasta and noodles with higher natural protein content and a superior amino corrosive example.The present study aimed to make a balance in the nutritional value and antioxidant contents of the produced fortified noodles with some fruits and vegetables ,and also to mange quantities of unripe mango and red cabbage in producing new noodles products . finally a new trend existed new ways to manufacture some different untraditional commodities of different vegetables and fruits.

## MATERIALS AND METHODS

**Materials:**

**Mango fruits (UM)** (*Mangifira indica-variety baladi*), Red Cabbage*(RC)* (*Brassica oleracea L. ssp. capitata f. rubra cv)* were purchased from local market in Gharbia Governorate, Egypt.

**Other ingredients**: wheat flour(WF) (72% extraction) , egg powder (EP) and Nacl were purchased from local market in Cairo Governorate, Egypt.

**Chemicals** propylene glycol(PG), sodium carbonate and poly phosphate(PP)were purchased from Sigma Chemical Co. (St. Louis, MO, USA) all chemical and reagents used in this study are of high analytical grade.

**Methods:**

**Technical Methods:**

**Preparation of UMP and RCP** : using the procedure described by . Ovando *etal*.(2009) , UM and RC were washed under running faucet water and afterward organic products was physically stripped and cut into 3 mm cuts and promptly flushed in sodium metabisulfite (0.25% w/v). UM and RC were dried at 50 Cº in vacum dried broiler (HSPT.200 ),and put away in PE bags at RT (25Cº).

**Preparation of Noodles:**

**A -Control noodles**:- CN were set up by 100% wheat flour as referenced by .Bui and Little (2007) the fundamental fixings are 100 g WF, 30g of water, 10 g EP , 3 g salt, 2 g PG ,1.5 g NaCo3 and 0.2 g PP .The batter was moved to manual noodles machine(Atlants 15 Model 150mm - Fancy). The readied crude noodles were then steamed at 100°C for 3 minutes. The noodles were then dried in a bureau dryer (Lotus broiler 215) at 68°C for 2 hours. The cooled and dried moment noodles were gathered in PE bags for additional utilizations at RM (25Cº) .

**B -Noodles formula**: five additional dried noodles formula were prepared by substituting WF with(10 , 20 , 30 , 40 and 50 % )UMP or RCP , the optimal ratio of noodles with fruit or vegetable powder were investigated using sensory characteristics in compared with CN sample(100% WF).

**Analytical methods:**

**Determination of physicochemical properties:-**

Moisture , pH value, ash , fat , protein, crude fiber ,minerals and some vitamins: determined according to.A.O.A.C(2010) while total carbohydrates content were calculated by difference.

**Determination of total soluble solids(TSS%):-** according to .Konopacka and Plocharski (2004).

**Determination of total titratable acidity (TTA):-** accordance to .Nielsen (2003)

**Carotenoids measurement:-** according to the method of (Wettestein 1957)

**2.4. Extraction of total anthocyanin:-**

Anthocyanin were estimated by method of .Cheng and Breen(1991).

**Ascorbic acid(AA):-**

AA content was determined by method of Freed (1966)

**Determination of total phenolic compounds(TPCs):-**

TPCs according method *of* .Saeedeh and Asna(2007).

**Determination of total flavonoids(TFCs):-**

TFCs was determined by the method of .Ordonez *etal*.(2006).

Determination of total antioxidant activity(TAA) by .The 1,1-diphenyl-2-picrylhydrazyl (DPPH) assay was utilised with some modification. Lee *etal*.(2003).

**Biological Methods:-** According the method .Vichai and Kirtikara (2006).

**Sensory evaluation:-**

Various noodles tests were assessed organoliptically as announced by .Chan and Cavaletto (1982).The example was Decided through ten individuals from the staff situated at the Plant Exploration Division Food Innovation Exploration Organization. Rural Exploration Community, Egypt. The specialists were requirements for taste , shading, fragrance and by and large agreeableness, utilizing ten point gluttonous scale going between 1 to 10, where 9-10 equivalents very good,6-8 as great, 3-5 as poor and from 0 to2 were considered as declined test .

