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Evaluation of Some Probiotic Fermented Milk Products From Al-Ahsa Markets, Saudi Arabia

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Eight commercial probiotic fermented milk products (six full fat and two low fat) from Al-Ahsa markets were evaluated for chemical, microbiological and sensory properties. The chemical composition parameters ranged from 0.9-1.2% fat (low fat products), 3.0-3.9% fat (full fat products), 3.1-4.7% protein, 0.7-1.2% ash and 7.5-3.7% carbohydrate in all the milk products. The pH values of all the products decreased significantly from the production day to the end of storage period. With respect to the microbiological side, the coliform bacteria, moulds and yeasts counts were not detected in all the products during the refrigerated storage at 5±1°C. However, seven out of eight products contained over 10^6 cfu mL^{-1} of bifidobacteria on the production day. Only two of these products maintained 10^6 cfu mL^{-1} viable count of bifidobacteria till the end of cold storage period. On the other hand, three out of eight products showed the highest number of *L. acidophilus* viable count (above 10^8 cfu mL^{-1}) on production day. The results of sensory evaluation showed that all the tested products obtained high scores for flavor, appearance, texture or consistency and smell (odor) properties during the storage period. These results suggest that for optimum benefits, the probiotic fermented milk products with live probiotic bacteria should be consumed within one week of their production date. The research provided useful information to the dairy industries to develop new technology to ensure the supply of high quality milk products to the consumers. *(American Journal of Food Technology 4 (1): 1-8, 2009;* ***doi:*** *10.3923/ajft.2009.1.8)*

Starch Blocking Stability of the *Phaseolus vulgaris* Alpha-Amylase Inhibitor (α-AI1)

Wokadala C. Obiro, Tao Zhang and Bo Jiang

The starch blocking stability of speckled kidney beans (*Phaseolus vulgaris*) alpha-amylase inhibitor (α-AI1) for application as a nutraceutical additive against diabetes and obesity was assessed. The inhibitor was purified to 0.09% w/w of seed flour using pH fractionation, alcohol precipitation (75%), DEAE-Sepharose CL-6B and Sephacryl S-200 chromatography. The interactive effect of pH (A), temperature (B) and time (C) on residual inhibitory activity was modeled using

Response surface methodology with the Box-Behnken design. Intrinsic fluorescence and ANS-assisted surface hydrophobicity indicated activity loss is accompanied with tertiary structural unfolding. Chaotrophic salts at high (1.0 M) and kosmotrophic salts at low (0.1-0.01 M) concentration stabilized the inhibitor in the order $CH_3COO^- > Cl^- > Br^- > I^- > SCN^-$ and vice-versa, respectively. *(American Journal of Food Technology 4 (1): 9-19, 2009;* ***doi:*** *10.3923/ajft.2009.9.19)*

Optimization of Xylanase Production from *Fusarium solani* F7

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The purpose of this study was to characterization of xylanase producing *Fusarium solani* isolate and optimization of cultural conditions for xylanase enzyme production. Screening of *Fusarium solani* isolate was based on the diameter of the clear zone formation in oat spelt xylan agar plates, *Fusarium solani* isolate F7 was selected and optimized for xylanase enzyme production using cheaper substrate like wheat straw, rice straw, rice bran and wood husk. Maximum enzyme activity was observed in wheat straw (78.32 U mL^{-1}). Optimum pH and temperature for xylanase activity were found to be 5.5 and 30°C at 3% substrate concentration. In purification step, 75% ammonium sulphate saturation was found to be suitable giving maximum xylanase activity. Purified xylanase yielded single band with a molecular weight of 89 kDa. The use of wheat straw as a major carbon source is particularly valuable because oat spelt xylan is very expensive, The *Fusarium solani* F7 isolate proved to be a promising microorganism for xylanase production. *(American Journal of Food Technology 4 (1): 20-29, 2009;* ***doi:*** *10.3923/ajft.2009.20.29)*

Nutritional Quality of 1st Generation Quality Protein Maize Diet and its Effect on Some Biological Indices of Albino Wistar Rats

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Twenty male albino rats of the Wistar strain were placed in four experimental groups of five rats each. Group A (Reference group) received a standard protein diet, Group B received a basal or protein-free diet, Group C received the

F_1-QPM diet, while Group D received common maize (CM) diet. Water and feed were allowed *ad libitum*. Rats were fed for 21 days at the expiration of which indices of protein nutritional quality viz PER, NPU, NPR, TD and BV, were evaluated. The results showed that Group C rats had a higher ($p<0.05$) protein efficiency ratio (PER) value of 0.97±0.06 compared to rats in Group D (0.48±0.28). Similarly, net protein utilization (NPU) value of 80.67±3.21% for group C was significantly ($p<0.05$) higher than for group D (41.83±5.48). The same trend was observed for true digestibility (TD) and biological value (BV). The values were TD (89.27±0.55% for Group C and 81.59±0.11% for Group D) and BV (90.30±2.56% for Group C and 51.00±6.10% for Group D) respectively. Values of net protein ratio (NPR) obtained also followed the same trend (1.85±0.06 for Group C and 1.61±0.39 for Group D) but not significantly different ($p>0.05$). Additionally, the protein contents of the F_1-QPM and CM diets compared showed that though F_1-QPM had a higher level of protein (11.80±2.84%) than CM (10.67±0.31%), the difference was not significant ($p>0.05$). Quality protein maize (QPM) maintained its high nutritional quality in spite of change in environment. Increased cultivation and utilization of QPM is recommended as this could help to alleviate hunger and protein malnutrition in developing countries. *(American Journal of Food Technology 4 (1): 30-35, 2009; **doi:** 10.3923/ajft.2009.30.35)*

Production of Antioxidants by *Marasmiellus* sp. via Solid Substrate Fermentation

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This study was aimed to evaluate the antioxidant properties of methanol extracts of fermented substrates optimised for antioxidant production by *Marasmiellus* sp. KUM 50061 mycelial biomass. Extract of fermented maize supplemented with (w/w) malt extract 4%, yeast extract 4% and rice bran 4% exhibited the highest 1,1diphenyl-2-picrylhydrazyl radical scavenging ability. The effective concentration of extract to scavenge 50% radicals was 1.875 mg mL^{-1}. This formulation was chosen as the optimum substrate for antioxidant production by *Marasmiellus* sp. KUM 50061 mycelial biomass. The thiobarbituric acid reactive substance (TBARS) assay showed that the effective concentration to inhibit lipid peroxidation of buffered egg yolk by 50% was 6.00 mg mL^{-1}. Total phenolics amounted to 31.41±1.56 mg GAE g^{-1} extract as measured by the Folin-Ciocalteau method. *(American Journal of Food Technology 4 (1): 36-46, 2009; **doi:** 10.3923/ajft.2009.36.46)*

Study on the Effect of Control Variables on the Extraction of Peanut Protein Isolates from Peanut Meal (*Arachis hypogaea* L.)

R.J. Kain, Z. Chen, T.S. Sonda and J.C. Abu-Kpawoh

The effect of control variables involved in the extraction of proteins and preparation of protein isolate from peanut meal flour have been investigated and optimized. These control variables include: temperature of the extraction medium, sample/water ratio, extraction time, effect of successive extraction steps and centrifugal speed. The pH-dependent protein solubility profile revealed that the region of minimum solubility (isoelectric point) of the proteins was at pH 4.5. The solubility reduced as the pH increased until it reached the isoelectric point which was followed by progressive increase in solubility with further increase in pH. The effect of temperature on the extraction of proteins indicated a slight decrease in the protein yield of about 17.6 and 15.0% as the temperature was increased from 40 to 60°C in both cold and heat pressed protein isolates, respectively. Protein yields in both samples were adversely affected at an increased temperature of 70°C. There was an increase in the yield of proteins with decreasing solid-water ratio while the yield of proteins increased as the centrifugal speed was increased. *(American Journal of Food Technology 4 (1): 47-55, 2009;* ***doi:*** *10.3923/ajft.2009.47.55)*

Determination of Amitraz Residue by Headspace Gas Chromatography in Honey and Beeswax Samples from Iran

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In this study, 70 samples of honey and beeswax from different beehives (Eastern and Western Azerbaijan, Ardabil territory, Iran), markets and store shelves of (Tehran, Iran) were collected during 2006-2007 and analysis for detection of amitraz and DMA residues by static headspace solvent microextraction Gas chromatography with Thermionic Specific Detector (GC/TSD). It could be concluded that according to EU standard (MRL = 200 $\mu g\ kg^{-1}$) all the samples of honey could be declared as appropriate for human consumption. *(American Journal of Food Technology 4 (1): 56-59, 2009;* ***doi:*** *10.3923/ajft.2009.56.59)*

Improvement of Protein Content of Garri by Inoculation of Cassava Mash with Biomass from Palm Wine

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This study was done to determine the suitability of the biomass contained in the dregs of palm wine, an alcoholic beverage, as an alternative to pure cultures of microorganisms suggested earlier as inocula for improving the protein and amino acid content of garri. Garri was prepared from cassava mash inoculated with 0, 1, 5 and 10% (v/w) of palm wine dregs just before dewatering and fermentation and analyzed for protein content and other characteristics. Inoculation with palm wine dregs increased microbial activity in cassava mash, particularly the activity of lactic acid bacteria. Protein composition of garri was improved and detoxification of cyanogenic glucosides was enhanced. Inoculation adversely affected mineral composition. Organoleptic analysis showed that inoculation did not reduce acceptability of garri at $p<0.05$. *(American Journal of Food Technology 4 (2): 60-65, 2009; **doi:** 10.3923/ajft.2009.60.65)*

Influence of Different Drying Methods and Storage on the Quality of Indian Spinach (*Basella rubra* L.)

