Tenological and chemical studies on some foods

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The vitamins and minerals components are important and necessary substances to body. They play an important role in the different vital operation in body, in addition, they conserve the healthy case of body because they have the ability to prevent body from a lot of diseases. Shortage of these components in body leads to many diseases, such as night blandness, it is resulted from shortage in vitamin (A). Anemia is related to shortage in vitamins (B12 and folic acid) and iron. Rickets is related to shortage in vitamin (D), calcium and phosphorus. Peripheral neuropathy and some of liver diseases are related to shortage in vitamins (B1, B2, B6, B12 and folic acid). Atheroscelerosis is related indirectly to shortage in vitamin (C), beside other diseases.Because there are many natural food substances that contain high contents from vitamins and minerals, therefore the purpose of this study is producing food mixtures from vegetables, fruits and others of natural food sources; these will be treated technologically for consumpation as natural sources in processed form because this has a good ability for absorption inside the body, so this in order will prevent the body from many diseases which are resulted from shortage of vitamins and minerals components.For this study different groups of raw materials were used to prepare formulated food mixtures which consisted of : fruits (guava, apricot, dry dates, orange and lime); vegetable (carrot and garden-rocket); oil seeds (sesame and peanut); legumes(termis, lentil and fenugreek) and dry yeast.Fourteen mixtures were formulated, analyzed and evaluated by various methods.The obtained results could be summarized as follows:1 The obtained data of the moisture content of the raw materials showed that the garden-rocket, lime, carrot and orange had the highest values, 89.67, 89.14, 88.35 and 87.25%, respectively, while it ranged between 5.32 and 13.19% for legumes, oil seeds, dry yeast and dry dateDry yeast contain high pH value (6.5), while lime had the lowest value of pH (2.13).Meanwhile, lime contained high percentage of total acidity (39.05% on dry weight), while dry date had the lowest value of total acidity (0.24 %). The dry dates followed by orange and carrot had the highest values of total sugars (67.69, 63.19 and 51.54%), respectively, while it ranged between 1.39 and 39.79% for the other raw items (on dry weight). Also, it was found that the total free phenolic compounds for raw materials ranged between 0.09 and 2.93%, and the total free amino acid between 0.12 and 3.80% for the materials which used in the mixtures.The lupine had the highest value of protein (42.06%), while the drydate had the lowest value of protein (2.78%). Meanwhile, the fiber content of raw materials were ranged between 2.11 and 10.09%. The garden-rocket had the highest value of ash (16.19%), while the dry dates contained the lowest value of ash(2.49%).Sesame contains the highest value of oil (52.39%), while the dry date had the lowest value of oil (0.67%). Also, it was found that dry date had the highest value of carbohydrate (94.06 %), while the sesame had the lowest value of carbohydrate (21.37%) (on dry weight).2. The minerals content of the raw materials shown that carrot, dry yeast and garden-rocket contained high values of potassium (2685.8, 2036.2 and 2005.6 mg/100g), Respectively, and it ranged between 321.7 and 1037.6 mg/100g for the other raw materials. Meanwhile, it was found that the sesame had the highest value of phosphorus (619.88 mg/100g) but the dry dates had the lowest value of phosphorus (61.8 mg/100 g). The garden-rocket had the highest value of calcium (1281.2 mg/100 g), while the dry yeast had the lowest value (47.3 mg/100 g).Also, it was found that carrot had the highest value of magnesium (163.5 mg/100 g) while apricot had the lowest value of magnesium (3.33 mg/100 g), and it observed

