



American Journal of  
**Food Technology**

ISSN 1557-4571



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## **An Overview of Malaysian Food Industry: The Opportunity and Quality Aspects**

Hayati Habibah Abdul Talib and Khairul Anuar Mohd Ali

In foodstuff content, it is more meaningful if the quality standard assures that food is suitable for consumption, processed in a hygiene manner, is nutritious and safe. This paper will focus on the Malaysian food industry development in terms of quality standards that are necessary to be given consideration in the production of food. This paper also concentrates on the principles of quality assurance in food processing which is required by the global market standards. Malaysia being a part of this global market would like to set the quality standards that involve the processing of halal food. At present, the Malaysian government is using the global halal market stand as a brilliant opportunity to establish the country as a halal hub for halal products in this region. To achieve this goal, the government has set some international quality standards and MS1500:2004 to be complied with Malaysian food manufacturers in the production of quality food. (*Pakistan Journal of Nutrition* 8 (5): 507-517, 2009; **doi:** 10.3923/pjn.2009.507.517)

## **Supplementation of Cassava Hay as Anthelmintics on Fecal Parasitic Egg in Heifer Grazing on Ruzi Grass Pasture**

Sittisak Khampa, Pala Chaowarat, Rungson Singhaler and Metha Wanapat

Ten, one-year old heifers with initial body weight at  $150 \pm 10$  kg were randomly divided into 2 groups according to receive concentrate at 14% CP (1 kg/head/day) + Ivermectin ( $T_1$ ), cassava hay ( $T_2$ ) (1 kg/head/ day) and means were compared using t-test. All animals were grazing on ruzi grass pasture. The results have revealed that supplementation of cassava hay as anthelmintics replace ivermectin was non significant affected to fecal parasitic egg counts and average daily gain in buffaloes grazing on ruzi grass pasture ( $p > 0.05$ ). In addition, fecal parasitic egg counts dramatically declined for both treatment groups with 60.5 and 50.6%, respectively. However, Average Daily Gain (ADG) tended to be higher in swamp buffaloes fed on groups cassava hay ( $T_2$ ) treatments than in those fed concentrate + ivermectin. However, digestion of coefficients of nutrients particularly organic matter was significantly higher in  $T_2$  than those in  $T_1$ . It was, hence concluded that cassava hay could not only provide as a protein source but also high efficiency serve as an anthelmintics in heifer. (*Pakistan Journal of Nutrition* 8 (5): 518-520, 2009; **doi:** 10.3923/pjn.2009.518.520)

## **Chemical Profile of *Chromolaena odorata* L. (King and Robinson) Leaves**

Igboh M. Ngozi, Ikewuchi C. Jude and Ikewuchi C. Catherine

The proximate, amino acid and phytochemical composition of *Chromolaena odorata* was investigated. A high total carbohydrate (20.58% WW and 50.82% DW), crude fibre (10.76% WW and 26.57% DW) and protein (6.56% WW and 16.20% DW) content was observed. The protein is rich in the essential amino acids (with histidine and phenylalanine being very high) and has a protein score of 88.24% with methionine as the limiting amino acid. The phytochemical screening revealed the presence of alkaloids, cyanogenic glycosides, flavonoids (aurone, chalcone, flavone and flavonol), phytates saponins and tannins. The anti-nutrients composition includes cyanogenic glycosides (0.05% WW and 0.13% DW), phytates (0.22% WW and 0.54% DW), saponins (0.80% WW and 1.98% DW) and tannins (0.15% WW and 0.37% DW). Our result suggests that *C. odorata* is a source of high quality protein which could serve as a potential source of protein supplement. (*Pakistan Journal of Nutrition* 8 (5): 521-524, 2009; doi: 10.3923/pjn.2009.521.524)

## **Performance of Sudanese Desert Lambs Fed Graded Levels of Water Melon (*Citrullus lanatus*) Seed Cake Instead of Groundnut Cake**

Amani A. Beshir, Yagoub M. Yagoub and Salih Ahmed Babiker

The present study was conducted to evaluate water melon (*Citrullus Lanatus*) seed cake as a possible protein supplement for growing lamb in comparison to groundnut cake. Graded proportion of water melon seed cake (WMSC) (0, 25, 50, 75, 100%) which replace groundnut cake (GNC) were incorporated in five diets iso-caloric, iso-nitrogenous diets for lamb. Diet A contained 0% proportion of MWSC, diet B, C, D and E contained 25, 50, 75 and 100% WMSC proportions, respectively. Forty five yearling male lambs of Sudan desert sheep ecotype Kabashi with average body weight of 31.5kg were used for feeding trial. There was a significant ( $P < 0.01$ ) linear decrease in feed intake and average daily live weight gain with increasing WMSC level in the diet, but dietary treatments had no significant effect on feed conversion efficiency and final body weight. However, lambs fed diet A (0% WMSC) was found to be superior over the other treatment groups in previous parameters. (*Pakistan Journal of Nutrition* 8 (5): 525-529, 2009; doi: 10.3923/pjn.2009.525.529)

## **Vegetables Mentioned in the Holy Qura'n and Ahadith and Their Ethnomedicinal Studies in Dera Ismail Khan, N.W.F.P., Pakistan**

Sarfraz Khan Marwat, Mir Ajab Khan, Muhammad Aslam Khan, Mushtaq Ahmad, Muhammad Zafar, Fazal-ur-Rehman and Shazia Sultana

The present research work is based on nine herbaceous plant species: *Agaricus campestris* L., *Allium cepa* L., *Allium sativum* L., *Beta vulgaris* L. *Citrulus lanatus* (Thunb.) Mats. & Nakai, *Cucumis sativus* L., *Lagenaria siceraria* (Molina) Standley, *Trigonella foenum-graecum* L. and *Zingiber officinale* Roscoe. mentioned in Holy Quran and Ahadith. These plants were collected from Dera Ismail Khan District, NWFP, Pakistan, during 2007. This is a part of check list of medicinal flora and their uses enlisted in Holy Quran, Ahadith and Islamic literature. The main aim of this study is to document the knowledge of ethnobotanical importance of vegetables in the light of Islam. In view of the importance of this study related comprehensive and detailed data was collected. Complete macro and microscopic detailed morphological features of these species were discussed. Results were systematically arranged by alphabetic order of botanical names, family followed by Quranic name, Arabic name, English name, Local/vernacular name, habit and habitat, parts used, medicinal uses and references cited from Holy Quran and Ahadith. It is concluded that herbal medicines are being widely used in the world because of better cultural acceptability, least injurious with none or much reduced side effects. (*Pakistan Journal of Nutrition* 8 (5): 530-538, 2009; *doi*: 10.3923/pjn.2009.530.538)

## **Effects of Supplementation of Cassava Hay as Anthelmintics on Fecal Parasitic Egg in Swamp Buffalo Grazing on Ruzi Grass Pasture**

Sittisak Khampa, Pala Chaowarat, Rungson Singhaler and Metha Wanapat

Six, one-year old male swamp buffaloes with initial body weight at 200±10 kg were randomly divided into two groups according to receive concentrate at 14% CP (1 kg/head/day) + Ivermectin (T<sub>1</sub>); cassava hay (T<sub>2</sub>) (1 kg/head/day) and means were compared using t-test. All animals were grazing on ruzi grass pasture. The results have revealed that supplementation of cassava hay as anthelmintics replace ivermectin was non significant affected to fecal parasitic egg counts and average daily gain in buffaloes grazing on ruzi grass pasture (p>0.05). In addition, fecal parasitic egg counts dramatically declined for both treatment groups with

64.8 and 57.4%, respectively. However, Average Daily Gain (ADG) tended to be higher in swamp buffaloes fed on groups cassava hay (T<sub>2</sub>) treatments than in those fed concentrate + ivermectin. However, digestion of coefficients of nutrients particularly organic matter was significantly higher in T<sub>2</sub> than those in T<sub>1</sub>. It was, hence concluded that cassava hay could not only provide as a protein source but also high efficiency serve as an anthelmintics in swam buffaloes. (*Pakistan Journal of Nutrition* 8 (5): 539-541, 2009; doi: 10.3923/pjn.2009.539.541)

### ***Salvadora persica*, *Tamarix aphylla* and *Zizyphus mauritiana*- Three Woody Plant Species Mentioned in Holy Quran and Ahadith and Their Ethnobotanical Uses in North Western Part (D.I. Khan) of Pakistan**

Sarfaraz Khan Marwat, Mir Ajab Khan, Muhammad Aslam Khan, Fazal-ur-Rehman, Mushtaq Ahmad, Muhammad Zafar and Shazia Sultana

The present research work is based on Three woody plant species: *Salvadora persica*, L. *Tamarix aphylla* (L.) Karst. and *Zizyphus mauritiana* Lam. mentioned in the 16<sup>th</sup> Ayat of Sura Saba in Holy Quran and Ahadith. These plants were collected from Dera Ismail Khan District, NWFP, Pakistan, during 2007. This is a part of check list of medicinal flora and their uses enlisted in Holy Quran, Ahadith and Islamic literature. The main aim of this study is to document the knowledge of ethnobotanical importance of these plants in the light of Islam. In view of the importance of this study related comprehensive and detailed data was collected. Complete macro and microscopic detailed morphological features of these species were discussed. Results were systematically arranged by alphabetic order of botanical names, family followed by Quranic name, Arabic name, English name, Local/Vernicular name, habit and habitat, distribution, parts used, medicinal uses and references cited from Holy Quran, Ahadith. It is concluded that herbal medicines are being widely used in the world because of better cultural acceptability, least injurious with none or much reduced side effects. (*Pakistan Journal of Nutrition* 8 (5): 542-547, 2009; doi: 10.3923/pjn.2009.542.547)

### **Chemical Profile of *Tridax procumbens* Linn**

C. Ikewuchi Jude, C. Ikewuchi Catherine and M. Igboh Ngozi

The proximate, mineral and phytochemical composition of *T. procumbens* was investigated. The proximate profile included moisture (90.05±0.00%), crude protein (3.44±0.00% WW and 34.57±0.00% DW), crude fat (0.60±0.02% WW

and  $6.03 \pm 0.20\%$ ), total carbohydrate ( $5.10 \pm 0.02\%$  WW and  $51.26 \pm 0.20\%$  DW), crude fibre ( $0.61 \pm 0.04\%$  WW and  $6.13 \pm 0.40\%$  DW), total metabolizable energy value ( $39.56 \pm 0.26$  kcal/100 g WW and  $397.59 \pm 2.61$  kcal/100 g DW) and a total ash content of  $0.20 \pm 0.02\%$  WW and  $2.01 \pm 0.20\%$  DW, which is rich in sodium (5.02 mg/100 g WW and 50.44 mg/100 g DW), potassium (3.18 mg/100 g WW and 31.92 mg/100 g DW) and calcium (2.09 mg/100 g WW and 20.96 mg/100 g DW). The phytochemical screening revealed the presence of alkaloids, carotenoids, flavonoids (catechins and flavones), saponins and tannins. It is richly endowed with carotenoids (9.41 mg/100 g WW and 94.57 mg/100 g DW) and saponins (10.30 mg/100 g WW and 103.52 mg/100 g DW). This result suggests the likelihood of this plant serving as a potential source of protein supplements and pro vitamin A (carotenoids) to the population. It also indicates that dehydration can improve the nutritional quality of *Tridax procumbens*. (*Pakistan Journal of Nutrition* 8 (5): 548-550, 2009; **doi**: 10.3923/pjn.2009.548.550)

### **Antidiabetic Activity of Some Herbal Plants in Streptozotocin Induced Diabetic Albino Rats**

S.K. Prasad, Alka Kulshreshtha and Taj N. Qureshi

Aqueous extract of leaves of 3 herbs (*Murraya koenigii*, MK; *Psidium guajava*, PG and *Catharanthus roseus*, CR) were used to test their antidiabetic activity in Streptozotocin (STZ) induced diabetic albino rats. MK, PG and CR are given to the STZ induced diabetic rats at the concentration of 500 mg/kg body weight in different groups of 6 diabetic rats each orally once a day for 15 days. Glibenclamide (GBC) is also given to another group to support the results at the concentration of 3 mg/kg body weight orally once a day for 15 days. Diabetic control received vehicle. Body weight showed significant increase (MK and PG:  $p < 0.05$ , CR and GBC:  $p < 0.001$ ) after 15 days of treatment with herbal extract when compared with the control. Blood glucose level on 15th day of treatment become significantly low ( $p < 0.001$ ). At the termination of the experiment (on 15th day) the urine glucose and ketone were absent in herbal treated group which was present in the diabetic control. Histological study of the pancreas also assesses the results of body weight and blood glucose level. Islets of diabetic control group were damaged, shrunken in size and infiltration of lymphocytes was observed. While islets of herbal extracts treated rats were comparable to normal rats. Many rounds and elongated islets were evenly distributed through out the cytoplasm. No significant histological alteration was found in glomeruli or any other segment of kidney tubule in STZ induced diabetic rats. In herbal extract treated group no difference was found in kidney tubules when compare with their respective

diabetic control. Findings of the present study suggest that the aqueous extract of leaves of MK, PG and CR at the dose of 500 mg/kg body weight brings about significant beneficial effects in various physiological/ histological parameters altered during diabetic manifestations and these effects are quite comparable with glibenclamide (a standard drug used to treat diabetes mellitus). (*Pakistan Journal of Nutrition* 8 (5): 551-557, 2009; *doi*: 10.3923/pjn.2009.551.557)

### **Cocoyam Starch Modification Effects on Functional, Sensory and Cookies Qualities**

M.C. Ojinnaka, E.N.T. Akobundu and M.O. Iwe

Starches of fine texture from cormels of cocoyam (*Xanthosoma sagittifolium*), cultivar *Ede ocha* and cultivar *Ede uhie* were subjected to acid and enzyme modification treatments. Proximate composition, functional and amylograph pasting properties of the starches were evaluated. The starch samples were also used in the production of cookies at 5, 10, 15, 20 and 25% level of substitution with wheat flour. The cookies produced were subjected to proximate analysis and sensory evaluation. The result of the sensory evaluation showed that cookies prepared at 5% level of substitution were most acceptable. After eight weeks of storage in light polythene bags, the cookies prepared at 5 and 10% levels of substitution with wheat flour were found to be more acceptable by the panelists. Observations on the functional properties showed that the modified cocoyam starches exhibited higher bulk densities than the untreated starches. Native and modified starches with the high water absorption capacity and swelling index were produced from cultivar *Ede uhie*. There was no significant difference ( $p>0.05$ ) in the solubility of the starch samples. (*Pakistan Journal of Nutrition* 8 (5): 558-567, 2009; *doi*: 10.3923/pjn.2009.558.567)