O.O. Oladele and A.T. Aborisade

This study reports the effects of drying methods on nutrient retention in a leaf vegetable during storage. The leaves of Indian Spinach were dried to 3.50-4.0% moisture content in the sun (35°), shade (28°C) and oven (45°C) and then stored in polyethylene wrappers. Their moisture, ascorbic acid, minerals and total chlorophyll contents were determined after drying and during storage. There was minimal moisture gain during the twelve week storage period being less than 1% in all three drying methods. Ascorbic acid decreased by 43-48% as a result of drying but storage for twelve weeks did not result into much further loss. Shade-dried leaves retained ascorbic acid in the least. Chlorophyll and minerals contents also decreased slightly with drying and storage. Shade-dried leaves were lowest in Ca, Mg, K, Na, Fe, Mn and Zn. The contents of Ca and Mg in shade dried leaves increased in storage while K, Mn and Zn decreased. Manganese was the most critically reduced element by both drying and storage with shade dried leaves losing 73.2, 81.6% at drying and 12 weeks later. Comparative figures for sun and oven dried leaves were 49.2, 47.6, 50 and 62.6% for the same periods. The greatest reduction in Zn content also occurred with shade drying. Sun drying

resulted into more nutrient retention while there was only marginal difference in ascorbic acid content by the three techniques. Chlorophyll content was not much affected by both drying and storage and shade dried leaves retained chlorophyll more than those dried in the sun and oven. *(American Journal of Food Technology 4 (2): 66-70, 2009; **doi:** 10.3923/ajft.2009.66.70)*

Effect of Enzyme Type, Mode of Enzyme Action and Temperature on the Obtention of Low Phenylalanine Hydrolysates from Wheat Flour

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With the aim of obtaining wheat flour with low phenylalanine (Phe) content, protein extracts were prepared using an enzymatic method with a protease from *Bacillus licheniformis*. Then, the protein extracts were hydrolyzed by the action of one commercial enzyme (pancreatin or Panc) and a crude enzymatic extract obtained from pineapple peel (CE). The effect of some parameters was evaluated, such as enzyme type, mode (isolated or successive association), order of enzyme action and temperature (30, 35, 40, 50 and 70°C). The Activated Carbon (AC) was used as adsorbent and the efficiency of Phe removal was evaluated by second derivative spectrophotometry, measuring Phe content in wheat flour and in its hydrolysates after AC treatment. The results showed that the use of CE followed by Panc at 50°C was the most advantageous condition, leading to a Phe removal of 66.3% and a final Phe content of 522.4 mg kg^{-1} of hydrolysates. *(American Journal of Food Technology 4 (2): 71-78, 2009; **doi:** 10.3923/ajft.2009.71.78)*

Effects of Preheated Treatments on Physicochemical Properties of Resistant Starch Type III from Pullulanase Hydrolysis of High Amylose Rice Starch

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In this study, the effects of preheated treatments on physicochemical properties of resistant starch type III formation by pullulanase hydrolysis of High Amylose Rice Starch (HARS) were investigated. A debranching enzyme (Pullulanase, 8 U g^{-1} starch at 55°C for 0-48 h) was introduced to modify the amylopectin molecules of 15% (w/w) HARS suspension (32.10%, amylose content) which had been

preheated at 95 and 121°C for 30 min. Retrogradation gels of debranched starches with different degrees of hydrolysis (0.14 to 3.10%) were then induced at 4°C for 16 h. Afterward, one cycle of the freeze-thaw process (-10/30°C) was applied to promote syneresis of the retrograded starches. Results show that pullulanase hydrolysis enhanced the degree of syneresis (33.22, 45.27 and 58.91% for non-debranched and debranched starches which had been preheated at 95 and 121°C for 48 h, respectively). The debranched starches with higher degree of hydrolysis provided products with higher resistant starch contents. The resistant starch content increased quadrupled with debranching and the freeze-thaw process (4.07 to 10.68% and 5.12 to 19.32% for 0 to 48 h pullulanase hydrolysis of HARS preheated at 95 and 121°C, respectively). Results had shown that after debranching and retrogradation, the HARS molecules had rearranged and changed their crystal pattern from A to V-type pattern, as revealed by X-ray diffraction analysis. *In vitro* starch hydrolysis index of the RS III samples from 0 to 48 h of pullulanase hydrolysis of the HARS which had been preheated at 95 and 121°C were reduced from 71.591 to 41.69% and 68.66 to 26.83%, respectively. *(American Journal of Food Technology 4 (2): 79-89, 2009;* ***doi:*** *10.3923/ajft.2009.79.89)*

Fatty Acids Profile of Tropical Bagridae Catfish (*Mystus nemurus*) During Storage

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Changes in the fatty acid composition of the fresh water catfish (*Mystus nemurus*) stored in 10°C and ice (0±2°C) for 1, 10 and 20 days were monitored. A total of 22 fatty acids were found to be present in the studied samples. The main saturated fatty acids (SFA) were palmitic (17.99%), tridecanoic (16.59%), stearic (4.40%) and myristic (2.61%). The monounsaturated fatty acids (MUFA) were dominated largely by the oleic acid (24.84%) and palmitoleic acid (4.66%). The long-chain polyunsaturated fatty acids (PUFA) were also present in significant amounts, composed of eicosapentaenoic (2.65%) and docosahexaenoic (4.44%). Results also revealed that saturated and monounsaturated fatty acid significantly increased ($p<0.05$) during storage while polyunsaturated decreased. This should attracts attention to the importance of the proper and short period storage to retain the best quality of fish meat and its lipid contents. *(American Journal of Food Technology 4 (2): 90-95, 2009;* ***doi:*** *10.3923/ajft.2009.90.95)*

In vivo Evaluation of Cross-Linked Milk and Wheat Proteins Mediated by Microbial Transglutaminase in White Wistar Rats

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The present study was designed to evaluate the *in vivo* nutritional quality of the modified proteins of milk and wheat by cross-linking with microbial transglutaminase (TGase). White Wistar rats were divided into six groups receiving diets that contained casein, cross-linked milk protein, milk protein, cross-linked wheat protein, wheat protein, or a protein free diet. Results showed that cross-linked milk and wheat proteins can support growth, with the animals showing a positive nitrogen balance. Protein true digestibility was similar between casein and non-cross-linked milk protein diets. It was also observed that milk and wheat proteins were not affected by cross-linking concerning several quality parameters: protein efficiency ratio, food efficiency ratio, food transformation index, apparent nitrogen digestibility, true digestibility, biological value, net protein utilization, net protein ratio and protein retention efficiency. Based on these results, it can be suggested that the use of microbial TGase does not affect the nutritional quality of milk or wheat proteins, while improving their physicochemical properties. *(American Journal of Food Technology 4 (3): 96-107, 2009;* ***doi:*** *10.3923/ajft.2009.96.107)*

Nutritional Evaluation of *Amaranthus cruentus* Leaf Meal Based Broiler Diets Supplemented with Cellulase/Glucanase/Xylanase Enzymes

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Sundried leaves of *Amaranthus cruentus* (*Amaranthus cruentus* leaf meal, ACLM) were milled and analyzed for their proximate composition. Crude protein was 23.0±0.55%; crude fat, 5.4±0.1%; crude fibre, 8.8±0.02%; ash, 19.3±0.01% and gross energy, 3.3±0.01 kcal g^{-1}; metabolizable energy, 2.8±0.21 kcal g^{-1} all on dry matter basis. Minerals, amino acids and antinutrients were also determined. Methionine and to a lesser extent, lysine, arginine, leucine and aspartate were high. The ACLM was incorporated into formulated broiler starter diets at varying inclusion levels of 0, 5, 15 and 25%. The diets were duplicated with a set supplemented with Roxazyme G2 in a 2×4 factorial

experiment. All the 8 diets including the control diets were formulated isocaloric and isonitrogenous and fed to the experimental chicks (n = 288) from day 3 to day 24. Statistical main effects indicated that broiler chicks in which ACLM was incorporated at 5% inclusion level in their diet with Roxazyme G2 supplementation was found to have the highest weight gain. Feed consumption value is found to be highest in chicks fed diet 8 at 25% inclusion level of ACLM with Roxazyme G2 supplementation. The feed conversion value obtained for birds on diet 4 with Roxazyme G2 supplementation was the best. Broiler chicks on diet 4 also had the best value for Protein Efficiency Ratio (PER). There were no significant differences ($p>0.05$) in all the hematological parameters investigated. The additive inclusion of Roxazyme G2 in broiler diets can further increase the use of ACLM as a protein source effectively at 5%. There were no deleterious effects even up to 25% ACLM inclusion level with enzyme supplementation. *(American Journal of Food Technology, 4 (3): 108-118, 2009; **doi:** 10.3923/ajft.2009.108.118)*