that the highest value of iron was in garden-rocket (67.8 mg/100 g), while the iron content in other raw materials ranged from 1.62 to 26.68 mg/100 g.On the other hand, it was found that carrot had the highest value of sodium (334.8 mg/100 g), while lentil had the lowest value of sodium (3.02 mg/100 g). Meanwhile dry yeast had the highest value of zinc (10.64 mg/100 g) followed by sesame (6.53 mg/100 g), while it was ranged from 0.35 to 5.51 mg/100 g in other raw materials. Also, it was observed that the manganesecontents of raw materials ranged between 0.36and 3.41mg/100g, while the copper contents ranged between 0.44 and 2.39mg/100g 3-Chemical composition of formulated food mixtures:I- Type No. 1 (Food mixture No.1/ 1):-Formulated food mixture as source to compensate the deficiency of vitamins Bi, B2, B6, B12 and folic acid.By studying the characterization of food mixture No.1/1 it was found that:The moisture content for mixture No.1/1 was 6.82%. ThepH value was 6.51, while the total acidity was 0.61% (on dry weight).The reducing and total sugars of food mixture No.1/1 were 1.02 and 2.35%, respectively. Also, it was observed that the total free phenolic compounds and total free amino acid offood mixture No. 1/1 were 0.23 and 0.58%, respectively, while the protein content was 25.87%.The crude fiber content of food mixture No.1/1 was 2.82%, ash content was 2.57%, fat was 3.44 %, while the total carbohydrate reached to 68.12 %, and total carotenoid was 9.98 mg/ 100 g. Also, it contain high level of vitamins (B1, B2, B6, B12 and folic acid). Also, it observed from the results that therewas low decrease in the percent of component of food mixture No. 1/1 during storage periods.The mineral content of food mixture No.1/1 shown that the potassium (789.5 mg/100 g), phosphorus (364.56 mg/100 g), calcium (109.35 mg/100 g), magnesium (47.81 mg/100 g), iron(5.12 mg/100 g), sodium (5.98 mg/100 g), while the zinc, manganese and copper were 3.95, 1.55 and 0.89 mg/100 g, respectively.The microbiological examination of food mixture No.1/1 indicated to the low total count of bacteria, also the total count of molds and yeasts were very low at zero time and after storage for 9 months.The organoleptic evaluation of food mixture No.1/1 shown that the color and odor were considered palatable and the taste was considered acceptable.Biological evaluation of type No.1:The obtained results could be summarized as follows :The highest weight gain and the highest value for food intake and food efficiency were obtained from group 2, while the lowest weight gain and the lowest value for food intake and food efficiency were obtained from group 3.By weighting some organs of rats such liver, heart, kidney, brain and spleen it was found non-significant change between group 2 and the control, while it was found a significant change for liver and kidney between group 3 and the control, but did not obsery any significant change for heart, brain and spleen.By measuring the GPT and GOT of serum it was found no significant differences between group 2, group 3 and the control during feeding periods.By measuring the glucose levels in serum it was observed no significant differences between group 2 and 3 when compared to the control, while it was found a significantdecrease in total cholestrol levels between group 2 and the control at the end of feeding periods and non significant differences between group 3 and the control at the end of feeding periods.11- Type No.2 (Food mixtures No.2/1 and 2/2):Formulated food mixtures as source to compensate the deficiency of some minerals (calcium and phosphorus).By studying the characterization of these mixtures it was found the following constituents:The moisture content of food mixtures No.2/land 2/2 was 7.86 and 6.82%, respectively. The pH value was 6.32 and 6.1, while the total acidity was 0.56 % and 1.09 % for food mixtures No. 2/1 and 2/2.The food mixture No.2/1 contained high percentage of reducing and total sugars (20.81 and 36.82%), respectively, while food mixture No.2/2 contained low percentage of reducing and total sugars (1.04 and 2.90%), respectively.The total free phenolic compounds content of food mixtures No.2/1 and 2/2 were 0.89 and 0.21%, respectively, also the total free amino acid of food mixtures No. 2/1 and 2/2 was 1.15 and 0.56 %, respectively.The food mixture No.2/1 contain low percentage of crude protein (14.62%) than food mixture No.2/2 (28.66%), also the food mixture No.2/1 contain low percentage of crude fiber and ash than food mixture No.2/2 which were (3.34 and 5.34%), (2.64 and 3.62%), respectively.The fat content of food mixtures No.2/1 and 2/2 was 3.54 and 6.48%, respectively. The total carbohydrate of food mixtures No.2/1 and 2/2 was 79.20 and 61.24%, respectively. Meanwhile, the total carotenoids of food mixtures No.2/1 and 2/2 were 6.27 and 10.76 mg/ 100 g, respectively. Also, it observed from the results that there was low decrease in the percent of component of food mixtures No. 2/1 and 2/2 during storage periods.The minerals content of potassium, phosphorus,