**Statistical analysis:-**

Data of sensory evaluation different fortified noodles were statistically analyzed by using SPSS (version 16.0 software Inc. Chicago, USA) according Gomez and Gomez (1984).Treatment means were compared using the least significant differences (LSD) at 0.05 levels of probability and Standard Error

## RESULTS AND DISCUSSIONS

**Sensory evaluation of different fortified noodles samples:**

Effect of taking an interest proportions of sustained noodles tests on the organoleptic boundaries, to research the synergistic conduct of the strengthened cycle of the tried noodles just as the invigorated noodles arranged for them to give an equilibrium in their physico-synthetic investigation were done in the momentum study. Tangible investigation of food items is of essential significance, since it mirrors the customers inclination for an individual food item and can likewise assume an imperative part in the advertising activity. Ten FN samples process from WF , and other additives such as RCP or unripe UMP changing partaking proportions were directed and decided in their organoleptic boundaries, for example, color , flavors , texture and overall acceptability (Table 1).

Sensory attributes (flavor , color , taste and overall acceptability) of noodles formula were illustrated in Table (1) which indicated that , noodles formula contained WF and UMP with the ratio of (70:30) had the highest value of sensory attributes (8.90± 0.57 , 8.43± 0.57 , 7.58± 0.57 and 83.93%) respectively . Followed by noodles formula which consists of WF : RCP (70:30) which recorded (7.83± 0.57 ,

8.50±0.50 , 8.80±0.50 and 83.76%) respectively .While noodles formula which consists of WF : RCP (90:10) had the lowest of sensory attributes.

After discernment, the judgment individuals favored some of taking an interest proportions of strengthened noodles and two recipes have been picked as the best blending cycle to set up the different noodles in the new work,and the formulas were the formula of WF and UMP at the ratio of 70:30 and the mixed formula of WF and RCP at the ratio of 70:30 .

**Table 1. Organoleptic evaluation of different fortified prepared noodles formulas:-**

| Fortified noodles formulas | Mixing Ratio | Organoleptic properties | | | |
|---|---|---|---|---|---|
| | | Flavor(10) Mean ±S.D | Color(10) Mean ±S.D | Taste(10) Mean ± S.D | OverAll Acceptablity % |
| WF:RCP | 90:10 | efg 5.00±0.00 | cde 6.00±1.00 | def 5.88±0.57 | 56.26 |
| WF:RCP | 80:20 | cd 6.80±0.33 | cd 6.00±0.00 | bcd 7.50±0.50 | 67.66 |
| WF:RCP | 70:30 | b 7.83±0.57 | abc 8.50±0.50 | ab 8.80±0.50 | 83.76 |
| WF:RCP | 60:40 | bcd 7.40±0.33 | bc 7.50±0.50 | b 7.91±0.57 | 76.03 |
| WF:RCP | 50:50 | d 6.20±0.57 | bc 7.00±0.00 | bcd 7.00±0.00 | 67.33 |
| WF : UMP | 90:10 | defg 6.81±0.67 | bcd 7.70±0.67 | cd 7.00±0.00 | 71.70 |
| WF : UMP | 80:20 | bcd 7.50±0.50 | b 7.85±0.57 | abc 8.00±1.00 | 77.83 |
| WF : UMP | 70:30 | a 8.90±0.57 | ab 8.43±0.57 | bcd 7.85±0.57 | 83.93 |
| WF : UMP | 60:40 | bcde 7.50±0.50 | ef 6.81±0.67 | bcd 7.50±0.50 | 72.70 |
| WF : UMP | 50:50 | bcd 7.00±0.00 | bcd 7.55±0.33 | bcde 7.50±0.50 | 73.50 |

**M± SE: Means± standard error for sensory evaluation ; the means within the same column having different superscript are significantly varied ($P \leq 0.05$).**

**chemical composition of UMP , RCP and different noodles formulas:**

Chemical composition of UMP and RCP were listed in Table (2).Data showed that the Phisco-chemical constituents of UMP were 45.2 % TSS , 3.9 pH value , 1.02% TTA , 2.28 % ash , 14.5 % moisture, 4.36 % protein , 2.83 % fat , 3.49% CF and 76.44% carbohydrates .