Kinetics of Moisture Uptake of Osmo-Foam-Mat Dried Mango Powders and Application of Sorption Isotherms to Shelf-Life Prediction

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The kinetics of moisture uptake by foam-mat dried powder from mango pulp was evaluated at four temperatures (10, 20, 30 and 40°C) and two relative humidities (55 and 80%), while moisture sorption data for shelf life prediction was determined at the same temperatures and eight water activities ranging from 0.032-0.925. Result show that the rate of moisture uptake was highly in the first 2 to 4 h at any given storage temperature and relative humidity. Moisture uptake generally decreased with increase in storage temperature but did not show a defined trend after the first few hours. The rate of moisture uptake was higher at 55 than at 80% storage relative humidities. Effective diffusivities of samples incorporated with foam stabilizes were higher due to high porosity. Moisture uptake obeyed the penetration theory indicating that the process was Fickan. Predicted shelf-life of the powders generally decreased with increased storage relative humidity and temperature. The predicted shelf-life of the powders was generally above 365 days. The shelf life of powders incorporated with foam stabilizers was generally shorter as they had lower equilibrium moisture content. Predicted shelf life of the powders was longer in packaging materials of low permeability to thickness ratio. *(American Journal of Food Technology, 4 (3): 119-125, 2009; **doi:** 10.3923/ajft.2009.119.125)*

In vitro Binding Capacity of Cholesterol and Bile Salts by Partially Depolymerized Chitosans

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Orthogonal design was used to optimize the binding capacity of Sodium Cholate (SC) and Sodium Deoxycholate (SD) by nine partially depolymerized chitosans obtained from a native chitosan using sodium nitrite ($NaNO_2$). The effects of sodium treatment on depolymerization of chitosan were investigated by measuring the molecular weight, viscosity and reducing sugar of chitosan. Depolymerization for 3 h reduced the molecular weight of the chitosan by 91% (26 kDa) compared to the native chitosan (458 kDa) with a decrease in viscosity of the chitosan solution and increased reducing sugar. The binding capacity of total cholesterol, SC and SD by chitosan samples were measured *in vitro* by enzymatic and HPLC methods, respectively. The optimized conditions were sodium nitrite (0.4%, w/v), acetic acid (1 and 2%, v/v), chitosan (3%, w/v) and reaction time (1 h) at room temperature, sodium chelate 69 μmol g^{-1} chitosan and deoxycholate125 μmol g^{-1} chitosan. The strongest binding capacity of sodium deoxycholate and total cholesterol was observed with partially depolymerized chitosan (average molecular weight 52 kDa) compared to the native chitosan. *(American Journal of Food Technology, 4 (3): 126-135, 2009;* ***doi:*** *10.3923/ajft.2009.126.135)*

Effects of Different Final Cooking Methods on Physico-chemical Properties of Breaded Fish Fillets

Y. Moradi, J. Bakar, S.H. Syed Muhamad and Y. Che Man

Breaded black pomfret (*Parastromateus niager*) fillets were pre-fried for 30 sec in sunflower oil and palm olein and stored at -20°C for one week prior to the final cooking. They were finally cooked by microwave, oven and deep-fat frying. Moisture loss, fat uptake, fatty acid, texture and color of the pre-fried and all completely cooked samples were evaluated. Final cooking methods resulted in the change in the fat and fatty acid composition of the pre-fried fillets. The least changes were observed in the oven cooked samples. Eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) in oven cooked samples were significantly ($p<0.05$) higher than the other cooked samples. They also had lower ratio of n-6/n-3 and lower thermal oxidation. The hardness was found highest in the final fried and lowest in the microwaved samples. Significant differences on the color of the final cooked samples were obtained among the different cooking methods. *(American Journal of Food Technology 4 (4): 136-145, 2009;* ***doi:*** *10.3923/ajft.2009.136.145)*

Effect of Stem Bromelain on the Browning of Apple Juice

B.N. Tochi, Z. Wang, Shi Ying Xu and W. Zhang

The effectiveness of pineapple stem protease (bromelain) in enzymatic browning inhibition was evaluated on apple juice and compared with that of L-cysteine and ascorbic acid at 25±1°C. The relative effectiveness of these anti-browning agents was determined in terms of color (L*) and enzymatic activity measurements with respect to time. L-cysteine at 0.7 and 1.0 mM concentrations gave the best results though the latter is associated with undesirable odor and bleaching effect. Ascorbic acid seemed to be only effective within the first 5 h after which its effectiveness dropped sharply. Stem bromelain, as compared to both L-cysteine and ascorbic acid, was found weakest in enzymatic browning inhibition hence considered ineffective. *(American Journal of Food Technology 4 (4): 146-153, 2009; **doi:** 10.3923/ajft.2009.146.153)*

Mineral and Proximate Composition of Cashew Apple (*Anarcadium occidentale* L.) Juice from Northern Savannah, Forest and Coastal Savannah Regions in Ghana

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In this study, variations in the mineral, phenol, tannin, vitamin C and sugar composition of cashew apple juice from three agro-ecological zones (Northern Savannah, Forest and Coastal Savannah) of Ghana were investigated. The mean proximate composition (mg/100 mL) was as follows: phenolics (269.5), condensed tannins (266.0), Vitamin C (231.4) and sugars (12.05 mg mL^{-1}). The mineral composition (mg/100 mL) showed potassium (76.0) to be the highest, followed by calcium (43.0), magnesium (10.92), phosphorous (0.79) and sodium (0.41). Zinc, copper and iron concentrations were much lower and ranged from 0.05-0.08 mg/100 mL. The physicochemical properties of the juice were as follows: pH (4.31), colour (light yellow for juice from yellow apples and yellow with traces of red pigments for juice from red apples). Phenol and tannin contents in the juice showed significant ($p<0.05$) variation among the ecological zones. Thus, apples from the Forest transitional zone appear to be better for juice extraction because of their relatively low tannin, higher pH, higher sugar and less phenolic content. No significant differences in the quantitative composition of calcium, iron, zinc and phosphorus could be attributed to the ecological zone or colour from which the juice was extracted. *(American Journal of Food Technology 4 (4): 154-161, 2009; **doi:** 10.3923/ajft.2009.154.161)*

Preparation and Characterization of Highly Flexible Chitosan Films for Use as Food Packaging

N. Niamsa and Y. Baimark

Highly flexible chitosan films were prepared by film casting of chitosan solutions by using lactic acid solutions as the solvents compare to acetic acid solution. Influences of chitosan molecular weights (100 and 740 kDa), lactic acid concentrations (1.0, 1.5 and 2.0% w/v) and lactic acid configurations (L- and DL-forms) on film characteristics were investigated. Fourier transform infrared (FTIR) spectra of the films showed that there were intermolecular bonds between chitosan film matrices and lactic acids. Tensile strengths at break of the films decreased and percent elongations increased when the lactic acid was used instead of acetic acid for dissolving chitosan. Flexibility of the chitosan films increased with the lactic acid ratio for the both L- and DL-lactic acids. The L-lactic acid showed higher plasticization effect than the DL-lactic acid. Film transparency did not change, whereas wetability of the chitosan films increased as the lactic acid ratio increased. *(American Journal of Food Technology 4 (4): 162-169, 2009;* ***doi:*** *10.3923/ajft.2009.162.169)*

Steamed-Dried Squashes (*Cucurbita* sp.) Can Contribute to Alleviate Vitamin A Deficiency