iron, magnesium, zinc and copper for food mixture No.2/2 were more than food mixture No.2/1, while these food mixtures contain low percentage of sodium and manganese.The microbiological examination of food mixtures No.2/1 and 2/2 indicated to the low contained of total viable bacterial count which ranged from 3.16 to 3.24 and from 3.85 to 3.88, respectively, also the total count of molds and yeasts were very low which was 2.53 to 2.57 for food mixture No.2/1. and less than fifteen for food mixture No.2/2. during storage.The organoleptic evaluation shown that the color and odor scores of food mixtures No.2/1 and 2/2 were considered palatable while the scores of taste for food mixture No.2/1 was considered palatable and food mixture No.2/2 was considered acceptable.Biological evaluation of type No. 2:The obtained results could be summarized as follows:The highest weight gain and the highest value for food efficiency were obtained from group 2 and group 4 while thelowest weight gain and the lowest value for food efficiency were obtained from group 3 and group 5 when compared to group 1.All rats fed on the tested diets had non-significant difference of heart, brain and spleen. There was non- significant difference of liver between groups 2, 4 and the control, but there was a significant difference between group 3, 5 and the control. Also, non-Significant difference of kidney between groups 2, 3, 4 and the control, but there was a significant difference between group 5 and the control.There was non- significant differences in GPT activity between all groups, and the control. Also, there was no significant differences in GOT activity between all groups and group 1 (control) during feeding periods.There was no significant differences in glucose levels between all groups and the control during storage periods. Meanwhile, it was found no significant differences in total cholestrol between groups 2, 3, 5 and the control, but there was a significant differences between groups 4 and the control after four weeks of feeding periods.The percentage of calcium was increased gradually in group 2 during feeding periods and decreased gradually in group 3 to zero.Also, the percentage of phosphorus was increased gradually in group 4 during feeding periods and decreased gradually in group 5 when compared with the group 1 (control).III- Type No. 3 (Food mixturesNo.3/1 and 3/2):Formulated food mixture as source to compensate the deficiency of iron and vitamins (B12 and folic acid).The chemical composition of food mixtures No. 3/1 and 3/2 illustrated that:The percentage of moisture content of food mixtures No. 3/1 and 3/2 was 5.20 and 8.48%, respectively. The pH value was 4.9 and 5.21 and the total acidity was 1.28 and 1.08% for food mixture No. 3/1 and 3/2, respectively.The food mixture No.3/1 contained high percentage of reducing and total sugars (18.57 and 34.71%), respectively, but these percentage were higher in food mixture No.3/2 (24.84 and 43.92%), respectively.The total free phenolic compounds were 0.92 and 1.39%, also the total free amino acid content were 1.04 and 1.39% for food mixtures No.3/1 and 3/2, respectively.The crude protein of food mixtures No.3/1 and 3/2 was 10.93 and 7.12%, respectively. The percentage of crude fiber was 4.84 and 7.89%, also the percentage of ash for food mixtures No.3/1 and 3/2 was 2.62 and 3.27%, respectively.The food mixture No.3/1 content 0.83% of fat, while the food mixture No.3/2 contain 2.05 %of fat. Also, the food mixtureNo.3/1 contain 85.62% of total carbohydrate, while the food mixture No.3/2 contain 87.56% of total carbohydrate.The total carotenoids of food mixtures No.3/1 and 3/2 were 14.81 and 6.33 mg/100 g, respectively. Also, it observedthe high percentage of vitamin B12 in food mixtures No.3/1 and 3/2, while the percentage of folic acid was higher in food mixture No.3/2 than food mixture No.3/1. Also, it observed from the results that there was low decrease in the percent of component of food mixture No. 3/land 3/2 during storage periods.Minerals potassium, phosphorus and copper contents of food mixture No.3/1 were more than food mixture No.3/2, meanwhile, food mixture No.3/2 was high in content of minerals calcium and iron. The percentage of magnesium, sodium, zinc and manganese were low.The microbiological examination of food mixtures No.3/1 and 3/2 indicated to the low total viable bacterial count of these food mixtures which ranged from 3.42 to 3.81 and from less than thirty to 2.52 for food mixtures No.3/1 and 3/2, respectively, also the total count of molds and yeasts were very low for food mixtures No.3/1 and 3/2 during storage.The organoleptic evaluation of food mixtures No.3/1 and 3/2 shown that color, taste and odor for food mixture No.3/1 was considered palatable. The color of food mixture No.3/2 was considered palatable, while the taste and odor were considered acceptable.Biological evaluation of type No. 3: The results shown that:The highest weight gain and the highest value for food intake and food efficiency were obtained from group 2, but thelowest weight gain and the lowest value for food