### **Influences of Supplementation of Cassava Hay as Anthelmintics on Fecal Parasitic Egg in Native Cattle Grazing on Ruzi Grass Pasture**

Sittisak Khampa, Pala Chaowarat, Uthai Koatdoke, Rungson Singhaler and Metha Wanapat

Ten, one-year old male native cattle with initial body weight at  $150\pm 10$  kg were randomly divided into two groups according to receive concentrate at 14% CP (1 kg/head/day) + Ivermectin ( $T_1$ ); cassava hay ( $T_2$ ) (1 kg/head/day) and means

were compared using t-test. All animals were grazing on ruzi grass pasture. The results have revealed that supplementation of cassava hay as anthelmintics replace ivermectin was non significant affected to fecal parasitic egg counts and average daily gain in buffaloes grazing on ruzi grass pasture ( $p>0.05$ ). In addition, fecal parasitic egg counts dramatically declined for both treatment groups with 69.7 and 48.3%, respectively. However, Average Daily Gain (ADG) tended to be higher in swamp buffaloes fed on groups cassava hay ( $T_2$ ) treatments than in those fed concentrate + ivermectin. However, digestion of coefficients of nutrients particularly organic matter was significantly higher in  $T_2$  than those in  $T_1$ . It was, hence concluded that cassava hay could not only provide as a protein source in native cattle but also high efficiency serve as an anthelmintics. (*Pakistan Journal of Nutrition* 8 (5): 568-570, 2009; **doi**: 10.3923/pjn.2009.568.570)

### **Preparation of Fiber and Mineral Enriched Defatted Rice Bran Supplemented Cookies**

Mian K. Sharif, Masood S. Butt, Faqir M. Anjum and Haq Nawaz

Microwave stabilized defatted rice bran was supplemented in commercial straight grade wheat flour @ 10, 20, 30, 40 and 50% supplementation level to prepare fiber and mineral enriched cookies. Cookies were analyzed for physical analysis, dietary fiber, mineral content (Na, K, Ca and Mg) and sensoric attributes to find out the most suitable compositions for commercialization. Overall, rice bran supplementation improved dietary fiber content and mineral profile of the cookies. On the basis of physical analysis and sensoric attributes, it was concluded that defatted rice bran can be substituted upto 10 to 20% in wheat flour to prepare rice bran supplemented cookies without adversely affecting quality attributes. (*Pakistan Journal of Nutrition* 8 (5): 571-577, 2009; **doi**: 10.3923/pjn.2009.571.577)

### **Biochemical Properties of Bacterial Contaminants Isolated from Livestock Vaccines**

Asghar Ali Kamboh, N. Rajput, I.R. Rajput, M. Khaskheli and G.B. Khaskheli

In present study, 40 livestock vaccines were tested for bacterial contaminants. Four different bacterial species were identified from the vaccine samples. The species were *Escherichia coli*, *Pasteurella multocida*, *Bacillus cereus* and *Bacillus subtilis*. Of the 40 livestock vaccines studied, 1 Haemorrhagic septicaemia (H.S) and 2 Anthrax vaccines were found positive for bacterial contaminants, possessing batch numbers 057, 079 and 010 respectively, while 37



samples were observed without any bacterial growth. The percentage prevalence of positive vaccine samples was recorded as 7.5%. The pure contamination was recorded in 1 (33.33%) Anthrax vaccine sample with batch number 079, while 2 (66.67%) samples, 1 H.S and 1 Anthrax with batch numbers 057 and 010 respectively were recorded for mixed bacterial species. During investigating biochemical properties, it was observed that *Escherichia coli* show the positive reaction to catalase and negative to oxidase, urease and indole. While *Pasteurella multocida*, *Bacillus cereus* and *Bacillus subtilis* were positive to catalase and oxidase, while negative to urease and methyl red. (*Pakistan Journal of Nutrition* 8 (5): 578-581, 2009; doi: 10.3923/pjn.2009.578.581)

### **A Comparative Assessment of the Proximate Composition, Ascorbic Acid and Heavy Metal Content of Two Species of Garden Egg (*Solanum gilo* and *Solanum aubergine*)**

Edem, Christopher A., Dosunmu, Miranda I., Bassey, Francisca I., Wilson, Charles and Umoren, Patience

The proximate composition, ascorbic acid and Heavy metal contents of two species of Garden egg, *Solanum gilo* and *Solanum aubergine* were evaluated using chemical analysis. The result of the proximate composition analysis showed that *solanum gilo* fruits had the following composition: moisture (74.80%), carbohydrate (52.13%), crude protein (14.87%), crude fibre (16%), crude fat (7%) and ash (10%). It also contained (93.7%) of ascorbic acid. The *Solanum aubergine* fruits on the other hand contained moisture (94.6%), carbohydrate (58.5%), crude protein (15.75%), crude fat (4%), crude fibre (11.75%) and ash (10%). It also contained (75.9%) ascorbic acid. The Heavy metal concentrations of *Solanum gilo* fruits are Zn (3.81ppm), Cr (1.74ppm), Cd (0.16ppm), Cu (1.48ppm), Co (0.12ppm) and Hg (0.01ppm). The *solanum aubergine* fruits on the other hand contained Zn (1.58ppm), Cr (2.45ppm), Cd (0.77ppm), Cu (0.04ppm), Co (0.10ppm) and Hg (0.01ppm). The concentrations of As and Pb in the fruits of both species were not detected. The result Shows that the values of moisture, ascorbic acid, crude fibre and crude fat were higher in *S. gilo* fruits, while the values of carbohydrate and crude protein were higher in *S. aubergine* fruits. The result also showed that the fruits of both species have same ash content. The result revealed that the concentrations of Zn, Cu and Co were higher in *S. gilo* fruits, while *S. aubergine* fruits has higher values of Cr and Cd. The results also revealed that the concentrations of Cr and Cd in both species of the plant were all above WHO permissible limits of 0.05 ppm and 0.005 ppm, respectively. (*Pakistan Journal of Nutrition* 8 (5): 582-584, 2009; doi: 10.3923/pjn.2009.582.584)

## **A Comparative Evaluation of Heavy Metals in Commercial Wheat Flours Sold in Calabar-Nigeria**

Edem Christopher A., Grace Iniama, Vincent Osabor, Rebecca Etiuma and Matilda Ochelebe

The concentrations of heavy metals in commercial brands of wheat flours sold in Calabar-Nigeria were evaluated using Flame Atomic Absorption Spectrophotometer. The result of the analysis table showed the concentrations of the Heavy metals to be Cd (0.002 mg/kg) Cr (0.012 mg/kg) Cu (0.016 mg/kg) Fe (0.040 mg/kg) Ni (0.006) and Zn (0.019 mg/kg) for Dangote flour samples and Cd (0.0004 mg/kg) Cr (0.006 mg/kg) Cu (0.034 mg/kg) Fe (0.020 mg/kg) Ni (0.060 mg/kg) for Golden penny flour sample. Mn, Pb, As and Hg were not detected in all the samples while Zn was only detected in Dangote flour. The results revealed the heavy metals concentrations to follow the trend Fe > Zn > Cu > Cr > Ni > Cd for Dangote flour and Ni > Cu > Fe > Cr > Cd for Golden Penny flour. Keywords Heavy Metals, Golden Penny, Dangote Wheat flour. (*Pakistan Journal of Nutrition* 8 (5): 585-587, 2009; doi: 10.3923/pjn.2009.585.587)

## **Effects of Protein Level in Concentrate and Urea-Treated Corn Silage on Rumen Ecology and Milk Production in Lactating Dairy Cows**

Sittisak Khampa, Pala Chaowarat, Rungson Singhalert and Metha Wanapat

Four, lactating dairy cows were randomly assigned according to a 2x2 Factorial arrangement in a 4x4 Latin square design to study supplementation of concentrate containing different level of protein at 14 and 18% CP and urea-treated corn silage at 2 and 5% respectively. The treatments were as follows by concentrate containing protein at 14% CP + 2% urea-treated corn silage (T1); concentrate containing protein at 14% CP + 5% urea-treated corn silage (T2); concentrate containing protein at 18% CP + 2% urea-treated corn silage (T3) and concentrate containing protein at 18% CP + 5% urea-treated corn silage (T4), respectively. The animals were offered the treatment concentrate at a ratio to milk yields at 1:2 and urea-treated corn silage were fed *ad libitum*. The results have revealed that total DM intake (%BW) and ruminal pH were not affected ( $p > 0.05$ ). Likewise, the concentration of ammonia-nitrogen ( $\text{NH}_3\text{-N}$ ) and Blood Urea Nitrogen (BUN) were significantly different affected by protein levels in concentrate with urea levels treated corn silage. In addition, rumen microorganism populations such as bacteria, protozoa and fungal zoospores were affected ( $p < 0.05$ ) by different by protein levels in concentrate with urea level treated corn silage. Moreover, the differences

of protein levels in concentrate and urea level treated in corn silage were affected to milk yield and composition ( $p < 0.05$ ), especially income over feed highest in dairy cows were received a concentrate containing protein at 18% CP + 5% urea treated corn silage (T4). Therefore, results from this experiment indicated that the differences of protein levels in concentrate and urea level treated corn silage affected on rumen ecology and milk production in lactating dairy cows. (*Pakistan Journal of Nutrition* 8 (5): 588-591, 2009; doi: 10.3923/pjn.2009.588.591)

### **Supplementation of Malate and Yeast in Concentrate Containing High Cassava Chip on Rumen Ecology in Dairy Steers**

Sittisak Khampa, Pala Chaowarat, Rungson Singhalert and Metha Wanapat

Four, one-year old of dairy steers were randomly assigned according to a 2x2 Factorial arrangement in a 4x4 Latin square design to study supplementation of malate level at 500 vs 1,000 g with yeast (*Saccharomyces cerevisiae*) at 1,000 vs 2,000 g in concentrate containing high levels of cassava chip. The treatments were as follows: T1 = supplementation of malate at 500 g with yeast at 1,000 g; T2 = supplementation of malate at 500 g with yeast at 2,000 g; T3 = supplementation of malate at 1,000 g with yeast at 1,000 g; T4 = supplementation of malate at 1,000 g with yeast at 2,000 g in concentrate, respectively. The animals were offered the treatment concentrate at 1% BW and ruzi grass was fed *ad libitum*. The results have revealed that rumen fermentation and blood metabolites were similar for all treatments. The populations of protozoa and fungal zoospores were significantly different as affected by malate level and yeast. In conclusion, the combined use of concentrate containing high level of cassava chip at 70%DM with malate at 1,000 g and yeast at 2,000 g in concentrate with ruzi grass as a roughage could improved rumen ecology in dairy steers. (*Pakistan Journal of Nutrition* 8 (5): 592-596, 2009; doi: 10.3923/pjn.2009.592.596)

### **Supplementation of Yeast Fermented Cassava Chip (YFCC) as a Replacement Concentrate and Ruzi Grass on Rumen Ecology in Native Cattle**

Sittisak Khampa, Pala Chaowarat, Rungson Singhalert and Metha Wanapat

Ten, one year old of native cattle with initial body weight of  $150 \pm 10$  kg were randomly divided into two groups and received concentrate at 14% CP (T1) and Yeast Fermented Cassava Chip (YFCC) (T2). The cows were offered the treatment concentrate at 1% BW and ruzi grass was fed *ad libitum*. Means were

compared using T-test. All animals were kept in individual pens and received free access to water. The results have revealed that replacement of YFCC on feed intake was non-significantly different, while Average Daily Gain (ADG) was higher ( $p < 0.05$ ) in native cattle fed YFCC (T2) treatments than received concentrate at 14% CP (T1) (259 and 205 g/d). In addition, the ruminal pH, ammonia-nitrogen and blood urea nitrogen concentration were significantly different ( $p < 0.05$ ). Supplementation of YFCC (T2) could improve population of bacteria and fungal zoospore, but decreased populations of *Holotrich* and *Entodiniomorph* protozoa in rumen ( $p < 0.05$ ). The results indicate that supplementation of Yeast Fermented Cassava Chip (YFCC) as a replacement concentrate at 14% CP could improve rumen fermentation efficiency in native cattle. (*Pakistan Journal of Nutrition* 8 (5): 597-600, 2009; **doi**: 10.3923/pjn.2009.597.600)

### **Evaluation of Raw and Boiled Velvet Bean (*Mucuna utilis*) as Feed Ingredient for Broiler Chickens**

C.D. Tuleun, J.P. Patrick and L.O. Tihamiyu

Chemical analysis and a performance trial were carried out to determine the effect of boiling *Mucuna utilis* seeds on their proximate composition, minerals assay and amino acid profile, level of antinutritional factors and blood serum and haematological parameters of finisher broiler chickens. Four types of mucuna seed meal were prepared. Type 1 was prepared from raw seeds, types 2, 3 and 4 were from seeds soaked in water for 24 h and then boiled in water for 20, 40 and 60 min respectively. The four dietary treatments had 20% inclusion of the four types of mucuna seed meal respectively. A four week feeding trial was conducted using one hundred and twenty, five week old, broiler birds averaging 590 gm live weight. Results of the study show that raw mucuna seeds are a good source of nutrients. Increase in boiling time significantly ( $p < 0.05$ ) reduced the crude protein content, phosphorus, iron, selenium, methionine, cystine, lysine, isoleucine, alanine, tyrosine and threonine content. Concentration of antinutritional factors in the seeds were significantly ( $p < 0.05$ ) reduced. Significant ( $p < 0.05$ ) improvements in feed: gain and protein efficiency ratios with a corresponding increase in mean daily weight gain were observed as the boiling time increased. At the end of the experiment, the haematological parameters revealed no significant differences among treatments in the levels of Packed Cell Volume (PCV), Haemoglobin (Hb), Red Blood Cell (RBC) counts, mean corpuscular volume (MCV) and Mean corpuscular Haemoglobin concentration (MCHc). Similarly, albumin, globulin, serum glutamic pyruvic transaminase estimated were found to be insignificantly varied with the exception of total protein. (*Pakistan Journal of Nutrition* 8 (5): 601-606, 2009; **doi**: 10.3923/pjn.2009.601.606)