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To promote the consumption of squashes flesh, the vitamin A potential of steamed-dried squashes from Cameroon was evaluated in determining the beta-carotene content through HPLC method in raw, steamed and steamed-dried peeled flesh of three squashes species: *Cucurbita moshata* cv. Dickinson, *Cucurbita maxima* cv. Hungarian Blue and *Cucurbita pepo* cv. Sacred Indian Rattle. The vitamin C and total lipids contents were also titrated with 2, 6 dichlorophenol indophenol dye and extracted with hexane in a soxhlet apparatus for 6 h, respectively. The moisture content was estimated by drying in an oven at 105°C until constant weight. The beta-carotene contents of dried steamed squashes were 2834.75±11.22; 3043.91±1.65 and 5917.83±720.49 µg/100 g serving of *C. pepo*, *C. moshata* and *C. maxima*, respectively. The vitamin C contents ranged from 5.70±0.32 µg/100 g serving (*C. moshata*) to 11.81±0.19 µg/100 g serving (*C. maxima*). Total lipids ranged from 6.22±0.00 g/100 g serving (*C. pepo*) to 7.09±0.11 g/100 g serving (*C. moshata*) and the water remaining

ranged from 6.39±1.18 g/100 g serving (*C. maxima*) to 8.19±0.70 serving (*C. pepo*). Drying of steamed squashes seemed to result in a significant concentration of beta-carotene content (71 and 89 times higher than those of steamed squashes). The same effect was observed for the vitamin C content (about 1.7 times) and the total lipid content (6 to 12 times). These results suggest that as a ready to eat product, steamed-dried squashes could contribute to fight against vitamin A deficiency if they are well conserved. *(American Journal of Food Technology 4 (4): 170-176, 2009; **doi:** 10.3923/ajft.2009.170.176)*

Acrylamide Status in Selected Traditional Saudi Foods and Infant Milk and Foods with Estimation of Daily Exposure

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This study reports the results of the survey study on acrylamide levels in selected traditional foods and infant powder milk and cereal based foods obtained from the Saudi market. Food samples divided into twelve groups. An LC-MS/MS method for the determination of acrylamide (AA) has been described. The samples were pre-dried, crushed/minced, degreased and mixed with D_3 acrylamide internal standard then acrylamide was water extracted at 60°C. The aqueous solution was clean-up using a Carrez-Precipitation followed by centrifugation. The clean-up extract was then analyzed by LC-MS/MS. The method was applicable to detect AA in different food types at concentration of ≈30 μg kg^{-1}. The extraction method was developed to enable detecting of traces of AA. A second sensitive extraction method was followed in order to allow a concentration of AA as low as 1-5 μg kg^{-1}. In general, the acrylamide (AA) level in different food groups were in order, grilled egg-plant>coffee (soluble)>extruded maize>cookies (korse Omer; tweel) and biscuit>extruded maize (cheese) and cookies> French fries>sweet (zalabia)>bread and cooked palm date (Hunaini)>out layer of fried fish>infant powder milk and cereal foods. The highest value of acrylamide (950 μg kg^{-1}) was detected in grilled egg-plant whereas the lowest value was detected in baby powder milk (3.4 μg kg^{-1}). The calculated daily intake amounted to 60 μg AA/person/day which corresponds to 0.86 μg kg^{-1} b.wt. day^{-1} (body weight of 70 kg). The average daily AA dietary intake of different infant milk brands, analyzed in the present study, during the first six months of birth amounted to 0.63 μg day^{-1}. This is corresponding to 0.075 μg AA kg^{-1} b.wt. day^{-1} (body weight of 8 kg). The outcome of this study has strongly recommended the necessity to conduct a large-scale survey in order to evaluate the levels of acrylamide in traditional foods. Thus, the true risk levels related to AA intake will be accurately estimated. *(American Journal of Food Technology 4 (5): 177-191, 2009; **doi:** 10.3923/ajft.2009.177.191)*

In vitro Antimicrobial Evaluation of *Zingiber officinale*, *Curcuma longa* and *Alpinia galanga* Extracts as Natural Food Preservatives

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In the present study, antimicrobial activity of various extracts of *Zingiber officinale*, *Curcuma longa* and *Alpinia galanga* were screened against the common food borne bacteria such as *Escherichia coli*, *Salmonella enteriditis*, *Clostridium perfringens*, *Staphylococcus aureus*, *Campylobacter jejuni*, *Bacillus cereus* and fungi such as *Saccharomyces cerevisiae*, *Hansenula anomala*, *Mucor mucedo*, *Candida albicans* using disc diffusion method. All the extracts showed significant antibacterial and antifungal properties. The methanol extracts (100 μg mL^{-1}) revealed maximum zone of inhibition ($p<0.001$). *Zingiber officinale* and *Curcuma longa* possessed considerably greater activity than *Alpinia galanga*. These findings established the potential of the selected rhizomes of Zingiberaceae family as effective natural food preservatives. *(American Journal of Food Technology 4 (5): 192-200, 2009;* ***doi:*** *10.3923/ajft.2009.192.200)*

Effect of *Lactobacillus lactis cremoris* Isolated from Kefir against Food Spoilage Bacteria

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The present study aims to control the food spoilage bacteria associated with food poisoning by LAB where it was isolated from kefir and identified as Lactobacillus lactis cremoris. Kefir is a delicious drink with probiotic activity. Nearly ten different food spoilage Bacteria's were isolated from spoiled food and it was used as test organisms. The susceptibility of test organisms towards the LAB was screened by the study of its effect of temperature, pH and Agitation. All the test organisms were labile to LAB. In this study, the LAB metabolite which is responsible for antibacterial activity shows its thermo tolerant even at 100°C for one hour. The activity of extract was very efficient at pH 4.5 and 6.5 and was ineffective at pH 8.5. The HPLC studies shows presence of bacteriocin and 68% was recovered. From this study we conclude that the lactic acid bacteria isolated from kefir which helps to control food spoilage and potential remedy to the food industries. The ability of the isolated LAB can produce heat stable as well as its acid tolerant which helps to prevent the contamination produced by endospore formers and other acid producing bacteria's. *(American Journal of Food Technology 4 (5): 201-209, 2009;* ***doi:*** *10.3923/ajft.2009.201.209)*

Development of a Milk Drink Added of Conjugated Linoleic Acid: Use of a Sensory Evaluation

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Three sensory tests had been applied to evaluate a chocolate flavor milk drink added of Conjugated Linoleic Acid (CLA) aiming at the selection of a final formulation with the best sensory characteristics. Initially, the triangular test with the samples added of CLA (CLABE) or canola (CANBE) were assessed by an untrained sensory panel comprising 20 assessors. An affective test with 66 probable milk drink consumers was carried out with CLABE or CANBE. In the third stage, 100 assessors had evaluated the sensory acceptance and the purchase intention of two chocolate flavor milk drinks added of 1.25% (1.25% CLABE) and 2.5% (2.5% CLABE) of CLA. In the triangular test, the assessors noticed the difference between prepared drinks ($p<0.5$). In the acceptance test, the CANBE was preferred to CLABE. However, 53% of the interviewed people affirmed the interest in increasing the consumption of a milky product able to reduce body weight. In the acceptance test applied in the third stage, 1.25% CLABE was preferred to 2.5% CLABE. No statistic difference was observed between the two drinks for the purchase intention carried out at the same time of the sensory evaluation. However, the evaluation of this parameter almost doubled, passing from 16 to 31% for the point certainly I would buy, when the assessors was informed that the CLA added drink could help in the reduction of the body weight. *(American Journal of Food Technology 4 (5): 210-217, 2009;* ***doi:*** *10.3923/ajft.2009.210.217)*

Nutritional Analysis and Stability Studies of Some Natural and Synthetic Food Colourants

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The pH, titratable acidities, proximate and mineral compositions of two natural colourants and three synthetic colourants were determined. The pH and titratable acidity were determined over a period of 14 days at 24 h intervals. The natural colourants were the calyxes of *Hibiscus sabdariffa* (SL) and the stem of *Sorghum bicolour* (KD), while the synthetic colourants were Egg Yellow (EY), Chocolate Brown (CB) and Dark Orange (DO). The pH of all samples increased as the number of days increased. The pH of SL was considerable lower than that of other colourants in this study (from 1.6 on day 1 to 2.7 on day 14) thus suggesting high acidity while the other colourants had basic pH (5.6-6.2 on day 1

to 7.4-8.4 on day 14). The natural colourants had higher moisture, lipid, carbohydrate and fibre contents while the synthetic colourants were very high in ash content. The protein contents of the colourants were fairly uniform irrespective of their sources. The synthetic colourants were particularly high in K and Mg while the natural colourants were rich in Ca. *(American Journal of Food Technology 4 (5): 218-225, 2009; **doi:** 10.3923/ajft.2009.218.225)*

Optimization of Enzymatic Hydrolysis of Defatted Sesame Flour by Different Proteases and their Effect on the Functional Properties of the Resulting Protein Hydrolysate