intake and food efficiency were observed in group3 .By weighting some organs of rats such liver, heart, kidney, brain and spleen it was found non-significant changes for heart kidney and brain between the control (group 1) and group 2, 3. A significant difference between the control (group 1) and group 3 for liver and spleen, but non significant changes were found for liver and spleen between the control and group 2.By measuring GPT and GOT of serum it was observed that there were no significant differences in GPT activity between group 2 and control during feeding periods. A significant difference was observed between group 3 and control after four weeks of feeding periods. On the other hand, there was no significant differences in GOT activity between groups 2, 3 and group 1 (control) during feeding periods.There was no significant differences of glucose levels in serum between the control and groups 2, 3 during all feeding periods. Also, the results indicated to a significant decrease of total cholesterol on group 2 when compared to control at all feeding periods, but there was no significant differences of total cholesterol of group 3 when compared to control during feeding periods.The iron content of blood serum of group 2 was increased significantly through the feeding periods when compared to control, while the iron of plasma of group 3 was decreased significantly during the feeding periods when compared to the control and lowered to zero after four weeks.By measuring the effect of iron content on blood picture it could be observed that a significant decreases of haemoglubin and red blood cells of group 3 when compared to control, but a significant increase in white blood cells of group 3 was observed when compared to control during all feeding periods. While it was observed a significant increases of haemoglubin and red blood cells of group 2 when compared to group 3 and the control, but a significant decrease in white blood cells of group 2 when compared to group 3 and the control during feeding periods.VI—Type No. 4 (Food mixtures No. 4/1, 4/ 2, 4/3 and 4/4):Formulated food mixtures as source to compensate the deficiency of vitamin B6.The high moisture content was in food mixtures No.4/ 4 (65.14%), while the lowest moisture content was in food mixture No. 4/1 (5.92%).The pH value of food mixture No.4/1, 4/2, 4/3 and 4/4 was 5.61, 5.85, 3.82 and 4.2, respectively, while the total acidity was 1.09, 1.01, 6.22 and 1.10 %, respectively.Reducing and total sugars were high in food mixture No.4/3 followed by food mixture No.4/2 but low in food mixtures No.4/1 and 4/4. Total free phenolic compounds were high in the food mixture No.4/3 which followed by food mixture No.4/4 than the food mixture No.4/2 and 4/1. Total free amino acids were high in food mixture No.4/3 then food mixture No.4/4 and lowered in food mixtures No. 4/1 and 4/2.Crude protein was high in food mixture No.4/1 followed by food mixture No.4/2 and were less in the food mixtures No. 4/3 and 4/4.Crude fiber and ash were high in food mixture No.4/3 followed by food mixture No. 4/4 and were less in the food mixtures No. 4/1 and 4/2.The fat content of food mixtures No. 4/1, 4/2, 4/3, and 4/4 were 1.71, 2.87, 1.99 and 2.21%, respectively, also the total carbohydrate was 77.22, 81.31, 85.44, and 81.61% for food mixtures No. 4/1, 4/2, 4/3, and 4/4, respectively (on dry weight). Also, it observed from the results that there was low decrease in the percent of component of food mixture No. 4/1,4/2 ,4/3 and 4/4 during storage periods.The total carotenoids were high in food mixtures No. 4/1 and 4/4 more than food mixtures No. 4/2 and 4/3. Also, it was observed that food mixtures No. 4/4 and 4/2 are very rich by vitamin B6 which followed by food mixture No.4/3 and at least the food mixture No.4/1.Minerals content of food mixtures