## **Changes in Chemical Composition of Camel's Raw Milk During Storage**

Rea Haroun Omer and Abdullah Hamid Eltinay

A total of 70 samples of individual dromedary raw milks were collected from different areas in UAE. The milk samples were divided into three portions under sterile conditions the 1st portion stored at 4°C, the 2nd portion stored at 7°C, the 3rd portion stored at room temperature (25-30°C). Samples were examined for pH, acidity, fat, protein, lactose, total solids and ash contents. The results shows that there were significant changes in pH, acidity, lactose, total solids and insignificant changed in fat, protein, during storage. The storage duration of raw camel milk was estimated at 4°C, 7°C and room temperature (25-30°C), the results was 42 days at 4°C, 15 days at 7°C, 3 days, at room temperature. (*Pakistan Journal of Nutrition* 8 (5): 607-610, 2009; doi: 10.3923/pjn.2009.607.610)

## **Optimization of Lactic Acid Production by Lactic Acid Bacteria Isolated from Some Traditional Fermented Food in Nigeria**

I.A. Adesokan, B.B. Odetoyinbo and B.M. Okanlawon

Seven species of Lactic Acid Bacteria (LAB) namely *L. fermentum*, *L. casei*, *L. brevis*, *L. delbrueckii*, *L. acidophilus*, *L. plantarum* and *Leuconostoc mesenteroides* were isolated from ogi, burukutu and retted cassava (fufu). The isolates were screened for quantitative production of lactic acid using normal MRS broth and modified MRS broth under varying conditions of growth such as temperature and pH and influence of carbon and nitrogen sources. It was observed that all the test isolates best utilized glucose and yeast extract at concentrations of 20 g L<sup>-1</sup> and 5 g L<sup>-1</sup> respectively for production of lactic acid at optimum temperature of 30°C and pH of 5.5. *L. plantarum* produced the highest quantity (2.95±0.32 g L<sup>-1</sup>) of lactic acid while *L. delbrueckii* produce the lowest (0.89±0.07 g L<sup>-1</sup>). Lactic acid produced by *L. fermentum*, *L. delbrueckii* and *L. plantarum* had the highest inhibitory activity against pathogenic microorganisms such as *Staphylococcus aureus*, *E. coli* and *Pseudomonas species* with zone of inhibition ranging between 8 and 20 mm. (*Pakistan Journal of Nutrition* 8 (5): 611-615, 2009; doi: 10.3923/pjn.2009.611.615)

## **Suitability of Different Wheat Varieties Grown in NWFP for Bread Making and Effect of Storage Time on Falling Number**

Hamida Abid, Javed Ali and Arshad Hussain

Six commercial wheat varieties (2005-2006 harvest) viz Ghaznavi-98, Auqab, Fakhr-e-Sarhad, Saleem-2000, Khyber 87 and Pirsabak-2005 were tested for physicochemical characteristics and sensory evaluation of bread prepared from these varieties and effect of storage time on the falling number. Changes in the course of one-year storage were evaluated in terms of falling number. It was observed that the physicochemical characteristics of these cultivars were moisture% (14.166, 16.033, 14.93, 14.6, 12.6, 13), Ash% were (1.4, 2, 2, 1.9, 1.6, 1.59), protein % (11.5, 10.7, 11.9, 13.27, 14.5, 15), Gluten index % (8.9, 8.5, 8.4, 9.3, 7.8, 8.7), Fat % (1.9, 1.8, 2.1, 1.8, 1.6, 1.6), Fiber % (3.2, 2.7, 2.8, 2.395, 2.8, 2.7) respectively. The overall acceptability of bread prepared from Khyber-87 and Pirsabak-2005 were obtained the highest score i.e. 7.52 and 6.88 as compared to other cultivars. The average falling number during storage for one year at room temperature the average falling numbers of Ghaznavi-98, Auqab, Fakhr-e-Sarhad, Saleem-2000, Khyber-87 and Pirsabak-2005 were 338.5, 267.0, 264.25, 302.6, 355.4 and 266.9 respectively. (*Pakistan Journal of Nutrition* 8 (5): 616-619, 2009; doi: 10.3923/pjn.2009.616.619)

## **Proximate and Nutrient Investigations of Selected Medicinal Plants Species of Pakistan**

Javid Hussain, Abdul Latif Khan, Najeeb ur Rehman, Zainullah, Farmanullah Khan, Syed Tasleem Hussain and Zabta Khan Shinwari

Eight medicinal plants species were investigated for proximate analysis and micronutrient analysis. These species included *Coriandrum sativum*, *Amomum subulatum*, *Zizphus vulgaris*, *Punica grantham*, *Pistacia vera*, *Mentha sylvestris*, *Sphaeranthus hirtius* and *Cassia angustifolia*. In proximate analysis carbohydrate, protein, fiber, fat, ash and energy values were calculated for the eight species. In comparative assessment of the various species, the results showed that *Pistacia vera* is most significant species having higher concentrations of fat, protein and energy values compared to the other species. In case of micronutrient analysis, fabulous concentration level of Fe was revealed in *Sphaeranthus hirtius*, considerable amount has also been found in *Mentha sylvestris*. The level of Zn

was highest in *Mentha sylvestris* while the concentration of Co was highest in *Sphaeranthus hirtus*. (*Pakistan Journal of Nutrition* 8 (5): 620-624, 2009; doi: 10.3923/pjn.2009.620.624)

### **Oral Administration of Extract from *Curcuma longa* Lowers Blood Glucose and Attenuates Alloxan-Induced Hyperlipidemia in Diabetic Rabbits**

Sarah Nwozo, Oluwatosin Adaramoye and Edith Ajaiyeoba

The biochemical effects of methanol extract of *Curcuma longa* on plasma cholesterol, glucose, protein, triglyceride and creatinine levels were studied in alloxan induced diabetic rabbits. The rabbits were induced by intra-peritoneal injection of alloxan, which was prepared in proportion to the rabbit's body weight and administered per kilogram body weight of each rabbit. The animals were placed into three main groups in this study: normal, diabetic test animals and diabetic control animals. Single doses of plant extracts were used for the respective studies and the biochemical parameters were assessed from day 0 to day 12, on day 3 respectively. The results of plasma glucose levels indicated an increase from 6.6-8.0 g/L in the diabetic rabbits treated with *C. longa* extract, compared to the diabetic control which maintained a level of 6.3 g/L. Creatinine level in the test animals decreased from 264.5-94.6  $\mu\text{mol/L}$  and plasma cholesterol in the test group. However the plant extract only showed a slight decrease in the plasma triglyceride and protein levels of alloxan diabetic rabbits. Polydipsia in untreated in diabetic animals was reduced to normal in those administered the plant extract. *Curcuma longa* could be a possible source of antidiabetic chemotherapeutic agents. (*Pakistan Journal of Nutrition* 8 (5): 625-628, 2009; doi: 10.3923/pjn.2009.625.628)

### **Influence of the Lactating Women Diet on the Concentration of the Lipophilic Vitamins in Human Milk**

Grazyna Duda, Malgorzata Nogala-Kalucka, Wanda Karwowska, Bogumila Kupczyk and Eleonora Lampart-Szczapa

The aim of the study was to assess the intake of vitamins A and E by Polish breast feeding mothers and the correlation between the intake of these vitamins and their concentration in the maternal milk. Dietary intake was assessed by triple 24 h diet recall questionnaire. Milk samples were collected and the content of vitamin A and E was determined. The mean intake of vitamin E ( $7.7 \pm 3.4$  mg/day) covered 54.7% of the recommended value. The mean vitamin A content in daily food

rations (DFR)  $-1012 \pm 735$   $\mu\text{g}$ -allowed to cover 63.2% of the requirement. The mean concentration of vitamin A in milk was  $57.07 \pm 29.3$   $\mu\text{g}/100$  mL. There was a correlation of the content of vitamin A in milk and the intake of this vitamin ( $r = 0.371$ ) and the intake of essential fatty acids ( $r = 0.455$ ) also. The mean concentration of the vitamin E in the milk ( $413.1 \pm 194.4$  mg/100 mL), statistically significant correlated with its intake in DFR ( $r = 0.483$ ). DFR of breast-feeding mothers, were characterized by insufficient supply of vitamins A and E. The dietary intake of these vitamins correlated with their concentration in maternal milk. (*Pakistan Journal of Nutrition* 8 (5): 629-634, 2009; doi: 10.3923/pjn.2009.629.634)

### **Effect of Replacement of Barley Grains by Wasted Bread Crumbs or Rejected Dates on Growth Performance and Carcass Traits of Growing Rabbits**

S.A. AL-Shami and T.A. Mohammed

Thirty five 10 weeks of age white New Zealand rabbits were assigned to investigate the effect of partial and complete replacement of barley grains by Wasted Bread Crumbs (WBC) or Rejected Dates (RD) on growth performance and carcass traits of growing rabbits. The rabbits were allotted into seven groups (5 rabbits per each). Seven diets were formulated, the control (No. 1) based on barley grains as the main energy source and the tested alternative energy sources (WBC and RD) replaced 33.33, 66.66 and 100% from the barley quantity of the control to formulate 6 diets respectively. The diets were offered for 40 days. The results indicated that WBC inclusion (15 or 30%) reduced ( $p > 0.05$ ) body weight, Daily Body Gain (DBG), Daily Feed Intake (DFI) and deteriorated Feed Conversion (FCR), Protein Efficiency Ratio (PER) and Efficiency of Energy Utilization (EEU) when compared with control, however, the higher inclusion level of WBC reduced ( $p < 0.05$ ) DBG and improved FCR, PER. On the other hand, RD addition at different levels decreased ( $p < 0.05$ ) DBG, increased DFI and deteriorated ( $p < 0.05$ ) FCR, PER, EEU and PI when compared with the control. The data revealed that WBC was more efficient, resulted in good and higher growth performance and rabbits utilized it better than RD. Both WBC and RD reduced dressing % and increased head and viscera relative weights when compared with the control while, WBC reduced ( $p > 0.05$ ) abdominal fat relative weight and RD increased ( $p > 0.05$ ) abdominal fat relative weight. Both WBC and RD had no effect on chemical composition of rabbit's meat. The data indicated that WBC posses good energy source at different levels for rabbit feeding while RD were less fit and require further investigation. (*Pakistan Journal of Nutrition* 8 (5): 635-641, 2009; doi: 10.3923/pjn.2009.635.641)



## **Effect of Essential Oils Supplementation on Growth Performance, Nutrient Digestibility, Health Condition of Holstein Male Calves During Pre- and Post-Weaning Periods**

M.A. Soltan

One hundred Holstein male calves were assigned to investigate the effect of essential oil mixture (eucalyptus oil, menthol crystal, mint oil) supplementation in milk replacer (0, 94, 187 and 281 mg/calf/day) during the 8 weeks (pre-weaning period) and in drinking water (0, 15.6, 31.2 and 46.8 mg/liter) for the next 16 weeks (post-weaning period) on growth performance, nutrient digestibility, health condition as well as on some blood serum parameters. Calves receiving 94, 187 and 271 mg EOM/calf/day during pre-weaning period had lower ( $p>0.05$ ) concentrate intake across the whole period by about 6.1, 6.1 and 1.2% respectively when compared with control but had no effect on roughage intake while reduced the total dry matter intake across the whole pre-weaning period by about 3.6, 3 and 1.2% respectively although, EOM had no effect on body gain and improved feed conversion ratio. EOM improve nutrient digestibility and increase total protein and albumin concentrations in the blood serum. Moreover, EOM treatment reduced the incidence of diarrhea, reduces the average number of diarrheic days and improves the general health score compared with the control. Although there were bad effects of the higher doses of EOM supplementation on health, it can be concluded that the supply of EOM reduced the necessity of antibiotics treatments against digestive and respiratory diseases. On the other hand, during post-weaning period it was clear from this study that calves administrated 15.6 mg of EOM/liter of drinking water may increase daily body gain, reduced feed intake and improved FCR by about 3.8, 3.2 and 8.15% respectively when compared with control while, the higher dose of EOM administration less effective and uneconomical to be used. (*Pakistan Journal of Nutrition* 8 (5): 642-652, 2009; *doi*: 10.3923/pjn.2009.642.652)

## **Socio-Economic Aspects Influencing Food Consumption Patterns Among Children under Age of Five in Rural Area of Sudan**

Muna A. Abdalla, Saad A. Sulieman, Abdullahi H. El Tinay, Abdul Gader H. Khattab

A secondary analysis of data for 150 children under the age of five was carried out in three villages of El Fau rural area of Gadarif state. The community mainly consists of farmers of a semi nomadic nature who own different sizes of herds and

agricultural lands; they are the farmers of the Arabic pedigree. The rest of the community is workers from western Sudan, who were brought from their original areas to enhance the nomadic settlement strategy of the Sudanese government in the mid seventies. These worker groups comprise of different tribes namely *Tama*, *Hawsa*, *Birgid*, *Masalet* and *Folany*. Farming is the major activity practiced almost by all the community members and the government controls the farming system. The study was carried out to investigate some of the social and economic factors, which have a direct and indirect effect on feeding patterns and nutritional status of children under age of five. Mothers were interviewed with a semi-structured questionnaire, about the social norms affecting both mother and child's nutritional and health status, in addition to the feeding habits of the children (including breastfeeding and weaning practices). In addition, information was collected about the socio-economic status of the family. The income of the family was assessed. The results revealed low parental education (76.7% of the mothers and 54.0% of the fathers are illiterate), socioeconomic-demographic factors and poor nutrition of knowledge of mothers as well as and feeding practices led to the prevalence of nutritional anaemia (65.3% of the children with haemoglobin concentration of 50% or below) in addition to the prevalence of wasting, where 6% of the children are moderately malnourished and 3.3% of them are severely malnourished. It is recommended that an improvement in societal infrastructure, better maternal education and nutrition are needed to maintain the children's nutritional status in several rural areas of Sudan. (*Pakistan Journal of Nutrition* 8 (5): 653-659, 2009; doi: 10.3923/pjn.2009.653.659)