Data listed in Table (2). also showed that the RCP were contain 28.4% TSS , 4.10 pH value ,1.9% TTA , 3.20 % ash , 12.7 % moisture, 3.20 % protein ,1.94 % fat , 6.98% CF and 71.98% carbohydrate.

Chemical composition of different FN sample were changed after adding UMP or RCP , this change illustrated in Table (2) as mentioned that TSS , fat , acidity and carbohydrate were decreased , while CF increased . TSS , carbohydrates and CF in CF were 45.2 (Brix), 73.19% and 1.95% respectively and 1.99% for fat , 12.46 % protein ,2.05% ash , 8% moisture , 1.2 TTA and pH were 4.22 . Data showed also that noodles prepared using UMP have 1.69% fat , 13.02 % protein ,2.06% ash , 8% moisture , 1.23 TTA , pH 4.47 ,2.72% CF and 72.69 % carbohydrates. While prepared noodles which content RCP showed 40.15 (Brix) TSS, pH 5.41 , 0.9 TTA , 2.07 %ash ,7.5 % moisture , 12.44 %protein ,2.15 % CF , 1.124 % fats and 74.69 % carbohydrate, . Also data showed that addition of UMP and RCP improved , this results were agreements with .Taneya *etal*.(2014) *and* Ebtihal *etal*.(2017).

**Table 2. Chemical composition of unripe mango powder(UMP) , red cabbage powder(RCP) in addition to fortified and unfortified noodles samples** (DWB)**.**

| Parameters | Mango powder | Red cabbage powder | Prepared noodles samples | | |
|---|---|---|---|---|---|
| | | | Control noodles | Mango noodles | Red cabbage Noodles |
| TSS°(Brix) | 45.2 | 28.4 | 45.2 | 39.35 | 40.15 |
| pH value | 3.9 | 4.10 | 4.22 | 4.47 | 5.41 |
| acidity | 1.02 | 1.90 | 1.2 | 1.23 | 0.9 |
| Ash% | 2.28 | 3.20 | 2.05 | 2.06 | 2.07 |
| Moisture% | 14.5 | 12.7 | 8 | 8.1 | 7.5 |
| Protein% | 4.36 | 3.20 | 12.46 | 13.02 | 12.44 |
| Fat% | 2.83 | 1.94 | 1.99 | 1.69 | 1.12 |
| Crude fiber% | 3.49 | 6.98 | 1.95 | 2.72 | 2.15 |
| Carbohydrate% | 76.44 | 71.98 | 73.19 | 72.69 | 74.69 |

**Control noodle 100 wheat flour, mango noodles and red cabbage noodles(70% wheat flour:30%mango or red cabbage powder )**
**TSS= Total soluble solids**

**Minerals contents in UMP , RCP and different noodles formulas**

Data in Table (3) showed minerals contents in UMP , RCP and noodles with or without fortification , UMP were recorded a high amounts of K and Mg ( 305.1 mg/100g and 63.7 mg/100g)while Ca recorded 40.5 mg/100 , Na 5.1 mg/100g ,1.8 µg/ 100gm Se and 4.8 mg/100g Fe. RCP were exhibit a high amount of K and Na ( 678.5 and 180 mg/100g) , and a lower contents of Mg (0.13 mg/100g) , 28.9 mg/100g Ca , 3.1 mg/100g Fe and 1.50 µg/ 100gm Se.