No. 4/1, 4/2, 4/3, and 4/4 shown that food mixture No. 4/3 contained the maximum concentration of potassium which followed by food mixture No. 4/4 then 4/1 and the least concentration was observed in food mixture No.4/2. Also, the content of food mixtures No.4/1,4/2,4/3, and 4/4 of iron, magnesium, zinc and copper were good but the contained these food mixtures of phosphorus, calcium, sodium, and manganese were low.The microbiological examination of food mixtures No. 4/1,4/2,4/3, and 4/4 shown that the total viable bacterial count were low at zero time and after storage for 9 months. Also, it was observed that the total count of molds and yeasts for food mixtures No. 4/1,4/2,4/3, and 4/4 were very low which were less than fifteen at zero time and after storage for 9 months. So, these results indicate to the healthy acceptability of these food mixtures.The organoleptic evaluation of food mixtures 4/1,4/2,4/3, and 4/4 indicated to the color of food mixtures No.4/1 and 4/2 was better than other food mixtures and were considered palatable.The food mixture No.4/2 and 4/3 had the highest score for taste followed by food mixture No.4/1 and the lowest score was associated to food mixtures No. 4/4, so food mixtures No.4/2 and 4/3 were considered palatable and food mixtures No.4/1 and 4/4 were

considered acceptable. Also, the food mixture No.4/2 had the highest value of odor followed by mixtures 4/3, 4/4 and 4/1, and it were considered palatable.VI—Type No.5 (Food mixtures No. 5/1 and 5/2):Formulated food mixtures as source to compensate the deficiency of vitamin A.The chemical composition of food mixtures No. 5/1 and 5/2 were as follows :Moisture contents of food mixtures No. 5/1 and 5/2 was 79.32 and 78.98%, respectively. The pH value of food mixtures No.5/1 and 5/2 was 3.30 and 3.9, respectively, and wasobserved that the total acidity was 4.18 and 4.86% for food mixtures No.5/1 and 5/2, respectively.The food mixture No.5/1 contained high percentage of reducing and total sugars than food mixture No.5/2. Also, it observed that food mixture No.5/1 contained high percentage of total free phenolic compounds than food mixture No.5/2.The total free amino acid of food mixtures No.5/1 and 5/2 was 2.08 and 2.67 %, respectively, also the crude protein content of food mixtures No.5/1 and 5/2 was 6.53 and 12.31%, respectively, (on dry weight basis).Crude fiber content of food mixtures No.5/1 and 5/2 was 7.15 and 8.25%, respectively, while the ash content was 4.98 and 8.46% for food mixtures No.5/1 and 5/2, respectively, (on dry weight basis).Also, it was observed that the fat content in food mixture No.5/2 was higher than food mixture No.5/1, while the total carbohydrate in food mixture No.5/1 was higher than food mixture No.5/2.The percentage of total carotenoides were very high in food mixture No.5/1 than food mixture No.5/2. Also, food mixture No. 5/1 contained high concentration of vitamin A, food mixture No.5/2 contained high of vitamin A but this contained less than the contained of food mixture No.5/1.The minerals content of food mixtures No.5/1 and 5/2 shown that the food mixture No.5/2 is rich by some minerals such as potassium, magnesium, calcium, iron, zinc and copperthan food mixture No.5/1. Meanwhile, sodium and manganese of food mixtures No.5/1 and 5/2 were low.The microbiological examination of food mixtures No. 5/1 and 5/2 indicated to the total viable bacterial count, molds and yeasts were very low at zero time and after storage for 9 months, so these food mixtures are very safety to using.The organoleptic evaluation of food mixtures No.5/1 and 5/2 shown that the color of food mixtures No.5/1 and 5/2 was considered acceptable, the taste and odor of food mixture No.5/1 were considered better and more acceptable than food mixture No.5/2.VV-Type No.6 (Food mixtures No. 6/1, 6/2 and 6/3):Formulated food mixtures as source to compensate the deficiency of vitamin C (Ascorbic acid).The chemical composition of these food mixtures (No. 6/1,6/2 and 6/3) illustrated that:The moisture content of mixtures 6/1, 6/2 and 6/3 was 12.02, 11.85and 6.87%, respectively. The pH value of food mixtures No.6/1, 6/2 and 6/3 was 3.96, 3.97 and 4.0, respectively, and the percentage of total acidity was 5.01, 5.0 and 4.48%, respectively.The food mixture No.6/3 contained high percentage of total and reducing sugars, when compared to food mixtures No.6/1 and 6/2. Also, food mixture No.6/3 contained total free phenolic compounds more than food mixtures No. 6/1 and 6/2.