### **Extent of Awareness and Food Adulteration Detection in Selected Food Items Purchased by Home Makers**

Nidhi Gupta and Priti Panchal

Food is essential for sustenance of life. Adulteration of food cheats the consumer and can pose serious risk to health in some cases. The present study was planned with the main objective of identifying buying practices of homemakers and their extent of awareness related to selected food products. Stratified sampling method with questionnaire cum interview schedule was adopted to collect data. Tool was standardized by difficulty index, validity index and split half reliability method. Statistical test such as chi-square between awareness and occupation, t-test among age group, educational level and extent of awareness were carried out. Study revealed that respondent's awareness related to rights and responsibilities was good but poor related to food adulteration. Education, family income and occupation had an effect on extent of awareness. Age and awareness has no correlation while a positive correlation was found between family income and

awareness. This research paper is the part of the work carried out under the project funded by University Grant Commission, India. (*Pakistan Journal of Nutrition* 8 (5): 660-667, 2009; doi: 10.3923/pjn.2009.660.667)

### **Taro Cocoyam (*Colocasia esculenta*) Meal as Feed Ingredient in Poultry**

Mohammed Abdulrashid and Leonard Nnabuenyi Agwunobi

Ninety six broiler chickens at four weeks of age were randomly allotted in groups of 12 to the eight experimental diets with three replicates in each treatment and four birds per replicate. The dietary treatment contain 0% 25%, 50% and 100% Cocoyam meal. Taro comprised of raw sundried and boiled sundried forms. There was a significant difference ( $P < 0.05$ ) in feed conversion with a linear decrease in boiled taro cocoyam meal as substitution levels of inclusion increased. Higher amounts of feed intake were achieved at 50% inclusion levels. Body weight gain decreases linearly ( $P > 0.05$ ) with increase in Cocoyam meal inclusion levels. The cost of daily feed intake differ significantly ( $P < 0.05$ ) in raw taro cocoyam meal. The levels of some antinutritional factors were also determined in both raw and boiled, sundried taro cocoyam. Boiling reduced ( $P < 0.05$ ) the amounts of the antinutritional factors in the taro cocoyam meal. It was also observed that birds on 100% raw sundried taro passed more watery dropping than those on boiled. In the CCYM, the value for proventriculus, crop and all other cuts parts are significantly higher ( $P < 0.05$ ) as compared with the control. The values of live weight, dressed weight and Eviscerated weight for the cocoyam diet is relatively lower than the control, may be due to effects of antinutritional factors present in cocoyam diets. Thus proper processing of cocoyam meal will effectively replace maize at 25% (raw sundried) and 50% (boiled sundried) as a major source of energy in diets of broiler finishers. (*Pakistan Journal of Nutrition* 8 (5): 668-673, 2009; doi: 10.3923/pjn.2009.668.673)

### **Effect of Dietary Protein Levels on Growth Performance and Body Composition of Monosex Nile Tilapia, *Oreochromis niloticus* L. Reared in Fertilized Tanks**

Mohamed H. Bahnasawy

Juvenile monosex Nile tilapia (*Oreochromis niloticus*) were fed four dietary protein levels (17%, 25%, 30% and 35%) to investigate their effects on growth performance, carcass composition and survival rate. The experiment was carried

out in concrete tanks (2.9m x 1.4m x 1m), stocking each tank with 160 fish (50 fish/m<sup>3</sup>). The diets were offered to the fish (2.5±0.1g average initial weight ) at a level of 3% of body weight, six days a week for 180 days. In addition to the experimental diet, inorganic fertilizer was added to each tank at a rate of 6.8 mg/l of premix superphosphate and urea. The results showed that a significant effects of dietary protein on growth performance of the reared fish. Weight gain and specific growth rate increased significantly with increasing dietary protein levels between 17% and 30%. but, 35% crude protein showed insignificant increase in growth parameters. The protein efficiency ratio was inversely correlated with dietary protein levels. The protein content of the fish muscle increased with increasing dietary protein level while the lipid content decreased. The diet had no significant effect on survival rate of the fish. From the present results, diet containing 30% crude protein is considered optimal for growth of monosex Nile tilapia, under the present experimental conditions and it is recommended for feeding monosex tilapia juveniles. (*Pakistan Journal of Nutrition* 8 (5): 674-678, 2009; **doi**: 10.3923/pjn.2009.674.678)

### **Dietary Iron Consumption and its Relation with Stress Symptoms of Adolescents**

Saime Küçükkömürler and Fatma Arpacı

The aim of this study is to investigate dietary iron consumption and its relation with stress symptoms of healthy adolescents. 39 voluntary and healthy university students from Ankara, Turkey at the age of 19-25 were included in the study. Nutrient intake of the volunteers was estimated from 24 h recall and averaged for 3 days and then adolescents were divided into two groups according to iron amounts they consume. The calculations also reveal the fact that dietary iron level of 92.3% of adolescents is low. A questionnaire containing stress symptoms was applied following the day when nutrients were recorded. Finally the relation of the stress symptoms and iron consumption was analyzed with t test. The results of the t test show that psychological stress change significantly according to the level of iron ( $p>0.05$ ). Average scores of the adolescents having a normal level of iron (46.33±12.98) was lower compared to those having a low level of iron (46.33±12.89). It was determined that there was no significant difference between stress symptoms experienced by normal and low lever dietary iron consumers ( $p>0.05$ ). Though it was expected that stress symptom experience of adolescents were affected by dietary iron levels no significant evidence for this was experienced. For further experiments, groups including high and low dietary iron consumption or larger groups are suggested for more precise results. (*Pakistan Journal of Nutrition* 8 (5): 679-683, 2009; **doi**: 10.3923/pjn.2009.679.683)

## **Evaluation of Chemical Composition and Yield of Mozzarella Cheese Using Two Different Methods of Processing**

O.A.O. El Owni and Sana, E. Osman

Two Mozzarella cheese making methods, Kosikowski (1982) and the modified method practiced by Khartoum Dairy Products Company (KDPC) were evaluated for their efficiencies in term of chemical composition and yield. In a comparison study; using fresh whole cow's milk; two experiments were conducted. In experiment one the cheese was manufactured according to the method described by Kosikowski (1982). While in experiment two the modified method practiced in Khartoum Dairy Product Company (KDPC) Ltd. was used. In Kosikowski (1982) method, pasteurized milk was used. Starter culture (0.5%) was added and renneting at 32.2°C, cooling and whey drainage overnight; were practiced in this method. In the modified method, raw milk was used. Starter culture (1%) and rennet were added at 38.5°C. The results showed that, fresh Mozzarella cheese; using Kosikowski (1982) method had the following means composition, fat 27.25%±0.82; protein 20.06%±0.65; total solids 51.42%±1.32; moisture 48.59% ± 1.32; titratable acidity 0.66% ± 0.02; ash 2.25±0.07%; lactose 1.59±1.35% and yield 13.2%. However, the mean compositions in modified method were: fat 25.71%±2.30; protein 23.33%±2.1; total solids 54.52%±2.84; moisture 45.48%±2.85; titratable acidity 0.58%±0.09; ash 2.38%±0.41; lactose 2.64% ±0.73 and yield 11.65%. Cheese batches in experiment two showed a decrease in fat, protein and ash content after storage for seven days at -18°C and 4°C. (*Pakistan Journal of Nutrition* 8 (5): 684-687, 2009; *doi*: 10.3923/pjn.2009.684.687)

## **Production and Sensory Evaluation of Tigernut Beverages**

Rita E. Sanful

The acceptability of roasted and non-roasted tiger nut beverages has been investigated. Forty panelists were used in the sensory evaluation study. The panelists compared the two beverages on the bases of mouth feel, texture, taste, aroma, consistency, appearance and general acceptability. Correlation analysis of the results showed that although the texture, aroma, appearance and consistency were important for consumers, mouth feel and taste were more important for the overall acceptance of the beverages. The mouth feel of the non-roasted tiger nut beverage was more acceptable than that of the roasted tiger nut beverage. The taste of the roasted tiger nut beverage, however, was more acceptable to the

panelists than that of the non-roasted tiger nut beverage. General preference is given to the roasted tiger nut beverage. (*Pakistan Journal of Nutrition* 8 (5): 688-690, 2009; *doi*: 10.3923/pjn.2009.688.690)

### **Assessment of Nutritional Status of School Children in Makurdi, Benue State**

Amuta, Elizabeth Une and Houmsou, Robert Soumay

This study was conducted to assess the nutritional status of school aged children (6-17 years) in Makurdi, capital of Benue State-Nigeria. Compared to NCHS/WHO standard, mean BMI (body mass index) of school children in Makurdi was inferior at all ages. The prevalence rate of undernutrition was (50.66%) and schools located in the slum parts of Makurdi (C.A.C wadata and L.G.E.A Wurukum) recorded the highest rate of undernutrition with (78.33%) and (73.33%) respectively. Males recorded a relatively high rate of undernutrition 162 (57.44%) than females 142 (44.65%). The study reveals that the average of school child in Makurdi is undernourished. Poor nutrition of children do not only affects the cognitive development of children but also likely to reduce the work capacity in future. (*Pakistan Journal of Nutrition* 8 (5): 691-694, 2009; *doi*: 10.3923/pjn.2009.691.694)

### **Rumen Fermentation Characteristics and Lactation Performance in Dairy Cows Fed Different Rumen Protected Soybean Meal Products**

M.A. Soltan

One hundred lactating Holstein dairy cows were assigned to investigate the effect of untreated Soybean Meal (SBM) by different treated SBM products; heat+ soy hulls addition (HS), extrusion treatment (EP), addition of tannin plant extract and essential oil (PA) or addition of tannin plant + pelleting (HPA) on rumen fermentation, milk production and composition of dairy cows from 17<sup>th</sup>-25<sup>th</sup> after calving. Basal experimental diet was formulated (containing untreated SBM) and used as control, SBM was replaced by four treated SBM products and fed to the five groups (20 cows per each). Solvent extracted untreated SBM exhibited greater effective degradability of CP and AA when compared with treated SBM products (HS, EP, PA or HPA). This was due to a greater fraction of soluble protein. Moreover, treated SBM products (HS, EP, PA and HPA) contained

relatively low concentrations of lysine, arginine, histidine, alanine, proline, serine, aspartic acid and glutamic acid in different levels compared with SE product which suggesting binding and cross linking reactions involving these AA as a result of the treatment methods. Treated SBM feeding instead of untreated one had no effect ( $p>0.05$ ) on dry matter intake while, improved milk production and milk-to-feed ratio across the whole experimental periods by about (2.2, 1.9, 3.2 and 4.4%) and by (2.5, 1.9, 3.8 and 4.4%) respectively. Moreover, treated SBM reduced ( $p<0.05$ ) the concentrations of ruminal  $\text{NH}_3\text{-N}$  by about 8.5, 7.8, 13.2 and 13.2% respectively, while had no effect ( $p>0.05$ ) on total VFA, acetate, butyrate concentrations and slightly decreased propionate in the rumen when compared with cows fed on untreated SBM containing diet. Regarding blood serum units treated SBM had no effect ( $p>0.05$ ) on blood serum glucose concentration, however cows fed on diets containing EP, PA and HPA treated SBM instead of untreated SBM showed a reduction ( $p<0.05$ ) in blood urea N by about 4.9, 6 and 7.7% respectively, on the other hand HS treated SBM leading to non significant ( $p>0.05$ ) reduction in blood urea N by about 3.8%. Treated SBM products increased milk fat percentage, fat yield and protein yield and had no effect on milk lactose percentage and the present study suggested that HS and EP treatment methods of SBM is less effective and the cow performance lesser respond than PA or HPA methods which depend on tanniferous plant species that protect protein from degradation in the rumen due to presence of small amounts of condensed tannin in the plant species and may be more available and digestible in the intestine more than the previous processing. (*Pakistan Journal of Nutrition* 8 (5): 695-703, 2009; *doi*: 10.3923/pjn.2009.695.703)

### **Microbial Quality Assessment Study of Branded and Unbranded Milk Sold in Peshawar City, Pakistan**

Hamida Abid, Javed Ali, Mohammad Waqas, Yasir Anwar and Javed Ullah

Four brands of commercially milk samples and unpasteurized milk, produced by farmers collected from Peshawar City (NWFP). These samples and samples of sterilized milk treated with ultra-high temperature (UHT) process, were microbially examined. The average minimum TPC of raw milk were  $7.05 \times 10^4$ cfu/ml and maximum were  $3.5 \times 10^6$ cfu/ml, minimum average coliforms were 16.65MPN/ml and average maximum 132MPN/ml, maximum fecal coliforms were 7.65MPN/ml and minimum value =0.3MPN/ml, *E. coli* O157:H7 were isolated from all samples except S7, Salmonella were also isolates from all raw milk samples, average maximum yeast and mould were  $4.3 \times 10^6$ cfu/ml and

minimum were  $3 \times 10^4$  cfu/ml. Storage life study of branded milk at 4°C, 25°C and 35°C for TPC were indicate that after 45 days TPC were increases and at the end of 90 days TPC were decreases, but in some cases it increases. All above microbes can have a hazardous effect on human body, unpasteurized milk sold by farmers showed a very high total viable count which indicates serious faults in production hygiene, unsatisfactory sanitation and unsuitable storage temperature. On contrast, the UHT milk produced by modern dairies showed a very high quality of microbial standard with a very delicate flavor. (*Pakistan Journal of Nutrition* 8 (5): 704-709, 2009; **doi:** 10.3923/pjn.2009.704.709)