**Table 3. Minerals contents in unripe mango powder(UMP) , red cabbage powder(RCP) in addition to fortified and unfortified noodles samples.**

| Mineral | Unripe mango powder (UMP) | Red cabbage powder (RCP) | Prepared noodles sample | | |
|---|---|---|---|---|---|
| | | | Control noodle (CN) | Mango noodle (UMN) | Red cabbage Noodle (RCN) |
| Calcium mg/ 100gm | 40.5 | 28.9 | 9 | 17.4 | 16.41 |
| Potassium mg/ 100gm | 305.1 | 678.5 | 54 | 150 | 239.01 |
| Sodium mg/ 100gm | 5.1 | 180 | 198 | 199.08 | 217.51 |
| Magnesium mg/ 100gm | 63.7 | 0.13 | 1.7 | 21.8 | 1.74 |
| Selenium µg/ 100gm | 1.8 | 1.50 | 0.0 | 0.6 | 0.4 |
| Iron mg/ 100gm | 4.8 | 3.1 | 2.1 | 3.2 | 3.01 |

**Control noodle 100 wheat flour, mango noodles and red cabbage noodles(70% wheat flour:30%mango or red cabbage powder )**

The effects of adding dried vegetables and fruits on minerals content of fortified noodles were listed in Table (3)This results are showed that adding of UMP or RCP improved mineral contents ,it can be noticed that mineral contents in CN were recorded, ( 9, 54 , 198 and 1.7 mg/100g) for Ca , K , Na and Mg respectively while Fe 2.1 mg/100g. Fortified noodles which consists of 30% UMP were recorded (Ca 17.4 , K 150 , Na 199.08 , Mg 21.8 , Se 0.6 µg /100g and 3.2 mg/100gm Fe). Data also showed that sample which fortified with 30% RCP were recorded a lowest content of Mg(1.74) mg/100g also Ca 16.41mg/100g, K 239.01mg/100g, Na 217.51mg/100g, Se 0.4 µg/100gm and FE 3.01 mg/100gm).

**Pigments of UMP and RCP and different noodles formulas**:

Data showed that UMP had the highest level of carotenoids , chlo.-A ,chlo.-B and T chlo. (30.931 , 6.13 , 14.301 and 20.301 mg/100g)respectively,while anthocyanin recorded 1.55 mg/100g , also RCP were recorded 53.71 mg/100g anthocyanin ,carotenoids 18.82,chlo.-A 6.05,chlo.l-B 11.98 mg/100g and T chlo. 18.03mg/100g).The color of RCP is due to anthocyanin accumulation *(Adrian etal.,2004)* ,they reported that anthocyanidin levels were 444 - 512 (mg/kg).

The impacts of adding UMP or RCP on certain shades substance of sustained noodles gave the connection between shade of noodles and their constituents of various colors, for example, carotenoids , chlo. and anthocyanin . The innovation of cycle, for example, drying of organic products or vegetable and noodles planning will influenced on their shades substance and their tones this outcomes were concurrences with (Bindvi *etal.*,2017), (Taneya *etal.*,2014) and (Ebtihal *etal.*, 2017).

The effects of adding UMP or RCP on noodles pigments are listed in table (4). Data showed that this process enhanced noodles pigments contents . CN contains 0.153 mg/100g carotenoids , 0.208 mg/100g chlo-A , 0.445 chlo-B,0.653 mg/100g T chlo and 0.0 mg/100g anthocyanin. Noodles with UMP were recorded 0.741 mg/100g carotenoids ,1.558mg/100g chlo-A ,3.147mg/100g chlo-B, 4.705mg/100g T chlo and 0.0 mg/100g anthocyanin . Also data showed that RCP improved noodles anthocyanin content which recorded 17.9 mg/100g.

**Table 4. Pigments of unripe mango and red cabbage powder in addition to fortified and unfortified noodles formula (mg/100g)(DWB).**

| Pigments | Unripe mango powder (mg/100g) | Red cabbage powder (mg/100g) | Prepared noodles sample(mg/100g) | | |
|---|---|---|---|---|---|
| | | | Control noodle | Mango noodle | Red cabbage Noodle |
| Carotenoids | 30.931 | 18.82 | 0.153 | 0.741 | 0.517 |
| Chlo-A | 6.13 | 6.05 | 0.208 | 1.558 | 0.732 |
| Chlo-B | 14.301 | 11.98 | 0.445 | 3.147 | 1.403 |
| T chlorophyll | 20.331 | 18.03 | 0.653 | 4.705 | 0.835 |
| Anthocyanin | 1.55 | 53.71 | 0.0 | 0.0 | 17.9 |