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Sesame Protein Hydrolysate (SPH) was prepared from defatted sesame (*Sesamum indicum* L.) flour (DSF) after screening with different proteases. The proteases under different conditions showed varied effects on the protein recovery process. For example, Alcalase® 2.4 L produced the highest degree of protein recovery (96.68%) at 60°C and pH 8 followed by Flavourzyme (69.76%). However, at 50°C and pH 7, the highest protein recovery was noted for Flavourzyme (79.28%) followed by Alcalase 2.4 L (77.62%). The hydrolysis conditions (Temperature T, pH, Enzyme/Substrate E/S, time t) were engineered to optimize the degree of hydrolysis (DH) with the process studied using the Response Surface Methodology (RSM). The DH ranged from 1.19 to 18.8% while the solubility of the Defatted Sesame Protein Isolate (DSPI) increased with increase in pH. The SPH was observed to be a better emulsifier with significantly higher foaming properties, water and oil capacities compared to the untreated DSF. Nonetheless, the stability of the resulting foam diminished on standing over time. The Sesame protein hydrolysate obtained using Alcalase was noted to have better functional attributes compared to that obtained using Flavourzyme. *(American Journal of Food Technology 4 (6): 226-240, 2009; **doi:** 10.3923/ajft.2009.226.240)*

Phenolics, Selenium, Vitamin C, Amino Acids and Pungency Levels and Antioxidant Activities of Two Egyptian Onion Varieties

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Selenium, vitamin C, pungency, amino acids, phenolics content and antioxidant activities of two Egyptian onion varieties, namely white (Giza-6) and red (Beheri)

onions have been studied. Data analysis showed that the red variety presents higher values for selenium, vitamin C and sulphur-containing amino acids. Concerning pungency, white onion can be classified as intermediate pungency (8.24 μmol of Pyruvic acid/100 g fresh wt.) and red as pungent (11.37 μmol of pyruvic acid/100 g fresh wt.). The phenolic acids, flavonols, anthocyanins and total phenolics content in red variety (81.59, 70.38, 7.56 and 187.17 mg/100 g fresh wt., respectively) were higher than for white variety (72.47, 32.49, 4.90 and 131.65 mg/100 g fresh wt., respectively). Consequently, antioxidant activity was higher for the red variety. Correlation analysis indicates that phenolic compounds beside other factors including Se and sulphur-containing amino acid contents play the major role in the antioxidant activity of onion bulbs. The antioxidant capacity of freeze dried powder from both onion varieties was also tested in sunflower oil-in-water emulsions and hydroperoxide formation was monitored during storage at 40°C. In accordance with differences in Se, sulphur-containing amino acid and phenolics content, Egyptian red onions had better antioxidant activity, while white onions was only effective in the early stages of the oxidation process. These data indicates that red variety has higher potential health benefits related to the presence of antioxidant compounds. *(American Journal of Food Technology 4 (6): 241-254, 2009;* ***doi:*** *10.3923/ajft.2009.241.254)*

Comparative Study of Chemical Composition and Physicochemical Properties of Two Varieties of Defatted Foxtail Millet Flour Grown in China

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In this study, we examined the chemical composition and physicochemical properties of two varieties defatted foxtail millet flour grown in China. The seeds were obtained, milled and sieved to produce flour. The flours were tagged DFMFW and DFMFY for defatted foxtail millet flour white and defatted foxtail millet flour yellow, respectively. The protein contents of DFMFW and DFMFY were 11.92 and 11.39, respectively. DFMFY had higher mineral elements, ash and fat content than DFMFW. Essential amino acids were above the recommended amount by Food Agricultural organization/World Health Organization (FAO/WHO) for humans. The foxtail millet flours had molecular sizes below 14.4 kDa and above 97.0 kDa. They had similar solubility curves. Water binding capacity was in the range of 1.36 and 1.26 g g^{-1}, while oil absorption capacity ranged between 0.78 and 0.50 g g^{-1} for both DFMFW and DFMFY, respectively. A low bulk density (0.27 and 0.23 g mL^{-1}) and was also low in total phenolic assay (0.56 and 0.72 mg g^{-1}) was observed for both

DFMFW and DFMFY, respectively. Foam capacity was 13.36 mL for DFMFW and 12.32 mL DFMFY. Their infrared falls within (1600 and 600 cm^{-1}) and both samples possessed O-H and C-H compounds. Defatted foxtail millet flour could be used in food formulation with less fear of retrogradation. *(American Journal of Food Technology 4 (6): 255-267, 2009;* ***doi:*** *10.3923/ajft.2009.255.267)*

Characterization, *in vitro* Trypsin Digestibility and Antioxidant Activity of Fermented Soybean Protein Meal with *Lactobacillus plantarum* Lp6

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In this study, soybean protein meal was subjected to solid state fermentation with *Lactobacillus plantarum* Lp6 either in the presence or absence of a protease. The extracts were investigated for changes in mineral composition, amino acid composition, *in vitro* trypsin digestibility, DPPH radical scavenging activities and electrophoretic pattern. The amino acid and mineral element compositions showed significant ($p<0.001$) variations among the samples. The Fermented Soybean Protein Meal (FSPM) with protease added (FSPMe) showed higher total free amino acid (4.8467 g/100 g sample) compared to 0.2523 g/100 g sample obtained for unfermented Soybean Protein Meal (SPM). The FSPMe had the highest *in vitro* trypsin digestibility and showed a single polypeptide with estimated molecular weight of 14.4 kDa in the sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) assay. *(American Journal of Food Technology 4 (6): 268-276, 2009;* ***doi:*** *10.3923/ajft.2009.268.276)*

Re-Evaluation of Individual and Combined Garlic and Flaxseed Diets on Hyperlipidemic Rats

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The aim of this study was to re-evaluate the effect of individual garlic and flaxseed and for the first time, we studied the effect of combined consumption of 10% of flaxseed and garlic, for 30 days on biochemical and histological factors of hyperlipidemic rats. The feeding trial was conducted on rats with high levels of serum cholesterol and triacylglycerol. Histological results showed a marked improvement of kidney tissues responding to garlic alone and a combined flaxseed and garlic diet but a slight histopathological change were noticed in flaxseed diet

group. Garlic results showed no histopathological changes in aorta, kidneys and liver that may illustrate the healing effect of fresh garlic on tissues. Biochemical results indicated that the mean of blood total cholesterol, triacylglycerol were reduced, as the effect of fresh garlic (FGD), flaxseed (FD) and combined fresh garlic and flaxseed diet (FFGD) but HDL-C was increased in fresh garlic diet only. Best results were obtained from flaxseed diets that reduced cholesterol levels markedly to 115% over negative control group. Slight reduction of serum levels of LDL-C has noticed in flaxseed (FD) and fresh garlic diets (FGD). These results may support the Mediterranean diet consumption that is rich in fresh food such as fresh garlic and seeds that may protect from heart disease. *(Pakistan Journal of Nutrition 8 (1): 1-8, 2009; **doi:** 10.3923/pjn.2009.1.8)*

Quality Comparison of Probiotic and Natural Yogurt

Istikhar Hussain, Attiq-ur-Rahman and Nigel Atkinson

The study was conducted to evaluate and compare the quality of probiotic and natural yogurt. Several samples of probiotic and natural yogurt were bought from supermarkets in Middlesborough (UK) and analyzed for physico-chemical, microbiological and organoleptic properties. Physico-chemical analysis showed that probiotic yogurts have more pH, fat and solid not fat (SNF) contents compared to natural yogurt. While natural yogurts have higher Total Titrable Acidities (TTA) and total solids contents, compared to probiotic yogurts. Organoleptically, probiotic yogurt was found more acceptable compared to natural yogurt. However, the fat contents of natural yogurt are lower and that might affect the overall acceptability of the yogurt. Similarly, an increase in the TA of the natural yogurt might affect the quality of the product. Microbiological analysis found no significant variation in total viable count between probiotic and natural yogurt. *(Pakistan Journal of Nutrition 8 (1): 9-12, 2009; **doi:** 10.3923/pjn.2009.9.12)*

Biochemical Compounds and Nutritional Roles of the Foods Explained in the Qur'an

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Moslems believe that Islam is the most perfect religion and Qur'an the most perfect book that explains all human needs with the best style and there isn't any defect in

Islam and Qur'an. The Holy Qur'an says; let man consider his food. Therefore we have decided to investigate the nutritional roles of those foods stated in Qur'an and their biochemical compounds. Almost all diet that is known as complete food today, mentioned in Qur'an and their advantages explained occasionally. A number of verses justified some differences that there were in divine religions about food consumption and a few explained advantages and disadvantages of certain nutrients and drinks such as wine. However according to our knowledge about nutritional roles of food in Qur'an it could be concluded their importance in health and prevention of disorders. Nevertheless, Islam has stressed on health and ordered to save it as a deposit, so the foods mentioned in Qur'an might have a lot of advantages, for example the best oil that has protective role in atherosclerosis is olive oil that is contain of a lot of ω9 fatty acids, researchers say today, olive is mentioned several times in Holy Qur'an. It is more possible that many unknown advantages in olive and other Qur'an's nutrients exist that will be revealed in future. Therefore Moslem scientists have an important duty to reveal a part of these unknowns. *(Pakistan Journal of Nutrition 8 (1): 13-19, 2009;* ***doi:*** *10.3923/pjn.2009.13.19)*