### **Effect of Palm Oil Supplementation on the Milk Yield and Composition of Dromedary She Camels**

Soliman N. Al-Dobaib

Three diets were formulated according to percentage of palm oil added (C, control 0%; D1, 1.5%; D2, 3%) and offered to nine adult milking she camels. Camels were randomly allotted into three diets (3 animals each) and each diet shifted in three periods. Each period was splitted into 2 weeks for acclimatization and 2 weeks for data collection. Camels were machine milked twice a day (morning and afternoon). Animals were individually fed since feed and water were offered as free choice. Daily feed intake, milk yield and milk chemical composition were recorded. Obtained results showed significant effect of diets on daily feed consumption and daily milk yield. Adding palm oil in the diet resulted in a significant decrease in feed consumption (8.79, 7.94 and 7.05 kg/day for C, D1 and D2, respectively). Likewise, daily milk yield decreased significantly in treated females (2.89, 2.79, 2.46 kg/day for C, D1 and D2, respectively). Supplementing diets with palm oil at 1.5 and 3% didn't affect milk composition (total solids, moisture, solid not fat, ash, fat, protein and lactose). Although, slight, but not significant increases in percent of milk fat (2.82, 3.02 and 3.01% for C, D1 and D2 respectively) were obtained, animals exhibited significant individual variations in milk composition. Addition of palm oil didn't significantly influence milk calcium, sodium, potassium, phosphorus, magnesium, ferrous, manganese, zinc and sulphur. However, copper increased at D2 diet (4.76 ppm) than at control and D1 (3.04 and 3.31 ppm, respectively). It can be concluded that supplementing diets of milking she-camels with palm oil at the tested levels in this study caused a reduction in feed intake and milk yield but did not affect their milk composition except for a significant increase in the concentration of copper in camels that received 3% palm oil. (*Pakistan Journal of Nutrition* 8 (6): 710-715, 2009; **doi:** 10.3923/pjn.2009.710.715)



## **Antioxidant Potential of the Young Leave Methanolic Extract of *Magnifera Indica* in Alloxan Induced Diabetic Rat**

M. Ugbenyen Anthony, A. Odetola Adebimpe and K.E. Ekpo

The study was designed to investigate the antioxidant potential of *Magnifera indica* young leave methanolic extract in alloxan induced diabetic rat. Albino rats each weighing 100-200g were given a peritoneal injection of 120mg of Alloxan per kg body weight. After 7 days the blood glucose level of the animals were checked to ascertain a diabetic state. Those that were diabetic were selected for the study. Significant increase ( $p < 0.05$ ) in lipid peroxidation and reduction in reduced glutathione (GSH), superoxide dismutase (SOD) and catalase (CAT) was observed in the serum, liver, kidney and heart of diabetic rats as compared to the normal control. Administering *Magnifera indica* young leave extract significantly reduced ( $p < 0.05$ ) lipid peroxidation and elevated the level of GSH, SOD and CAT in serum, liver, kidney and heart of diabetic rats compared to untreated diabetic rats. These findings indicate that *Magnifera indica* young leave extract can reduce free radical mediated oxidative stress to cells in experimental diabetes mellitus. (*Pakistan Journal of Nutrition* 8 (6): 716-720, 2009; doi: 10.3923/pjn.2009.716.720)

## **Pattern of Dietary Intake among Newly Diagnosed Type 2 Diabetic Subjects with Hypercholesterolemia**

Shirin Jahan Mumu, Farzana Saleh, Fadia Afnan, Afroza Akhter and Kazi Rumana Ahmed

Understanding the pattern of dietary intake of the diabetic subjects with hypercholesterolemia may help to develop specific intervention for this group of subjects. The aim of this study was to assess the dietary intake of Bangladeshi type 2 diabetic subjects with hypercholesterolemia. It was a descriptive cross-sectional survey. One hundred eleven newly diagnosed type 2 diabetic subjects (male 61%, female 39%, age  $45 \pm 9$  years, BMI  $24 \pm 4.8$  Kg/m<sup>2</sup>, mean  $\pm$ SD) with hypercholesterolemia (fasting plasma total cholesterol  $> 200$  mg/dl) were selected from the Out-Patient Department of BIRDEM by purposive sampling method. The daily intake of macro- and micro-nutrients was assessed by 24 h recall method and seven-day food frequency questionnaire was used for identifying the dietary sources. Average total energy intake was 1300 kcal/day and total carbohydrate, protein and fat consumption was 216.63 g/day, 57.19 g/day and 42.59 g/day respectively. Total fat consumption was 29.3% of total energy intake, with

saturated fatty acid 5%, monounsaturated fatty acid 11.51% and polyunsaturated fatty acid 9.71% of total energy. Dietary cholesterol intake was 96.31 mg/day. Total intake of fat, saturated fatty acid and cholesterol were higher compared to MUFA, PUFA and fiber intake. About 9% of patients did not include vegetables for a single time in their meal and dietary fiber intake was very low (4 g/day). Based on these preliminary findings, it may be suggested that active and effective dietary intervention is essential for preventing diabetes and hypercholesterolemia. (*Pakistan Journal of Nutrition* 8 (6): 721-724, 2009; doi: 10.3923/pjn.2009.721.724)

### **Development and Evaluation of Weaning Foods from Pigeon Pea and Millet**

J.C. Onweluzo and C.C. Nwabugwu

Weaning foods were formulated by complementing millet with pigeon-pea after sprouting and fermentation pre-treatments. Products were evaluated for composition and functional properties. Nutritional quality was evaluated by animal feeding experiment using 36 weanling male Wister rats (45-55g). Untreated composite, commercial weaning food (Cerelac) and casein diet served as controls. Sprouted pigeon pea and sprouted millet (SPSM) composite had high crude and true proteins which compared with protein of casein diet but differed ( $p \leq 0.05$ ) from the protein content of other diets. Calcium and iron in all formulated diets except SPSM compared with the levels in commercial diet. Viscosity was lower ( $p \leq 0.05$ ) in formulated diets (200-209cps) than in commercial control (303cps). Fermented pigeon-pea and fermented millet (SPFM) and sprouted pigeon-pea and fermented millet (SPFM) diets gave highest ( $p \leq 0.05$ ) weight gain (113.51 g and 123.42 g), PER (2.15 and 2.02), BV (70.7 and 76.2) and NPU (70.13 and 74.57), respectively thus suggesting their superiority over other diets. Diets FPSM and SPFM promoted growth better than other formulated diets. (*Pakistan Journal of Nutrition* 8 (6): 725-730, 2009; doi: 10.3923/pjn.2009.725.730)

### **Production and Evaluation of Porridge-Type Breakfast Product from *Treculia africana* and Sorghum Bicolor Flours**

J.C. Onweluzo and O.M. Nnamuchi

Porridge-type breakfast products were prepared by blending boiled and fermented (24 h) *Treculia africana* and fermented (24 and 48 h) sorghum flours in 80:20, 70:30, 60:40 and 50:50 ratios. Products were evaluated for composition,

functional properties and sensory acceptability. A commercial indigenous porridge-type product (Ogi dawa), served as the control. Products contained 14.24%-15.75% crude protein, 4.09%-6.00% ether extract and an average metabolizable energy of 1.8 KJ. Fermented *Treculia africana* products had higher ( $p \leq 0.05$ ) soluble carbohydrate and water uptake than other products. The formulated products exhibited lower ( $p \leq 0.05$ ) apparent viscosity than equal concentration of the control. Residual anti-nutrients, tannin, phytate, cyanide and lectin were generally low in the products. Blend of 50:50 boiled *Treculia africana* and fermented (24 h) sorghum product was least preferred. All blends of fermented *Treculia africana* products except 50:50 ratio had high ( $p \leq 0.05$ ) scores for mouthfeel, colour and appearance. All formulated products had higher nutrient density than the control. (*Pakistan Journal of Nutrition* 8 (6): 731-736, 2009; doi: 10.3923/pjn.2009.731.736)

### **Fermentation of Millet (*Pennisetum americanum*) and Pigeon Pea (*Cajanus cajan*) Seeds for Flour Production: Effects on Composition and Selected Functional Properties**

J.C. Onweluzo and C.C. Nwabugwu

The effects of period of fermentation on the chemical composition and selected functional properties of millet (*Pennisetum americanum*) and Pigeon pea (*Cajanus cajan*) seed flours were examined. The fermentation time ranged from 24-96 h. Flours of the unfermented seeds served as controls. Fermentation for 24 h decreased ( $p < 0.05$ ) crude protein in both millet and pigeon pea flours. At 72 h, significant increase ( $p < 0.05$ ) in crude protein occurred in pigeon pea. Ether extract and metabolizable energy increased ( $p < 0.05$ ) in both flours at 72 h fermentation. Apparent decreases ( $p > 0.05$ ) occurred in the total ash of both flours with increase in fermentation time except at the 96 h of pigeon pea. Tannin level was lowest in both flours at 72 h. Significant ( $p \leq 0.05$ ) decreases in cyanide occurred in pigeon pea from the 24 h and was lowest at the 72 h. Phytate was low in both flours. A 10% (w/v) gruel of millet and pigeon pea flour exhibited 363 cp and 380 cp apparent viscosity respectively at 72 h fermentation. Significant ( $p < 0.05$ ) reduction in water absorption capacity occurred only at the early stages (24 and 48 h) of fermentation in millet. Water Solubility Index increased in both flours with increase in fermentation period while reconstitution time reduced significantly ( $p < 0.05$ ). Least gelation concentration increased by 100% in pigeon pea at 48 h and 72 h. Fermenting for 72 h seem to offer some advantages over other periods. (*Pakistan Journal of Nutrition* 8 (6): 737-744, 2009; doi: 10.3923/pjn.2009.737.744)

## **Beneficial Effects of Rutin and Vitamin C Coadministration in a Streptozotocin-Induced Diabetes Rat Model of Kidney Nephrotoxicity**

Mohammed A. Alsaif

The aim of this study was to examine the possible antinephrotoxic activity of rutin (vitamin P) and vitamin C in kidney of streptozotocin (STZ)-induced diabetic rats. Oral administration on rutin (100 mg/kg), vitamin C (200 mg/day) and their combination (50 and 100 mg/kg) for 5 weeks on body and kidney weights and the levels of serum glucose, insulin and creatinine in normal and STZ-induced diabetic rats were evaluated. Reactive Oxygen Species (ROS), Malondialdehyde (MDA), reduced glutathione (GSH), oxidized glutathione (GSSG) concentrations and Glutathione Peroxide (GPx), Superoxide Dismutase (SOD) and Catalase (CAT) activities were estimated in kidney. Body weights decreased and kidney weights increased significantly ( $p < 0.001$ ) in diabetic rats and those changes were more significantly reduced in the combined treatment group. Abnormal levels of glucose and insulin in diabetic rats were more normalized in the coadministered group. ROS and MDA concentrations were significantly ( $p < 0.001$ ) increased in diabetic rats. The treatments with rutin, vitamin C and their combination to the diabetic rats significantly decreased the elevated ROS and MDA levels in kidney compared to diabetic control rats. The ratio of GSH/GSSG was significantly reduced in diabetic rats and these changes were rectified significantly ( $p < 0.001$ ) by the combined vitamins treatments. GPx and CAT were decreased while SOD was increased in diabetic rats, however, these activities were bring back to normal in combined treated animals. In conclusion, long-term treatment with these vitamins particularly in combination as diabetic maintenance therapy may consequently control or prevent the development of diabetic complications especially diabetic nephropathy. (*Pakistan Journal of Nutrition* 8 (6): 745-754, 2009; doi: 10.3923/pjn.2009.745.754)

## **The Use of Tiger-Nut (*Cyperus esculentus*), Cow Milk and Their Composite as Substrates for Yoghurt Production**

Rita E. Sanful

Yoghurt was produced from skimmed cow milk and tiger nut milk. The pH of the yoghurt was found to increase with increasing tiger nut milk in the composite. From

the comparison made of the sensory attributes of the three samples of yoghurt composite, the yoghurt produced from the combination of cow milk and tiger nut milk had the highest mean score in all the parameters even though the difference between the means of cow milk-tiger nut composite and that of pure cow milk was insignificant. Thus the result of the sensory evaluation revealed that yoghurt from pure cow milk and the composite (tiger nuts milk and cow milk) were rated alike in almost all the quality attributes indicating the feasibility of adding tiger nut to cow milk in the production of cheaper and nutritious yoghurt. (*Pakistan Journal of Nutrition* 8 (6): 755-758, 2009; **doi**: 10.3923/pjn.2009.755.758)

### **Biochemical, Microbial and Processing Study of *Dèguè* a Fermented Food (From *Pearl millet dough*) from Burkina Faso**

Fatoumata Hama, Aly Savadogo, Cheik A.T. Ouattara and Alfred S. Traore

*Dèguè* was a traditional fermented food (*pearl millet dough*) which consumed in Burkina Faso. In this work, the traditional processing of pearl millet into *dèguè* was investigated in 18 traditional production units. This study was followed in Ouagadougou and Bobo-Dioulasso. The main steps of diagram of production were dehulling, winnowing, washing, drying, milling, sieving, kneading, cooking, pounding, shaping and fermentation. Before fermentation, crude protein, crude fat, ash, starch and carbohydrates content were respectively 5.43; 3.00; 1.13; 33.37 and 41.81%. After 72 hours of fermentation only protein content (6.12%) was increased; starch content was (23.6%) decreased. pH and titratable acidity were respectively 6.75 and 0.12 before the fermentation and after 72 hours pH (4.49) was decreased and titratable acidity (0.57 g of 100 grams of lactic acid) was increased. Microbiology analyses indicated that the number of lactic acid bacteria, yeasts and moulds increased during the course of fermentation. The number of coliforms was decreased slightly after 72 hours of fermentation. (*Pakistan Journal of Nutrition* 8 (6): 759-764, 2009; **doi**: 10.3923/pjn.2009.759.764)