**Control noodle 100 wheat flour, mango noodles and red cabbage noodles(70% wheat flour:30%mango or red cabbage powder )**

**The effect of adding UMP or RCP on ascorbic acid , total antioxidants activity (TTA), total phenols(TPCs) and total flavonoids (TFCs)of fortified noodles**(FN) **samples**:-

Results in Table (5) showed that some bioactive compounds in RCP and UMP such asTTA , TPCs and TFCs of RCP were 92.52% ,63.1 mg/100g and 42.31mg/100g respectively while UMP were recorded 89.301% TAA , 115.55 mg/100g TPCs and 80.22 mg/100g TFCs , this means that UMP have high quantities of TAA , TPCs and TFPs ,while RCP contains high quantities of AA (112.1 mg/100g).

The effect of adding UMP or RCP on AA ,TAA , TPCs and TFCs contents of fortified noodles are listed in Table(5).Data showed that RCP and UMP enhanced of AA , TAA ,TPCs and TFCs contents of noodles. Control noodles contains 1.345% TTA , 7.15mg/100 TPCs and 25.00 mg/100g TFCs , also data showed that FN with UMP contains 3.444 % TTA , 19.7mg/100g TPCs and 26.75 mg/100g TFCs , on the other hand TAA , TPCs and TFCs contents of fortified noodles with RCP were (4.210 %, 30.675 mg/100g and 32.25mg/100g)respectively .Also the results indicated that both of fortified noodles will recorded 16.8 mg/100g AA . while control noodles contains 2.8 mg/100g AA .

**Table 5. Ascorbic acid (AA), total antioxidants activity(TAA), total phenols (TPCs)and total flavonoids (TFCs)in mango powder , red cabbage powder and different fortified noodles samples:**

| Samples(mg/100g) Parameters | Unripe mango powder (UMP) | Red cabbage powder (RCP) | Prepared noodles sample | | |
|---|---|---|---|---|---|
| | | | Control noodle (CN) | Mango noodle (UMN) | Red cabbage noodle (RCN) |
| Ascorbic acid mg/100g | 70.1 | 112.1 | 2.8 | 16.8 | 16.8 |
| Total antioxidants activity% | 89.301 | 92.52 | 1.345 | 7.131 | 4.210 |
| Total phenols mg/100g | 115.55 | 63.1 | 7.15 | 19.05 | 30.675 |
| Total flavonoids mg/100g | 80.22 | 42.31 | 25.00 | 24.75 | 32.25 |

**Control noodle 100 wheat flour, mango noodles and red cabbage noodles(70% wheat flour:30%mango or red cabbage powder )**

(Ana 2013)detailed that phenolic mixes has been as cancer prevention agents, despite the fact that they are likewise connected with other wellbeing advancing impacts, for example, against cancer-causing, calming, hostile to maturing, and hostile to thrombotic action.

**Cytotoxic effect of fortified noodles extracts against liver cancer cells (HEPG) at different Concentrations:**

Biological evaluation in Table (6) demonstrated that the impact of fortified noodles extricate which comprises of UMP or RCP at various focus (0.0 , 12.50 , 50 and 100 µg/ml) on (HEPG) growth cells and the IC50 (the grouping of braced noodles removes which have the option to repress half of cancer cells) . Information demonstrated that all fortified noodles concentrate will repress (HEPG) and there is a connection between the expansion of sustained noodles remove and the abatement of restraint of (HEPG), fortified noodles separate which contains UMP have a high consequences for (HEPG) , fortified noodles extract which contains UMP have a high effects on (HEPG), the best concentration leading to the lowest percent of surviving fraction of liver cancer cell was 100 µg/ml (31.7%) followed by 50 µg/ml (67.1%). Also the best concentration of RCP fortified noodles leading to the lowest percent of surviving fraction of(HEPG) was 100 µg/ml (39.0%) followed by 50 µg/ml (61.0%) and their IC50 was 73.6 µg/ml for both of UMP and RCP fortified noodles