Microbiological and Nutritional Quality of Hawked Kunun (A Sorghum Based Non-Alcoholic Beverage) Widely Consumed in Nigeria

N.A. Amusa and O.A. Odunbaku

The microbiological and nutritional quality of freshly processed and hawked kunun drinks in South Western Nigeria was investigated at Ibadan, Nigeria. The microbes found associated with both the hawked and the laboratory prepared kunun samples are *Lactobacillus plantarum, Bacillus sutilis, B. cereus, Streptococus feaceaum, S. lactis, Staphylococcus aureus, Micrococcus acidiophilis, Escherishai coli, Pseudomonas aureginosa, Saccharomysces cerevisiae, Candida mycoderma, Aspergillus niger, Penicillium oxalicum* and *Fusarium oxysporum.* However, the freshly processed kunun drinks harbored no coliform bacteria. The crude protein content of the hawked kunun drinks was found higher than that of the laboratory processed kunun samples, while the P^H of the Kunun zaki drinks were highest in the laboratory processed samples. However, there were no significant differences between the carbohydrates contents of the laboratory processed kunun drinks sample and that of the hawked kunun drinks. *(Pakistan Journal of Nutrition 8 (1): 20-25, 2009;* ***doi:*** *10.3923/pjn.2009.20.25)*

Studies on Nutritional Values of Some Wild Edible Plants from Iran and India

Ali Aberoumand and S.S. Deokule

The most important nutrients present in plants are: carbohydrates, such as the starch and free sugars, oils, proteins, minerals, ascorbic acid and the antioxidant phenols. The Plants *Alocacia indica Sch.,Asparagus officinalis DC., Chlorophytum comosum Linn., Cordia myxa Roxb., Eulophia ochreata Lindl., Momordica dioicia Roxb., Portulaca oleracia Linn.* and *Solanum indicum Linn.* are widely wild in many regions of Iran and India. These are consumed as fruits and vegetables. Therefore, to analyze the nutritional values in them, these plants are selected. Association of the Official Analytical Chemists Methods and Folin-Ciocalteau micro method are used for nutritional analysis of the plants. Results indicated that *Portulaca oleracia Linn.* and *Asparagus officinalis DC* have high amounts of proteins, fats and calorie values. Therefore, these plants are recommended for consumers as vegetables in their diet. The most of the Iranian and Indian people are using these plants in their daily diet. *(Pakistan Journal of Nutrition 8 (1): 26-31, 2009;* ***doi:*** *10.3923/pjn.2009.26.31)*

Nutritional and Antinutritional Components of *Pennisetum purpureum* (Schumach)

C.C. Okaraonye and J.C. Ikewuchi

The matrices of young shoots of *Pennisetum purpureum* (Schumach) were subjected to proximate and phytochemical analyses. The proximate profile included moisture (89.00%), total ash (2.00% WW and 18.18% DW), crude protein (2.97% WW and 27.00% DW), crude fat (1.63% WW and 14.82% DW), total carbohydrate (3.40% WW and 30.91% DW) and total metabolizable energy value (34.48 kcal 100 g^{-1} WW and 313.45 kcal 100 g^{-1} DW). The phytochemical screening revealed the presence of alkaloids, cyanogenic glycosides, flavonoids, oxalates, phytates, saponins and tannins. The anti-nutrients composition included tannins (28.640%), cyanogenic glycosides (2.830%), oxalates (0.159%), phytates (0.006%) and saponins (0.850%). This result suggests relative safety for consumption and the possibility of improving the nutritional quality of *Pennisetum purpureum* through dehydration. *(Pakistan Journal of Nutrition 8 (1): 32-34, 2009;* ***doi:*** *10.3923/pjn.2009.32.34)*

Nutritional Potential of *Oryctes rhinoceros* larva

C.C. Okaraonye and J.C. Ikewuchi

The proximate and mineral profiles of the larva of *Oryctes rhinoceros* were investigated. The fatty acid profile of the larval oil and the amino acid profile of the larval protein were also determined and from the latter, the protein score was evaluated. A high protein content (42.29% wet weight) rich in the essential amino acids (with histidine, methionine and phenylalanine being predominant) with a protein score of 72.97% and valine as the limiting amino acid was observed. The larval oil had a high proportion (60.34%) of unsaturated fatty acids, including the essential fatty acid linoleic acid. A high ash content (12.70% wet weight) containing a high proportion of manganese and iron (3.80 mg 100 g^{-1} and 10.70 mg 100 g^{-1}, respectively) was observed. The other mineral elements, calcium, magnesium, potassium, sodium, copper and phosphorus were only present in small concentrations (0.20-0.99 mg 100 g^{-1}). The larva could form a base for new food/feed products of considerable nutritive value, especially in view of its high protein content. *(Pakistan Journal of Nutrition 8 (1): 35-38, 2009;* ***doi:*** *10.3923/pjn.2009.35.38)*

Utilization of Low-Grade Cassava Meal (Gari) in the Diets of Egg Type Chicks (0-8 Weeks)

Vantsawa Philip Anthony

An experiment was conducted to evaluate the utilization of low-grade cassava meal (gari) in the diets of egg type chicks (0-8 weeks). The proximate analysis of gari showed that it has 2.5% crude protein, 0.3% ether extract and 3.5% crude fibre. One hundred and ninety two days old egg type chicks having equal weight were randomly allocated to six dietary treatments with two replicates and 16 birds per each replicate. The six dietary treatments composed of rations in which graded levels of gari replaced maize up to 100% in treatment six. The results showed a significant decrease ($p<0.05$) in feed consumption as the level of gari increased in the diets, while weight of birds and weight gain were significantly lower ($p<0.05$) for those with higher levels of gari. The feed to gain ratio and percent mortality did not show any significant difference ($p>0.05$). There was a decrease in cost (N)* Kg gain in weight as the level of gari increased in the diet with a savings of N65.44 k for the last treatment. It is therefore economical to use gari as a substitute for maize in the diet of egg type chicks. *(Pakistan Journal of Nutrition 8 (1): 39-41, 2009;* ***doi:*** *10.3923/pjn.2009.39.41)*

Impact of Helminth Parasitism on Fish Haematology of Anchar Lake, Kashmir

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The present investigation carried out seasonally from March 2004 to February 2006 is an attempt to study the impact of helminth parasitism on fish haematology of Anchar Lake, Kashmir. The fish fauna viz., *Schizothorax* spp. and *Cyprinus* spp. inhabiting the lake carried cestode, trematode and acanthocephala infestations either singly or mixed. The result showed a mean significant decrease from 9.39±0.18-7.39±0.14 g% in *Cyprinus* spp. and 10.57±0.23-7.62±0.13 g% in *Schizothorax* spp. for haemoglobin. Further, a decrease from 2.07±0.03-1.66±0.05 ($\times 10^6$ mm^3) in *Cyprinus* spp. and 2.32±0.02-1.69±0.04 ($\times 10^6$ mm^3) in *Schizothorax* spp. for RBC count in summer season was observed. However, a significant increase in WBC count was observed with a mean increase from 1.58±0.16-3.93±0.33 ($\times 10^4$/mm^3) in *Cyprinus* spp. and 1.56±0.10-2.76±0.27 ($\times 10^4$ mm^3) in *Schizothorax* spp. in summer season. Furthermore, a well marked increase in eosinophils was observed in all the helminth-infected fish fauna. The haematological manifestation of the infected fish are suggestive of *anaemia* and the *eosinophilia* may be believed to be associated with defensive and immunological responses of the fish. *(Pakistan Journal of Nutrition 8 (1): 42-45, 2009;* ***doi:*** *10.3923/pjn.2009.42.45)*

Effect of Replacement of Groundnut Cake with Decorticated Sunflower Cake on the Performance of Sudanese Desert Lambs

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Twelve Sudanese desert lambs of age less than one year and of average weight 18.5 Kg were utilized for this study. These lambs were divided into three groups of the equal number and initial weight to study the effect of replacing Groundnut meal by decorticated Sunflower meal on the performance of Sudanese desert lambs. The study was conducted at Small Ruminant Research pens, Faculty of Agricultural Technology and Fish Sciences, Al-Neelain University, Jabel Awlia, Sudan. Three iso-nitrogenous and iso-caloric diets were formulated. These diets contained 0.00%, 50% and 100% Sunflower meal instead of Groundnut meal respectively. These diets were randomly assigned to the experimental groups.