### **Chemical and Functional Properties of Full Fat and Defatted *Cassia fistula* Seed Flours**

A.I. Akinyede and I.A. Amoo

A relatively unknown leguminous (*Cassia fistula*) seeds were processed to full fat and defatted seed flours and the chemical and functional properties of seed flour

were investigated using standard methods. Results showed the following respective values for FCF and DCF: Fat 6.68 and 0.39%, ash 4.52 and 4.71%, protein 26.25 and 28.09%, fibre 7.47 and 7.68%, carbohydrate 49.80 and 53.44%, moisture content 5.28 and 5.69%. The respective mineral contents (mg/kg) were P 1.52 and 1.76, Zn 270.67 and 241.82, Fe 179.529 and 242.50, Mn 37.21 and 41.73, Mg 947.38 and 896.00, Na 118.42 and 145.31, Ca 924.99 and 1001.20, K 837.61 and 899.18. The respective phytic acid and tannin contents were 0.26 and 0.21%; 7.70 and 8.18%. The water absorption capacity, oil absorption capacity, emulsion capacity, least gelation capacity, foaming capacity and foaming stability (after 4 hours) of FCF and DCF were: 512 and 558%, 216.20 and 218.08%, 40 and 20%, 10 and 8% (m/v), 33.33 and 37.25%, 27.45 and 29.49% respectively. The protein solubility of FCF and DCF was least between pH 4 and highest between pH 7-10. Defatting significantly influenced the chemical composition and functional properties of CF. (*Pakistan Journal of Nutrition* 8 (6): 765-769, 2009; doi: 10.3923/pjn.2009.765.769)

### **Ultrastructural Changes in Hepatopancreas of *Palaemon serratus*, Following Treatment with Petroleum Carcinogenic Compounds**

Nabila E. Abdelmeguid, Hassan E. Awad, Ahmed M. Ibrahim and Nabiha A. Yousef

The aim of this study was to determine the effects of Polyaromatic Hydrocarbons (PAHs) on the fine structure of the hepatopancreas of *Palaemon serratus*. For this purpose, shrimps were intramuscularly injected with sublethal dose ( $100 \text{ ng } \mu\text{L}^{-1}$ ) of perylene, christen and benzo (a) pyrene. Samples of hepatopancreas were then taken for electron microscopic examinations (three weeks postinjection). Ultrathin sections revealed that the exposure changed the structure of hepatopancreatic epithelial cells (R- and F-cells) in perylene and christen injected specimens. However, benzo (a) pyrene treated group was less affected. Major changes observed in the hepatopancreatic cells included thickening and folding of basal lamina, distorted microvillous border, condensation and margination of heterochromatin, dilation and fragmentation of RER, well-developed lysosomal compartment and swelling mitochondria. Such ultrastructural changes could serve as a useful research tool and a general biomarker in studies of toxic stress in aquatic habitat. (*Pakistan Journal of Nutrition* 8 (6): 770-781, 2009; doi: 10.3923/pjn.2009.770.781)

## **Analytical Studies on the Gum Exudates from *Anogeissus leiocarpus***

Samia Eltayeb Ahmed, Babiker ELwasila Mohamed and Karamalla Ahmed Karamalla

*Anogeissus leiocarpus* gum samples were collected randomly as natural exudates from 3 different locations in Sudan, namely Abojebiha (season 1994-1995), Elfula and Rosaries (season 1996-1997). Physicochemical properties of gum samples (moisture, ash, nitrogen, protein, specific rotation, relative viscosity, refractive index, equivalent weight, pH, uranic acid, reducing sugar and tannin content). Results showed significant differences within each location in most parameters studied except in the refractive index values which was found to be constant in all samples (1.334). The effect of location on the properties of gum samples was also studied and the analysis of variance showed insignificant differences ( $p \leq 0.05$ ) in all properties studied except in ash content and this may be due to the differences in the type of clay soil which found in the three different locations. The general characteristics of *Anogeissus leiocarpus* gum might be described as the mean value of all properties studied of all gum samples of the three different location as follows: 9.2% moisture, 3.4% ash, 0.72% nitrogen, 4.74% protein%, -35.5° specific rotation, 1.68 relative viscosity, 4.2 pH, 1.334 refractive index, 14.3% uranic acid, 0.44% reducing sugar 1336.0% equivalent weight and 0.68% tannin content. UV absorption spectra of gum samples were determined and the maximum absorption points were found the same ranging between wave length 243 and 285. Cationic composition of gum samples was also determined and the results showed that magnesium (Mg) has the highest value in all samples followed by iron (Fe), sodium (Na), potassium (K), calcium (Ca), zinc (Zn) and trace amount of manganese (Mn), copper (Cu), nickel (Ni), cadmium (Cd) and lead (Pb). Functionality (water holding capacity and emulsifying stability of *Anogeissus leiocarpus* gum were studied. The water holding capacity value was found to be 65.5% and emulsifying stability value was found to be 1.008 insignificant differences were observed between *Anogeissus leiocarpus* gum and *Acacia senegal* gum for the 2 parameters studied. (*Pakistan Journal of Nutrition* 8 (6): 782-786, 2009; doi: 10.3923/pjn.2009.782.786)

## **Manipulation of Rumen Ecology by Yeast and Malate in Dairy Heifer**

Sittisak Khampa, Pala Chaowarat, Rungson Singhalert and Metha Wanapat

Four, one-year old of dairy heifers were randomly assigned according to a 2x2 Factorial arrangement in a 4x4 Latin square design to study supplementation of

malate level at 500 vs 1,000 g with yeast at 1,000 vs 2,000 g in concentrate. The treatments were as follows: T1 = supplementation of malate at 500 g + yeast at 1,000 g; T2 = supplementation of malate at 500 g + yeast at 2,000 g; T3 = supplementation of malate at 1,000 g + yeast at 1,000 g; T4 = supplementation of malate at 1,000 g + yeast at 2,000 g in concentrate, respectively. The cows were offered the treatment concentrate at 1%BW and ruzi grass was fed *ad libitum*. The results have revealed that rumen fermentation and blood metabolites were similar for all treatments. However, the concentration of volatile fatty acid was significantly different especially the concentration of propionic acid was slightly higher in heifer receiving T4 than T3, T2 and T1 (24.4, 22.9, 22.4 and 19.7%, respectively). The populations of protozoa and fungal zoospores were significantly different as affected by malate level and yeast. In conclusion, the combined use of concentrate containing high level of cassava chip at 70% DM with malate at 1,000 g and yeast at 2,000 g in concentrate with ruzi grass as a roughage could improved rumen ecology in dairy heifers. (*Pakistan Journal of Nutrition* 8 (6): 787-791, 2009; **doi:** 10.3923/pjn.2009.787.791)

### **Effects of Varying Levels of L-Leucine and Metabolizable Energy in Finisher Diet on Carcass Composition and Meat Sensory Characteristics of Broiler Chickens**

E. Erwan, A.R. Alimon, A.Q. Sazili, H. Yaakub and R. Karim

A study was conducted to evaluate the effects of leucine supplementation in grower-finisher diets containing varying levels of energy on the sensory characteristics and carcass composition of broiler chickens. In a 2 x 2 factorial arrangement, eighty 21-day old Cobb broiler chicks were divided into 16 groups and fed diets supplemented with 0 or 0.5% L-leucine and metabolizable energy (ME) concentration at either 3200 kcal/kg or 3000 kcal/kg, for three weeks. Feed intake, growth performance and feed conversion ration were determined on a weekly basis. At the end of the trial, the birds were slaughtered, carcass composition determined and meat samples taken for sensory evaluation. There was no interaction between level of L-leucine and ME on the sensory characteristics and carcass composition at 42 days. Dietary level of L-leucine and ME had no significant effect ( $P>0.05$ ) on the live-weight, breast meat, lean, bone, fat and skin. Similarly, the flavour, tenderness, aroma, juiciness and overall acceptability scores of breast meat of broiler fed diets supplemented with leucine were also not significantly different. Further research is needed to evaluate the potential impact of excess leucine in diets with reduced levels of crude protein. (*Pakistan Journal of Nutrition* 8 (6): 792-796, 2009; **doi:** 10.3923/pjn.2009.792.796)



## **Sonographic Assessment of Hepatic Steatosis (Fatty Liver) in School Children of Dera Ismail Khan City (NWFP) Pakistan**

M. Ramzan, I. Ali and A. Matin

Childhood obesity is escalating rapidly, both in industrialized and developing countries. It will emerge as a potential public health burden faced by the developing countries in the near future. In children, Non Alcoholic Fatty Liver Disease (NAFLD) is mainly associated with obesity and metabolic syndrome and is therefore considered as a metabolic complication of obesity. NAFLD comprises of a range of chronic liver diseases from simple steatosis, steatohepatitis and cirrhosis with liver failure. Since the prevalence of obesity in children is increasing, the prevalence of NAFLD in children is expected to increase as well. Prevention of obesity and identification of children with an increased risk of NAFLD are important steps in preventing irreversible liver damage. This prospective study was carried out in the primary schools of Dera Ismail Khan History City having mixed population. Clinical examination of the children excluded those suffering from chronic health ailments. History from the parents excluded the intake of hepatotoxic drugs. Body mass status of child was determined according to World Health Organization's criteria and Centers for Disease Control and Prevention (CDC)'s gender and age specific growth charts. Randomly selected normal weight and obese children have undergone abdominal ultrasound examination to confirm or rule out hepatic steatosis (Fatty Liver) by detecting the alteration in ultrasound/hyperechogenicity of the organ. Randomly selected children (normal weight and obese) among the 1336 school going children were subjected to ultrasound examination, comprising of 55 boys (59.13%) and 38 (40.86%) girls. 67 (72.04%) were obese and 26 (27.95) as normal weights. Hepatic ultrasound alterations/hyperechogenic liver was found in 7 (7.52%) obese boys. None of the obese girls and normal weight children was found to exhibit any alteration in ultrasound findings. (*Pakistan Journal of Nutrition* 8 (6): 797-799, 2009; *doi*: 10.3923/pjn.2009.797.799)

## **Extraction, Compositional Studies and Physico-Chemical Characteristics of Palm Kernel Oil**

V.N. Atasié and T.F. Akinhanmi

Proximate, physico-chemical and elemental analysis of palm Kernel nut were determined to contain fat/oil 42%, crude protein 7.01%, moisture 6.5%, crude fibre 11.09% and carbohydrate (by difference) 33.40%. The elemental composition (mg/100 g), included :Na (37.00±0.40), K (39.51±0.22), Mg (3.60±0.1), Ca (19.0±0.42), Fe (20.04±0.28), Zn (2.82±0.30), P (3.4±0.00).

The result of the physico-chemical properties of the palm kernel oil are:- saponification value (232.815 mgKOH/g), refractive index (1.453), iodine value (41.24g/100g), acid value (11.60 mgKOH/g) and peroxide value (1.70 meq/kg). (*Pakistan Journal of Nutrition* 8 (6): 800-803, 2009; **doi:** 10.3923/pjn.2009.800.803)

### **Mathematical Modeling of Moisture Content of Apple Slices (Var. Golab) During Drying**

Elham Meisami-asl, Shahin Rafiee, Alireza Keyhani and Ahmad Tabatabaeifar

Drying is one of the primary methods of food preservation. Determining coefficients used in drying models is essential to predict the drying behavior. The present study was conducted to compute drying characteristics of apple slices. Thin layer drying kinetics of apple slices (variety-Golab) was experimentally investigated in a convective dryer and the mathematical modeling was performed by using thin layer drying models in the literature. Drying characteristics of apple slices were determined using heated ambient air at temperatures between 40 and 80°C, velocities at 0.5 m/s and thickness of thin layer 2, 4, 6 mm. Beside the effects of drying air temperature, effects of slice thickness on the drying characteristics, drying time and quality of dried product were also determined. Drying curves obtained from the experimental data were fitted to twelve different thin layer drying models. All the models were compared according to three statistical parameters, i.e. Root Mean Square Error (RMSE), chi-square ( $X^2$ ) and modeling efficiency (EF). The results showed that increasing drying air temperature resulted to shorter drying times. Midilli model had the highest value of EF (0.999611), the lowest values of 0.031806 and 0.001088 for RMSE and  $X^2$  respectively. The Midilli model was found to be the best model for describing the drying curves of apples. The effects of drying air temperature and thickness on the drying constant and coefficient were also shown. (*Pakistan Journal of Nutrition* 8 (6): 804-809, 2009; **doi:** 10.3923/pjn.2009.804.809)

### **Food Security among Urban Households: A Case Study of Gwagwalada Area Council of the Federal Capital Territory Abuja, Nigeria**

H. Ibrahim, N.R. Uba-Eze, S.O. Oyewole and E.G. Onuk

Urban areas are faced with the problem of increasing population and consequently inadequate supply of food items. Many urban households and individuals in Nigeria merely eat for Survival. This study was therefore designed to assess the state of food security among urban households in the Federal Capital Territory of Nigeria. Simple random sampling technique was used to select 120 respondents from the

study area. Data were analyzed using simple descriptive statistics and Food Security Scale. The results revealed that 70% of the urban households in the study area are food secure, while only 30% are non food secure. The major coping strategies against food shortages were the purchase of less preferred food and reduction in the quantity of meals. The study recommends that efforts at reducing food insecurity among urban households should focus on increasing urban household income and food supply. (*Pakistan Journal of Nutrition* 8 (6): 810-813, 2009; *doi*: 10.3923/pjn.2009.810.813)

### **Manipulation of Rumen Ecology by Malate and Cassava Hay in High-Quality Feed Block in Dairy Steers**

Sittisak Khampa, Pala Chaowarat, Uthai Koatdoke, Rungson Singhalert and Metha Wanapat

Four, dairy steers were randomly assigned according to a 2x2 Factorial arrangement in a 4x4 Latin square design to study supplementation of malate level at 500 and 1,000 g and cassava hay in high-quality feed block. The treatments were as follows: T1 = supplementation of high-quality feed block without cassava hay + malate at 500 g; T2 = supplementation of high-quality feed block without cassava hay + malate at 1,000 g; T3 = supplementation of high-quality feed block with cassava hay + malate at 500 g; T4 = supplementation of high-quality feed block with cassava hay + malate at 1,000 g, respectively. The cows were offered the treatment concentrate at 1.0% BW and ruzi grass was fed *ad libitum*. The results have revealed that populations of protozoa and fungal zoospores were significantly different as affected by malate level and cassava hay supplementation. However, rumen fermentation and blood metabolites were similar for all treatments. In conclusion, the combined use of cassava hay and malate at 1,000 g in high-quality feed block with concentrates containing high levels of cassava chip at 65% DM could highest improved rumen ecology in dairy steers. (*Pakistan Journal of Nutrition* 8 (6): 814-817, 2009; *doi*: 10.3923/pjn.2009.814.817)