**Table 6. Cytotoxic effect of fortified noodles extracts against liver cancer cells (HEPG) at different Concentrations**

| Sample | | Concentration of extraction samples µg/ml | | | | | IC50 µg/ml |
|---|---|---|---|---|---|---|---|
| | | 0.00 | 12.50 | 25.00 | 50.00 | 100.00 | |
| %Surviving fraction of liver cell line (HEPG | Mango fortified noodles | 100 | 86.6 | 85.4 | 67.1 | 31.7 | 73.6 |
| | Red cabbage fortified noodles | 100 | 79.3 | 70.7 | 61.0 | 39.0 | 73.6 |

**mango noodles and red cabbage noodles(70% wheat flour:30%mango or red cabbage powder)**

**Cytotoxic effect of fortified noodles extracts against Breast cancer cells (MCF7) at different concentrations:**

Breast cancer disease(MCF7) is the most well-known malignant growth analyzed among American ladies and is second just to cellular breakdown in the lungs as a reason for malignancy passings in ladies . A few examinations additionally propose that eats less high in vegetables and organic products decline the danger for bosom malignancy (Tim *etal*.;(2002). Information in Table (7) show that some readied fortified noodles separates were repress bosom malignancy cells , invigorated noodles remove contains UMP gave a more vulnerable impact at MCF7cell their hindrance 18.7 % of bosom malignant growth cells at 100 µg/ml , at lower convergence of mango strengthened noodles extricate doesn't hinder bosom malignant growth cells, then again this impact doesn't show up close behind sustained noodles which substance RCP (Tim *etal*.,2002)reported that diets high in fat are also high in calories and contribute to obesity, which in turn is associated with increased risk of cancers at several sites. Although all types of fats such as saturated fats, may have a greater effect on increasing cancer risk, while that fats containing omega-3 fatty acids may reduce cancer risk .

**Table 7. Cytotoxic effect of fortified noodles extracts against Breast cancer cells(MCF7) at different Concentrations:-**

| Samples | | Concentration of extraction samples µg/ml | | | | | IC50 µg/ml |
|---|---|---|---|---|---|---|---|
| | | 0.00 | 12.50 | 25.00 | 50.00 | 100.0 | |
| %Surviving fraction of Breast cell line (MCF7) | Mango fortified noodles | 100 | 105.4 | 104.2 | 100 | 81.3 | not detected |
| | Red cabbage fortified noodles | 100 | 104.2 | 102.4 | 100 | 101.2 | not detected |

**mango noodles and red cabbage noodles(70% wheat flour:30%mango or red cabbage powder )**

**Cytotoxic effect of fortified noodles extracts against colon cancer cells (HCT) at different concentrations:**

Colon cancer (HCT) is the subsequent driving reason for disease passing among American people joined. Danger of colon disease is expanded in those with a family background of HCT cancer. Diets high in vegetables and organic products have been related with diminished danger. Tim *etal*.(2002).

The restraint impact of fortified noodles separates on HCT growth cells were shown in Table (8). Information demonstrated that invigorated fortified noodles separates which contains 12.5 µg/ml of RCP noodles concentrates will hinder 4.5% of HCT cells , 10.5% at 25 µg/ml , 20.9% at 50 µg/ml and 53.5% at100 µg/ml and their IC50 will 96.4 µg/ml . Fortified noodles which contains UMP repress 9.1% of HCT cells at 25 µg/ml , 13.6% at 50 µg/ml and 54.3% at 100µg/ml and their IC50 at 85.2µg/ml .

Cruciferous vegetables contain certain synthetics thought to lessen the danger for colorectal cancer growth. The best proof proposes that a wide assortment of vegetables, including cruciferous and different vegetables, decreases disease danger lately Nestle,(1998).