Feeding was on *ad libitum* base for 35 days from 2 April to 14 May, 2007. Replacement of groundnut meal with decorticated sunflower meal had no significant effect on the final body weight, weight gain and feed conversion efficiency. But this replacement induced significant ($p < 0.05$) effect on feed intake. *(Pakistan Journal of Nutrition 8 (1): 46-48, 2009; **doi:** 10.3923/pjn.2009.46.48)*

The Proximate and Effect of Salt Applications on Some Functional Properties of Quinoa (*Chenopodium quinoa)* Flour

H.N. Ogungbenle, A.A. Oshodi and M.O. Oladimeji

The proximate and the effect of salt applications on the functional properties of quinoa flour were investigated. The salts used were, NaCl, Na_2SO_4, KCl, K_2SO_4 and CH_3COONa. The average proximate compositions were as follows: 13.50±0 0.05% Crude protein, 11.20±0.03% moisture, 6.30±0.03% fat, 9.50±0.02% fibre, 1.20±0.02% ash and 58.3±0.04% carbohydrate. The least gelation concentration of 16% w/v in deionized water was fairly improved to between 10% -14% w/v in the presence of all the salts applied. The foaming capacity of 9% in deionized water was greatly improved to between 20.5-35% depending on the type and level of salts used. The water holding capacity decreased at low salt levels when compared with absence of salt and increased with increase in salt levels while the emulsion capacity decreased with increase in salt levels. *(Pakistan Journal of Nutrition 8 (1): 49-52, 2009; **doi:** 10.3923/pjn.2009.49.52)*

Association Between Socioeconomic Factors and Obesity in Iran

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The present study was conducted to determine the relationship between socio-economic factors and obesity within a population from Iran. Male and female subjects (n=4977) aged 15-65 years, were recruited from the Great Khorasan province of Iran using a cluster-stratified sampling method. Demographic and

socioeconomic data were collected by questionnaire. Of the study population, 29.1% were overweight and 13.8% were obese. Being overweight and obese was significantly more prevalent among women than men and urban- compared to rural-dwellers. A high prevalence of overweight and obesity was seen among individuals who were divorced or widowed and among housewives, or individuals with poor education. Urbanization, age, illiteracy, female gender and divorced, or widowed status were significant predictors of obesity ($p<0.001$). The association of obesity with urban-dwelling which is consistent with previous reports was also found to be the most important determinant of obesity. The prevalence of obesity in urban residents of Iran is high, particularly among poorly educated women. A community-based approach using multiple strategies including appropriate education will be required to address this problem. *(Pakistan Journal of Nutrition 8 (1): 53-56, 2009; **doi**: 10.3923/pjn.2009.53.56)*

Estimation of Cholesterol Level in Different Brands of Vegetable Oils

J. Okpuzor, V.I. Okochi, H.A. Ogbunugafor, S. Ogbonnia, T. Fagbayi and C. Obidiegwu

An analysis of twenty one assorted brands of vegetable oils in Lagos Metropolis Nigeria, reveals varying levels of cholesterol content. Cholesterol was found to be present in most of the oil brands sampled using three standard methods. Cholesterol was detected in seventeen of the vegetable oil brands with concentration of less than 1 mg/ml while seven of the oil brands had cholesterol concentrations ranging between 1-4 mg/ml. Low iodine values were obtained in four of the vegetable oil brands and three of them had high acid values. High performance liquid chromatography (HPLC) confirmed the presence of cholesterol at varying concentrations in all the oil brands and gave the lowest detectable cholesterol values in all the oil brands. The Laser brand made from rapeseed had the highest cholesterol concentration of 3.2 mg/ml while Grand brand made from groundnuts had the least concentration (0.12 mg/ml) of cholesterol using HPLC analysis. Leibermann-Burchard method showed that Gino brand from palm kernel had the least concentration of cholesterol (3.86 mg/ml ±0.032) and the highest concentration of 3.996 mg/ml ±0.0404 was obtained in Sesame seed oil brand. This report is important in view of health implications of cholesterol in our diets. Consequently, we have been able to show that there is no cholesterol free oil in the market as shown on the vegetable oil brand labels.

Therefore, companies producing and marketing vegetable oils are enjoined to desist from misleading the public by labeling their products as "cholesterol free". They should indicate the amount of cholesterol present in the vegetable oil, no matter how small the quantity may be. *(Pakistan Journal of Nutrition 8 (1): 57-62, 2009; **doi:** 10.3923/pjn.2009.57.62)*

Different Salts Effects on the Germination of *Hordeum vulgare* and *Hordeum bulbosum*

A. Tavili and M. Biniaz

The germination responses of *Hordeum ulgare* seeds to saline stress caused by different salt types was studied. For this, 25 seeds of mentioned species were placed on filter paper in Petri dishes containing distilled water (control), 60, 120, 180, 240, 300, 360 and 420 mM. saline solution of NaCl, $CaCl_2$ an KCl. The results indicated that saline levels effects were significant ($P < 0.05$) for seed germination percentage, seed germination velocity, mean time to germination, length of the stem and radicle and seed vigour. Seed germination decreased significantly by increasing salinity levels. Also, the results showed that *H. vulgare* is more tolerant than *H. vulgare* against salinity in germination stage. *(Pakistan Journal of Nutrition 8 (1): 63-68, 2009; **doi:** 10.3923/pjn.2009.63.68)*

Energy, Fluids Intake and Beverages Consumption Pattern among Lactating Women in Tabriz, Iran

Reza Mahdavi, Leila Nikniaz and Seyedrafie Arefhosseini

In current study, we determined daily mean intake of energy and fluids and also beverages consumption pattern in lactating mothers and the possible effects of some maternal factors on infants' weight. Information on food and fluid intake was collected from 182 mothers. Weight and height of mothers and infants were measured and the body mass index (BMI) and weight for age Z-score (WAZ) were calculated. The mean energy and total fluid intake were compared by recommended values. Furthermore, the possible effects of some maternal factors on infants' weight were evaluated. The mean daily energy intake (2390±405 kcal) was lower than the mean calculated energy values (2458±258 kcal) and RDA (2733 kcal). Daily mean fluid intake (3050±540 ml) was approximately similar to the recommended values. Also a significant association between the WAZ of

children and maternal BMI (B = 0.36, p<0.001) and weight (B = 0.15, p<0.042) persisted. With regards to the effect of maternal nutritional status on weight of infants, appropriate nutritional educations and interventions are suggested for lactating women. *(Pakistan Journal of Nutrition 8 (1): 69-73, 2009; **doi:** 10.3923/pjn.2009.69.73)*

Some Physical and Mechanical Properties of Khinjuk

K. Heidarbeigi, H. Ahmadi, K. Kheiralipour and A. Tabatabaeefar

Khinjuk is oiling crop; therefore, physical and engineering properties are necessitate to determine for processing and equipment design. In this study, some raw material characteristics were determined for Khinjuk, in order to collect information about identifying some physical and mechanical properties of them. The average grain length, width and thickness were 5.49, 5.09 and 4.08 mm, respectively. The geometric mean diameter, thousand grain kernel and aspect ratio were 5.02 mm, 87.15g and 0.95, respectively. True density, bulk density and porosity were 1.01 kg m^{-3}, 0.55 kg m^{-3} and 45%, respectively while the static coefficient of friction varied from 0.45 on plywood surface to 0.56 on galvanized iron. The angle of repose for static and emptying were 48.33 and 23.74° degree, respectively. Whereas the failure force and elongation were 42.49 N and 1.35 mm respectively. *(Pakistan Journal of Nutrition 8 (1): 74-77, 2009; **doi:** 10.3923/pjn.2009.74.77)*

Moisture Content Modeling of Sliced Kiwifruit (cv. *Hayward*) During Drying

Ali Mohammadi, Shahin Rafiee, Alireza Keyhani and Zahra Emam-Djomeh

Drying behavior of kiwifruit slice was studied at 40, 50, 60, 70 and 80°C and at a constant air velocity of 1.5 m/s for constant sample thickness of 4 mm in a thin layer dryer. Sample weight, temperature and drying air velocity were measured during drying and drying curves were obtained for each experimental data. The curves were fitted to twelve different semi-theoretical and/or empirical thin-layer drying models to estimate a suitable model for drying of kiwifruit. Coefficients were evaluated by non-linear regression analysis. The models were compared based on their coefficient of determination (EF), root mean square error (RMSE) and reduced chi-square (x^2). Midilli model had the highest value of EF

(0.999319), the lowest RMSE (0.032536) and x^2 (0.001119). The Midilli model was found to satisfactorily describe the drying behavior of kiwifruit. *(Pakistan Journal of Nutrition 8 (1): 78-82, 2009; **doi:** 10.3923/pjn.2009.78.82)*

Phytochemicals Investigation on a Tropical Plant, *Syzygium cumini* from Kattuppalayam, Erode District, Tamil Nadu, South India