### **Study on the Effects of Enzymatic Hydrolysis on the Physical, Functional and Chemical Properties of Peanut Protein Isolates Extracted from Defatted Heat Pressed Peanut Meal Flour (*Arachis hypogaea* L.)**

Regena Juliana Kain, Zhengxing Chen, Tamba Steven Sonda and John Christian Abu-Kpawoh

Physical, chemical and functional properties of peanut protein isolates (HPI) and hydrolysis (HPH) extracted from peanut meal obtained from heat treated peanut

oil extraction method were analyzed. HPH exhibited superior functional properties such as whipping, emulsification, fat and water absorption properties. Thermal denaturation profiles indicate that there is no significant difference ( $p \leq 0.05$ ) between HPI and HPH at both onset and transition temperatures. However, the conclusion temperatures were found to be significantly different ( $p \leq 0.05$ ). Protein solubility was pH dependent with HPH been more soluble at all pH levels. However, solubility was low at the isoelectric pH range of 4.5-5.5. Electrophoretic patterns obtained from SDS-PAGE show that HPH registered a lower molecular weight ( $< 31$  KDa) compared to HPI ( $\approx 66$  KDa). HPH had relatively smaller particle sizes ( $\pm 0.1 \mu\text{m}$ ) compared to HPI ( $\pm 100 \mu\text{m}$ ). Protein isolates extracted from peanut meal obtained from cold pressed peanut oil extraction method were used as control in analyzing functional parameters but HPH still exhibited superior qualities. Both HPH and HPI were found to be nutritionally rich in most essential amino acids with respect to the recommended FAO/WHO amino acid requirement patterns for both adults and children. (*Pakistan Journal of Nutrition* 8 (6): 818-825, 2009; doi: 10.3923/pjn.2009.818.825)

### **Internodule Variation of *Anogeissus leiocarpus* Gum**

Samia Eltayeb Ahmed, Babiker Elwasila Mohamed, Karamalla Ahmed Karamalla

Eighteen nodules of *Anogeissus Leiocarpus* gum were collected randomly from different trees from two different locations (Abojebiha and Elfula) in Sudan. The nodules were analyzed for twelve analytical parameters (moisture%, ash%, nitrogen%, protein%, pH, refractive index, specific rotation, relative viscosity, equivalent weight, uranic acid%, reducing sugars% and tannin %). Analysis of variance showed significant differences ( $P \leq 0.05$ ) for all parameters studied in each of Abojebiha and Elfula nodules except for the refractive index value which was found to be constant (1.334) in both locations. In addition UV absorption spectra of all nodules gave  $\lambda$  max (247, 258, 265, 270, 274, 277, 280 and 283). (*Pakistan Journal of Nutrition* 8 (6): 826-828, 2009; doi: 10.3923/pjn.2009.826.828)

### **Role of Health Management in Evaluation of Programs Monitoring the Growth of Children Aged 0-5 in Tehran, Iran**

Fereshteh Farzianpour, Ali Rabbani, Azizolah Batabi, Javad Rasouli and Masomea Amini Kashani

This study was conducted to evaluate the children's growth monitoring program in the southern part of Tehran-Iran. This descriptive cross-sectional study was

done on 1219 children aged 0-5 in health facilities in the southern part of Tehran. The data was collected through existing data in the children's growth monitoring system, anthropometric indicators and also gathering demographic variables through observation, interview and questionnaire. The data was statistically analyzed using SPSS software and Z and  $X^2$  tests. Findings indicate that out of 1219 children in the study, 618 (50.7%) were girls and 601 (49.3%) boys. Considering weight, 46.35% of the children 0-12 months old were between the 50th and 97th standard percentile. With the increase of age, the figure increased to 48.49%, 53.85% and 55.41%, at the age of 13-24 months, 25-36 months and 49-60 months respectively. But at the age of 37-48 months it decreased to 52.15%. Statistical analysis based on  $X^2$  tests indicates that there is a significant statistical relationship between sex and weight ( $p = 0.000$ ), but no significant relationship is found between sex and height ( $P = 0/05170$ ). The results indicate low weight in children in the study, considering NCHS standard. With regard to the mean difference of weight and height percentage between the children in the study and their peers in other countries, international standard NCHS can be a suitable indicator for monitoring children's physical growth. (*Pakistan Journal of Nutrition* 8 (6): 829-834, 2009; doi: 10.3923/pjn.2009.829.834)

### **The Effect of Soaking, Boiling and Fermentation with *Rhizopus oligosporus* on the Water Soluble Vitamin Content of Bambara Groundnut**

I.F. Fadahunsi

Effect of treatment conditions [soaking, boiling and fermentation with *Rhizopus oligosporus* (SBF)] on the water soluble vitamins and trypsin inhibitor of bambara nut flour [*Vigna subterranea* (L) Verdc] was investigated. It was observed that the thiamine content decreased by 5%, riboflavin 6.2%, folacin 9.6%, niacin 10.2% and biotin 14% after 24 h of soaking at room temperature. Treatment by boiling for 45 min revealed that there was a further decrease of 52.4%, 56.2%, 35.0%, 70.0% and 48.3% in the values of thiamine, riboflavin, folacin, niacin and biotin respectively. However, fermentation with *Rhizopus oligosporus* for 24 h significantly reduced the thiamine content from the original value of  $0.47 \pm 0.13 - 0.19 \pm 0.02$  mg/100g, while riboflavin content increased significantly from  $0.15 \pm 0.06 - 0.17 \pm 0.01$  mg/100 g, folacin  $0.16 \pm 0.02 - 0.23 \pm 0.03$  mg/100 g, niacin  $1.88 \pm 0.09 - 2.16 \pm 0.00$  mg/100 g and biotin  $0.10 \pm 0.02 - 0.16 \pm 0.05$  mg/100 g ( $P \leq 0.05$ ). Trypsin Inhibitor Activity (TIA) decreased by 22.1% after soaking for 24 h at room temperature and further decreased by 72% after boiling for 45 mins. Conversely, during fermentation period of 24 h, the TIA increased significantly from  $0.71 \pm 0.62 - 1.33 \pm 0.59$  mg/100 g protein ( $P \leq 0.05$ ). (*Pakistan Journal of Nutrition* 8 (6): 835-840, 2009; doi: 10.3923/pjn.2009.835.840)

## **Evaluation of Dietary Inclusion of Sweet Potato (*Ipoma Batatas*) Leaf Meal (SPLM) with and Without Enzyme Treatment in Broiler Diets**

Festus Mmereole

An experiment was conducted to test the effects of Sweet Potato Leaf Meal (SPLM) as a supplement in broiler diet with or without enzyme treatment. This study is a part of ongoing efforts to reduce feed costs in broiler production and thus make more animal protein available and affordable to the growing world population especially in those countries where there are dangerous deficiency gaps between the quantity of animal protein required and the quantity consumed. Five hundred day-old broilers were brooded for four weeks after which 135 birds were selected for the experiment. Data were collected on the body weight and body weight gains, feed intake and feed conversion ratio and costs of feeds per kilogram of body weight of broilers. The data were subjected to both statistical and economic analysis. The results obtained from the analysis revealed that the birds fed with diets containing 20% enzyme treated SPLM proved superior in all parameters evaluated. Based on these observation the study recommended that farmers should be encouraged to include 20% SPLM treated with enzyme in their feed formulation for improved broiler production. (*Pakistan Journal of Nutrition* 8 (6): 841-844, 2009; *doi*: 10.3923/pjn.2009.841.844)

## **Effect of Replacing Dietary Fish Meal with Silkworm (*Anaphe infracta*) Caterpillar Meal on Growth, Digestibility and Economics of Production of Starter Broiler Chickens**

A.T. Ijaiya and E.O. Eko

A total of one hundred and fifty day-old anak broiler chicks were used to investigate the replacement value of silkworm caterpillar meal (SCM) for fish meal (FM) on growth performance, nutrient digestibility and cost benefit of starter broilers. The birds were randomly allotted to five treatment groups of 30 birds with each treatment having two replicates of 15 birds each. Five isocaloric and isonitrogenous diets were formulated such that diet 1 which served as the control had 100% FM:0% SCM while diets 2, 3, 4 and 5, respectively) had: 75% FM:25% SCM;50% FM:50% SCM;25% FM:75% SCM and 0%FM: 00% SCM, respectively. The birds were given feed and water *ad-libitum*. The performance in terms of feed intake (29.51-31.66g), body weight gain (16.56-

19.03g), feed conversion efficiency (FCR) (1.60-1.72), protein efficiency ratio (PER) (2.67-2.77) and nutrient digestibility of the chicks indicated no significant ( $P > 0.05$ ) differences among the treatment means. Cost per kg gain gradually declined with increasing dietary level of SCM indicating higher economic benefit. The results of this study demonstrated that cheaper silkworm caterpillar meal can be an excellent substitute for fish meal in formulating diets for starter broiler chicks leading to increased economic gains. (*Pakistan Journal of Nutrition* 8 (6): 845-849, 2009; doi: 10.3923/pjn.2009.845.849)

### **Effect of Replacing Dietary Fish Meal with Silkworm (*Anaphe infracta*) Caterpillar Meal on Performance, Carcass Characteristics and Haematological Parameters of Finishing Broiler Chicken**

A.T. Ijaiya and E.O. Eko

The effects of substituting fish meal with different levels of silkworm (*Anaphe infracta*) caterpillar meal (SCM) on the growth, carcass characteristics haematology and economics of production formed the basis of this study. A total of one hundred and fifty four weeks old anak broilers were randomly allotted to five treatment groups in a completely randomized design with each treatment having thirty birds. Each treatment group was further divided into two replicates of fifteen birds per replicate. Five diets which had 100% FM: 0% SCM; 75% FM: 25% SCM; 50% FM: 50% SCM; 25% FM: 75% SCM and 0% FM: 100% SCM were formulated and labeled diets 1, 2, 3, 4 and 5, respectively with diet 1 serving as the control. Feed and water were provided *ad-libitum*. The performance in terms of feed intake (95.71g-98.25g), body weight gain (46.10g- 98.51g), feed conversion efficiency (1.98-2.08) and protein efficiency ratio (2.41-2.54) showed no significant ( $P > 0.05$ ) differences across the dietary treatments. Analysis of weight of carcass and body cuts as well as blood parameters apart from blood albumin indicated no significant ( $P > 0.05$ ) differences between the treatment means. Cost per kg of feed gradually decline with increasing dietary level of SCM inclusion levels indicating higher economic benefit. The result of this study revealed that the growth performance of the birds was not affected by the incorporation of silkworm caterpillar meal and it was more cost effective than conventional fish meal. It was concluded that cheaper silkworm caterpillar meal can be use as a complete substitute for fish meal in the diet of finishing broiler chickens. (*Pakistan Journal of Nutrition* 8 (6): 850-855, 2009; doi: 10.3923/pjn.2009.850.855)

## **The Studies on the Physico-Chemical and Organoleptic Characteristics of Apricot (*Prunus armeniaca* L.) Produced in Rawalakot, Azad Jammu and Kashmir During Storage**

Saira Ishaq, Habib Ahmed Rathore, Saima Majeed, Siddique Awan and Syed Zulfiqar Ali Shah

A highly significant effect ( $p < 0.05$ ) of storage period on physico-chemical characteristics and sensory parameters of Apricot fruit produced in Rawalakot areas of Azad Jammu and Kashmir was investigated at ambient temperature (Relative humidity 60-63% and temperature 28-30°C). The physico-chemical characteristics such as weight loss, total soluble solids, titratable acidity, ascorbic acid and sensory parameters like color, texture, taste, flavour and overall acceptability were studied at an interval of 2 days (0, 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup> and 10<sup>th</sup> day) for a total period of 10 days during storage. It was observed that there was an increasing trend of weight loss (0.00% at 1<sup>st</sup> day to 12.68% at 8<sup>th</sup> day of storage), gradual increase in TSS (11.8% at 1<sup>st</sup> day to 12.63% at 8<sup>th</sup> day of storage and then decreased to 5.22% at 10<sup>th</sup> day), decreasing trend of titratable acidity (0.94% at 1<sup>st</sup> day to 0.10% at 10<sup>th</sup> day) and ascorbic acid (14 mg/100 g at 1<sup>st</sup> day to 3.760 mg/100 g at 10<sup>th</sup> day). The organoleptic characteristics showed a gradual increase of colour scores (4.00 at 1<sup>st</sup> day to 5.25 at 8<sup>th</sup> day and at later stage this score was decreased to 1.97 at 10<sup>th</sup> day of storage), decrease of texture scores (7 at 1<sup>st</sup> day to 1.97 at 10<sup>th</sup> day) whereas, taste was increased to maximum scores (6.53 at 4<sup>th</sup> day and then decreased to 2.27 at 8<sup>th</sup> day of storage period), the flavour score was increased (5.00 at 1<sup>st</sup> day to 6.77 at 6<sup>th</sup> day and then decreased to 2.41 at 10<sup>th</sup> day of storage). The overall acceptability score was decreased with the passage of storage period and the highest overall acceptability score was 7.5 at 1<sup>st</sup> day in the fresh fruit that was reduced to a score 2.1 at the end of 10<sup>th</sup> day of storage. (*Pakistan Journal of Nutrition* 8 (6): 856-860, 2009; doi: 10.3923/pjn.2009.856.860)

## **Influence of Post Harvest Calcium Chloride Application, Ethylene Absorbent and Modified Atmosphere on Quality Characteristics and Shelf Life of Apricot (*Prunus armeniaca* L.) Fruit During Storage**