**Table 8. Cytotoxic effect of fortified noodles extracts against colon cancer cells (HCT) at different Concentrations**

| Samples | | Concentration of extraction samples µg/ml | | | | | IC50 µg/ml |
|---|---|---|---|---|---|---|---|
| | | 0.00 | 12.50 | 25.00 | 50.00 | 100.00 | |
| %Surviving fraction of Colon cell line (HCT) | Mango fortified noodles | 100 | 100 | 90.9 | 86.4 | 45.7 | 85.2 |
| | Red cabbage fortified noodles | 100 | 95.5 | 89.5 | 79.1 | 46.4 | 96.4 |

**mango noodles and red cabbage noodles(70% wheat flour:30%mango or red cabbage powder )**

From the above mentioned results , it could be concluded that the production of fortified noodles which prepared with optimal ratios of fruit and vegetable , will enhanced noodles nutrients , antioxidants ,vitamins ,minerals and some other phytochemical components which can be the activity of decrease of MCF7 , HCT and HEPG cancers cells .

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## تأثير إستخدام المانجو غير الناضج والكرنب الأحمر لإنتاج نودلز ذات محتوى غذائي وحيوي عالي.


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يعتبر المانجو غير الناضج والكرنب الاحمر من الماكولات التي تحتوي على العديد من المكونات الغير قابله للهضم ذات الفائدة الغذائية الهامة مثل الالياف . وتهدف هذه الدراسة الي استخدام مسحوق كلا من الخضر والفاكهة فى انتاج نودلز مدعمة ذات محتوي عالي من المغذيات ومضادات الاكسدة ومحتوي منخفض من الكربوهيدرات .ودراسة تأثير هذه الأضافة على لون النودلز المدعمه والخواص الحسية و الكيميائية لها . تم تجهيزخمس خلطات من النودلز المدعمه بنسب (١٠ ,٢٠ ,٣٠ ,٤٠ ,٥٠ %) من مسحوق الفاكهة أو الخضر المجففة وتم عمل تقيم حسى للنودلز المدعمة للمقارنه بالعينة القياسية التي تحتوى على ١٠٠% دقيق قمح. تم اختيار اثنين من النودلز المدعمة والتى تتكون من الدقيق مدعم بأجزاء من مسحوق الخضر او الفاكهه و أوضحت النتائج ان مسحوق المانجو الغيرناضجه يحتوي على ٤٥,٢ مواد صلبة و ١,٠٢ حموضة و رماد ٢,٢٨% و رطوبة ١٤,٥% و ٤,٣٦% برتين و دهون ٢,٨٣% و الياف ٣,٤٩% و ٧٦,٤٤% كربوهيدرات. بينما سجل مسحوق الكرنب الاحمر الاكثر فى المحتوي من البوتاسيوم والصوديوم(٦٧٨,٥ و ١٨٠,٠ ميلجرام/١٠٠جرام) تقريباً على التوالى . كما أظهرت الدراسة تأثيرات إجابية لمستخلص النودلز المدعم بالمانجوعلى مستوى السميه فى خلايا سرطان الكبد لايقاف عمل الخلايا السرطانية بنسبة ١٤,٦ % عند تركيز ٥٠ ميكروجرام /ملليلتر و كانت نسبة الإقاف ٥٤,٣% عند تركيز ١٠٠ميكروجرام/ ملليلتر بينما كانت نسبة الإقاف٥٠% من الخلايا عند تركيز ٨٥ ميكروجرام/ ملليلتر . واشارت الدراسة ايضا ان مستخلص نودليز الكرنب الاحمر اوقف نشاط ٤,٥% من خلايا سرطان الكبد عند تركيز ١٢,٥ ميكروجرام/ملليلتر و ١٠,٥% عند ٢٥,٥ميكروجرام/ملليلتر و ٢٠,٩% عند ٥٠ميكرجرام/ملليلتر و٥٣% عند١٠٠ ميكروجرام/ملليلتر فى حين ان إيقاف نشاط ٥٠%من خلايا سرطان القولون كان عند ٩٦,٤ ميكروجرام/ ملليلتر.