Saira Ishaq, Habib Ahmed Rathore, Tariq Masud and Sartaj Ali

The effect of different concentrations of CaCl<sub>2</sub> (1, 2 and 3%) with the combination of oxidizing agent like Potassium permanganate (KMnO<sub>4</sub>) on storage life of apricot



fruit packaged in sealed Polyethylene bags was investigated at ambient temperature (Relative humidity 60-63% and temperature 28-30°C) during storage. The quality characteristics such as weight loss, total soluble solids, titratable acidity, ascorbic acid and sensory parameters like color, texture, taste, flavour and overall acceptability were studied at an interval of 2 days (0, 2<sup>nd</sup>, 4<sup>th</sup>, 6<sup>th</sup>, 8<sup>th</sup> and 10<sup>th</sup> day) for a total period of 10 days during storage. All of the 9 treatments had shown a highly significant effect ( $p < 0.05$ ) on storage life and quality parameters of fruits. However, the treatment T<sub>4</sub> (KMnO<sub>4</sub> + 3% CaCl<sub>2</sub> + Polyethylene bags) was most effective in the retention of higher contents of vitamin C (11.47 mg/100 g), total soluble solids (12.58%), titratable acidity (0.72%) and sensory parameters like colour (4.97), texture (6.23), taste (6.52), flavour (6.38) and the higher overall acceptability score (6.72) with minimum weight loss (3.66%) in T<sub>4</sub>. Compared to control fruit showed maximum weight loss (9.5%), lower vitamin C (9.55 mg/100 g), titratable acidity (0.67%), total soluble solids (10.58%) and lower quality score like colour (3.92), texture (4.83), taste (4.79), flavour (4.43) and the lower score (4.6) of overall acceptability during storage whereas the Treatment T<sub>3</sub> (3% CaCl<sub>2</sub>+Polyethylene bags) was found better to all other treatments during storage. The treated apricot fruit have increased storage life up to 10 days as compared to control which was un acceptable after 6<sup>th</sup> day of the storage. (*Pakistan Journal of Nutrition* 8 (6): 861-865, 2009; **doi:** 10.3923/pjn.2009.861.865)

### **Isolation and Identification of Wild Strains of Lactic Acid Bacteria for Yoghurt Preparation from Indigenous Dahi**

Talat Mehmood, Tariq Masud, Syed Ali Abbass and Shabana Maqsood

Lactic acid bacteria are commonly found in fermented dairy products. Their role in the production of value added products of milk like yoghurt, cheese and butter etc has got great significance. In this study thirty-five samples of dahi were collected randomly from the local markets of Rawalpindi. A total of 69 isolates were identified phenotypically and divide into three genera *Lactococcus* (36 isolates), *Lactobacillus* (15 isolates) and *Streptococcus* (18 isolates). Out of 69 isolates 26% were of *S. thermophilus* followed by 22% *L. bulgaricus*, 16% *L. acidophilus*, 9% *L. lactis* and 9% *L. casei*, respectively. After identification, potential of strains for lactic acid production after 6 hrs, 12 hrs and 24 hrs were also determined. In addition to acid production diacetyl production was also observed at 37°C for 8 hrs with two hours intervals. There were generally increasing trend for diacetyl production. The study showed that there was a variety of lactic acid bacteria in our environment which has potential to produce quality yoghurt. (*Pakistan Journal of Nutrition* 8 (6): 866-871, 2009; **doi:** 10.3923/pjn.2009.866.871)

## **The Impact of Samh Seeds on Blood Parameters of Experimental Animals**

Norah Mohamad AL-Qahiz

Samh seeds are cultivated in some regions of KSA and some people think that it can improve health. We aimed to find out the health benefits of Samh seeds. The seeds were obtained from Al Jouf, KSA and roasted for 5 min and grounded into flour. Its content from protein, fat and carbohydrate were determined. Thirty six normal male albino rats ( $100\pm 5.0$  g) were classified into 6 groups; control group that fed standard diet only, 5% Samh group received 5% of the seeds; 15% Samh group fed 15% of the seeds; high lipid diet group received high lipid diet (15% fat and 1% cholesterol); 5% Samh and high lipid group received high lipid diet plus 5% of the seeds and 15% Samh and high lipid diet group received high lipid diet plus 15% of the seeds. After 60 days, rats were fasted then anesthetized and blood samples were collected for determination of glucose, blood lipids, urea, creatinine, albumin, total protein, bilirubin, calcium and iron. The results showed that the seeds are rich in protein ( $22.3\pm 2.1\%$ ) and the administration of 5% of the seeds decreased glucose and BUN, while it elevated creatinine, albumin, total protein, cholesterol, triglycerides, HDL, calcium and iron. On the other hand the administration of 15% of the seeds decreased creatinine, albumin, cholesterol, triglycerides and LDL, while increased glucose, BUN, total bilirubin, HDL and iron. In conclusion the administration of 15% of Samh seeds flour reduce creatinine concentration and improve blood lipids especially cholesterol, HDL and LDL. (*Pakistan Journal of Nutrition* 8 (6): 872-876, 2009; doi: 10.3923/pjn.2009.872.876)

## **Studies on Organic Acids and Minerals Content of Sourdough Naans Made from Different Extraction Rate Wheat Flours and Starter Cultures**

Ghulam Mueen-ud-Din, Salim-ur-Rehman, Faqir Muhammad Anjum and Haq Nawaz

Sourdough naans were prepared using different extraction rate wheat flours and sourdough starter cultures. Sourdough naans were analyzed to find out the effect of flour extraction rates on the production of organic acids and minerals content. It was concluded that organic acids (lactic, acetic and citric acid) increased with an increase in extraction rate and freeze dried cultures containing heterofermentative strains of LAB showed better performance than homo-fermentative in the production of organic acids. Similarly, minerals content were also increased

with an increase in flour extraction and 100% extraction rate sourdough naan showed the highest minerals content. (*Pakistan Journal of Nutrition* 8 (6): 877-881, 2009; *doi*: 10.3923/pjn.2009.877.881)

### **Biochemical Effectiveness of Cocoa Powder on Electrolytes Homeostasis, Liver and Cardiac Specific Enzymes and Renal Function**

Shafaq Noori, Humaira Zafar and Tabassum Mahboob

Cocoa beans are main ingredient of chocolate, cakes, cookies and coffee. Cocoa have health benefits effects, previously reported. This study was designed to evaluate the health effects of cocoa powder on different biochemical parameters. For this purpose 12 Male Albino Wistar rats were divided in to 2 groups (n = 6). Group I remain healthy control rats; Group II received cocoa powder at a dose of (1 g/kg b.w.) for 21 consecutive days orally. Biochemical analysis was evaluated by electrolytes homeostasis, liver specific enzymes, kidney markers and LDH cardiac specific enzyme. The cocoa-treated rats showed decreased intracellular potassium, increased Na<sup>+</sup>-K<sup>+</sup>-ATPase, decreased direct bilirubin, increased plasma potassium, increased ALT level. Decreased mean body weight was observed. No mortality and sign of toxicity was observed at this dose. Considerable changes were observed in biochemical parameters after chronic administration of cocoa powder. (*Pakistan Journal of Nutrition* 8 (6): 882-886, 2009; *doi*: 10.3923/pjn.2009.882.886)

### **Importance of Milk Consumption in the Diet of Secondary School Students in Nigeria**

M.A. Belewu, G.B. Adesiji, B.M. Matanmi, O. Bolarin, R.S. Adisa and M.K. Omobitan

The purpose of this study was to investigate the importance of milk consumption in the diet of secondary school students in Ibadan North and Akinyele local government areas of Oyo State, Nigeria. Questionnaire was used to elicit information from the students and simple randomly sampling was used to select forty students each from public secondary schools students of urban and rural areas and also forty students from private secondary school in both rural and urban areas. The sample consisted of equal number of males and females. Frequency distributions and percentages were calculated. Student's t-test was used to determine whether there is significant difference between milk consumption and developmental indices of students. The findings revealed that respondents'

preference was more to liquid than powdered milk while the purchasing power was also in-like manner. The private secondary school students had the highest daily consumption rate and purchasing power than the public school students. The results further revealed that there were statistical differences in height of students (both sexes) of the rural and urban secondary school students while there was no significant difference in the weight and forearms of private and the public secondary school students in both urban and rural. Milk is important in the diet of secondary school students since they are in their developmental stages of life, therefore the study recommends the introduction of school milk programme sponsored by government. Also, nutritional education should be introduced to academic curriculum of secondary school. (*Pakistan Journal of Nutrition* 8 (6): 887-890, 2009; *doi*: 10.3923/pjn.2009.887.890)

### **Effect of Commercial Kebab Frying on Physico-Chemical Parameters of the Tallow**

Muhammad Ali, Ikram Ullah, Saeed Ahmad, Hayat Khan and Haji Akbar

In Pakistan, especially in NWFP tallow is used as commercial deep-frying agent for the traditional fast foods chapli and Shami kebabs and is widely accepted for its color, flakiness, flavor and tenderness. The effect of 10 h continuous commercial kebab frying on the physiochemical parameters of the tallow was studied and evaluated. The tallow was evaluated for ash%, Peroxide Value, Optical Density, Conjugated Dienes, Conjugated Trienes, %FFA, Acid Value and Anisidine Value after 0, 2, 4, 6, 8 and 10 h of frying and the effect of frying kebab resulted in the increase of all these parameters. Results of the linear regression model suggest that frying kebabs have significant correlation with the oxidation of tallow and continuous frying for more than 10 h is not recommended. It is also concluded that kebab frying accelerate the thermal oxidation of the tallow. The results obtained in this experiment propose that POV can be adopted as the standard factor in the evaluation of oxidation of tallow used for the frying kebab and the upper limit will be determined as 28 meq/kg. (*Pakistan Journal of Nutrition* 8 (6): 891-895, 2009; *doi*: 10.3923/pjn.2009.891.895)

### **Comparative Study Between Single Organic Acid Effect and Synergistic Organic Acid Effect on Broiler Performance**

A. Galib Al-Kassi and M. Aqeel Mohssen

This study was conducted to compare the effects of single and synergistic organic acids (formic and propionic acids) on broiler performance. Three hundred one

day-old mixed sexes broiler (Arbor-Acres) were divided into five groups of 60 birds each and randomly assigned to five treatment diets. A control group is considered where no added acids. Group 2 and group 3 are formed with 0.1% formic acid and 0.2% propionic acid respectively. The fourth group is formed with 0.3% organic acids (formic and propionic acids). Group 5 is formed by the addition of 0.3% biotronic acid. The results indicated that group 2, 3, 4 and 5 showed significantly higher ( $p < 0.05$ ) in average live weight, average daily gain, average daily feed consumption and mortality rate compared with the control group. Nevertheless at the same time treatment 4 showed significant decrease in the feed conversion ratio compared with other treatments. (*Pakistan Journal of Nutrition* 8 (6): 896-899, 2009; **doi**: 10.3923/pjn.2009.896.899)

### **The Effect of Chromium Glycinate on the Blood Glucose Control and Blood Lipids of Normal and Diabetic Patients**

R. Abdul-Wahab Hamad, M. Monzer Krishan, M. Jihad Quasem and Ayman Suliman Mazahreh

The effect of chromium glycinate 200  $\mu\text{g}$  was investigated for its effect on blood control and serum lipids in four groups were divided into normal subjects ( $n = 30$ ), hyperglycemic ( $n = 28$ ), no-insulin dependent diabetics ( $n = 20$ ) and insulin-dependent diabetics ( $n = 20$ ). The level of glucose and lipids profile in serum were analyzed before chromium glycinate supplements and periodically each two weeks throughout this study after chromium glycinate 200  $\mu\text{g}$  supplements was taken for a period of four months. A significant improvements in the various parameters occurred in all groups of the study. The hyperglycemic group showed higher benefits in blood glucose control, lowered serum lipids and a decreased risk of coronary heart disease than other groups of no-insulin dependent diabetics and insulin-dependent diabetics. (*Pakistan Journal of Nutrition* 8 (6): 900-904, 2009; **doi**: 10.3923/pjn.2009.900.904)

### **Nixtamalization Effects on the Contents of Phytic Acid in the Varieties of Maize and the Bioavailability of Iron in Nixtamalized Maize to Young Pigs**

L.I. Rong and Wang Kang-Ning

The present study was conducted to investigate the effect of nixtamalization process on the phytic acid loss of maize and the subsequent influence on iron bioavailability of the iron-deficient piglets. Two experiments were conducted to

achieve the objective: in the first step, three types of maize varying in phytic acid contents were processed by five lime concentrations treatment (0, 0.6, 1.2, 1.8 and 2.4%), four cooking duration (0, 45, 60 and 75 min) and thereafter soaking for five periods (0, 2, 4, 6 and 8 h) to optimize the best nixtamalization process parameter based on the maximum loss of phytic acid. In the second study, weaning piglets suffered iron-deficient were fed two diets: either lime-cooked maize produced by optimal parameter (NTM) or non-nixtamalized maize as control (CON), to examine the effects of the nixtamalization on the iron bioavailability, iron status and growth performance. The results showed that: (1) The greatest phytic acid loss of three types of maize and their processing parameters (lime concentration, cooking duration and steeping duration) were 17.4% (1.2%, 75 min and 4 h), 14.9% (1.8%, 75 min and 4 h) and 27.5% (1.8%, 75 min and 4 h), respectively. (2) The hemoglobin concentration (Hb), Packed Cell Volume (PCV), Red Blood Cell count (RBC) and Hemoglobin-Fe (Hb-Fe) content were improved in the NTM piglets compared with CON piglets ( $p < 0.05$ ). (3) The Average Daily Gain (ADG) and Average Daily Feed Intake (ADFI) at D 14 and D 28 were higher in NTM than CON group ( $p < 0.05$ ). These results demonstrated that nixtamalization process parameter should be varying according to the phytic acid contents of the maize to break down the maize phytic acid effectively. Above all, the lime-cooked maize could enhance the iron status and the growth performance of weaning piglets suffered iron-deficiency anemia, thus could be considered as an effective intervention protecting the consumer (including human and animal) from suffering iron deficiency. (*Pakistan Journal of Nutrition* 8 (6): 905-909, 2009; **doi**: 10.3923/pjn.2009.905.909)