A. Kumar, R. Ilavarasan, T. Jayachandran, M. Decaraman, P. Aravindhan, N. Padmanabhan and M.R.V. Krishnan

The developing countries mostly rely on traditional medicines. This traditional medicine involves the use of different plant extracts or the bioactive constituents. This type of study provides the health application at affordable cost. This study such as ethnomedicine keenly represents one of the best avenues in searching new economic plants for medicine. In keeping this view in mind the present investigation is carried out in *Syzygium cumini* seed of Kattuppalayam, Erode District, Tamil Nadu, South India. The results suggest that the phytochemical properties of the seed for curing various ailments. *(Pakistan Journal of Nutrition 8 (1): 83-85, 2009; **doi:** 10.3923/pjn.2009.83.85)*

The Effect of Hypercholesterolemia on Serum Vascular Endothelial Growth Factor and Nitrite Concentrations in Early Stage of Atherosclerosis in Rabbits

Shaghayegh Haghjooyjavanmard, Mehdi Nematbakhsh and Masoud Soleimani

Vascular Endothelial Growth Factor (VEGF) and Nitric Oxide (NO) play an important role for maintaining endothelial integrity. The purpose is to investigate the VEGF alteration during early atherosclerosis lesion formation in an animal model of hypercholesterolemia. We also measured nitrite to observe the relationship between VEGF and endothelial NO production. 20 white male rabbits randomly assigned in 2 groups (1% high-cholesterol diet, HC group, n = 14, or standard diet, control, n = 6) for 4 weeks. The serum levels of VEGF and nitrite (NO metabolite) were determined. Fatty streaks were measured in rabbit's aortas. The results indicated that the serum level of VEGF concentration was significantly higher in hypercholesterolemic rabbits and negatively correlated with fatty streak lesions ($r = -0.89$, $p<0.05$). The serum level of nitrite was significantly higher in

HC group than the control ($p<0.05$). There was a significant negative correlation between serum level of nitrite and VEGF ($r = -0.55$, $p<0.05$). It is concluded that, the increased VEGF in early atherosclerosis may be regarded as a safeguarding response to endothelial injury, which is responsible for maintaining endothelial integrity. *(Pakistan Journal of Nutrition 8 (1): 86-89, 2009; **doi**: 10.3923/pjn.2009.86.89)*

The Effect of Moisture Content on Physical Properties of Wheat

M. Karimi, K. Kheiralipour, A. Tabatabaeefar, G.M. Khoubakht, M. Naderi and K. Heidarbeigi

Physical properties often required for designing the equipments for planting, harvesting and postharvesting operations of seeds. Several physical properties of three popular wheat varieties (Shiraz, Karoun and Shiroudy) were determined and compared for moisture content in 8, 12 and 18% w.b in 2007 in University of Tehran. The average length, width and thickness were 6.75, 3.26 and 2.77 mm at a moisture content of 8% w.b., respectively. studies on rewetted wheat seeds showed that the thousand-kernel weight increased from 18.38 to 22.43g. The geometric and equivalent mean diameter, surface area, sphericity and aspect ratio at a moisture content of 8% w.b were 3.93, 3.94 mm, 48.68 mm^2, 0.58, 0.48, respectively. The porosity increased from 0.43 to 0.45 %. Whereas the bulk density decreased from 0.72 to 0.66kg m^{-3} and the true density from 1.25 to 1.19 kg m^{-3}, with an increasing in the moisture content range of 8B18% w.b. The static and dynamic angle of repose varied from 37.28 to 47.33 and 29.89 to 36.5°. The mean of static friction coefficient of three wheat varieties increased the linearly against surfaces of three structural materials, namely, compressed plastic (0.43 - 0.53), galvanized iron (0.33 - 0.53) and plywood (0.35 - 0.41) as the moisture content increased from 8 to 18% w.b. *(Pakistan Journal of Nutrition 8 (1): 90-95, 2009; **doi**: 10.3923/pjn.2009.90.95)*

Energy and Fluid Intake among University Female Students During and after Holy Ramadan Month

Reza Mahdavi, Sima Balaghi, Seyed Jamal Ghaem Maghmi, Elnaz Faramarzi, Farideh Shiri and Negar Koshki Zadeh

Insufficient daily fluid and energy intake during holy Ramadan may have adverse effects on humans' health. In previous studies the importance of energy, macro and

micro nutrients intake were emphasized whilst the importance of fluids intake were overlooked, so in this study, daily fluid, energy ,fiber and Ca intake of female students during Ramadan and after Ramadan were investigated and compared. In this descriptive study, 60 volunteer female students who lived on campus were recruited. Information on food and fluids intake was collected by using a three day food and fluid intake weighed record method in Ramadan and after Ramadan. This study was conducted in School of Public Health and Nutrition of Tabriz University of Medical Sciences in, 2005. In comparison with Ramadan, daily energy intake and the percentage of energy from fat sources increased significantly after Ramadan. (1400±571 vs. 1629±589kcal and 23% vs 32%). The average daily intake of fluids during Ramadan was higher than that of after Ramadan (2392±800 vs 1685±802ml). However the mean daily intake of fluid both during and after Ramadan was lower than the recommended values. The most consumed beverages during Ramadan were tea, water, soft drinks, milk and others whilst after Ramadan were tea, water, milk and soft drinks and others, respectively. Adequate energy and fluid intake, particularly milk and water in students during holy Ramadan are strongly recommended. *(Pakistan Journal of Nutrition 8 (1): 96-99, 2009; **doi**: 10.3923/pjn.2009.96.99)*

The Effect of the Submersion Length's in Virgin Coconut Oil on the Shelf Life of Chicken Meat under Room Temperature Storage

Salam N. Aritonang, Elsa Martineli and Risanti Eltiana

The research of the length submersion effect of chicken meat in Virgin Coconut Oil (VCO) on the shelf life of chicken meat under room temperature storage was done by using 4 kg breast meat of 6 weeks old broiler. The design of experiment was a completely randomized design where the treatment were 4 different submersion period of chicken meat in virgin coconut oil for 0 h (A), 1 h (B), 2 h (C) and 3 h (D) with five replication. The variables observed were content of moisture and protein, bacteria colony count and the shelf life of chicken meat. The result of this research indicated that submersion length's of the chicken meat in VCO has significantly decreased moisture content and bacteria colony count and increased the protein content and the shelf life of chicken meat. It showed that submersion of the chicken for 2 h in VCO has significantly improved the shelf life of the chicken meat (15 h) under room temperature. *(Pakistan Journal of Nutrition 8 (1): 100-102, 2009; **doi**: 10.3923/pjn.2009.100.102)*

Amino Acid Composition of *Dioscorea dumetorum* Varieties

Y. Alozie, M.I. Akpanabiatu, E.U. Eyong, I.B. Umoh and G. Alozie

The crude protein contents and amino acid compositions of two varieties of *Dioscorea dumetorum* (edible and wild) were determined. The crude protein (g/l00g) of the wild variety (11.37) was significantly higher ($P<0.05$) than the edible variety (7.0). The amino acid profiles showed both varieties to be limiting in lysine, methionine and cystine. The wild variety had tryptophan (0.60g/100g total aa), phenylalanine (3.01g/100g total aa), threonine (2.93g/100g total aa) and valine (3.6g/100g total aa) in substantial amounts when compared to the reference FAO pattern. Aspartic acid (4.47-9.28/100g total aa) was the most abundant amino acid in both varieties with the highest amount recorded for the wild variety. The chemical scores of the essential amino acids were tryptophan (60.0), threonine (43.5), valine (39.6), methionine (28.0) isoleucine (34.5), leucine (32.0), tyrosine and phenylalanine (39.0) and lysine (20.72) for the edible and tryptophan (117.0), threonine (73.25), valine (72.0), methionine (54.0) isoleucine (64.75), leucine (65.71), tyrosine and phenylalanine (83.67) and lysine (44.18) for the for the wild variety. This results being the first amino acid profiles recorded for this yam suggests that the wild *D. dumetorum* is richer in amino acid content than the edible variety and is likely to be of more benefit in human and animal nutrition. *(Pakistan Journal of Nutrition 8 (2): 103-105, 2009;* ***doi:*** *10.3923/pjn.2009.103.105)*

Evaluation of the Nutritive Value of Quality Protein Maize on the Growth Performance and Carcass Characteristics of Weaner Rabbits

J.J. Omage, O.C.P. Agubosi, G.S. Bawa and P.A. Onimisi

Quality protein maize (QPM) was used to substitute normal maize variety in intensive rabbit study in attempt to reduce the cost of production. Thirty-six weaner rabbits with age ranging between 6-8 weeks and weighing between 225-300g were assigned to six treatment groups in a completely randomized design; six rabbits per treatment were individually caged and fed. The ration involved a percent replacement of normal maize with Quality protein maize at 0, 25, 50, 75, 100 % levels of inclusion across the treatments. The control diet involves a 0% level of QPM supplemented with synthetic lysine. Water and feed was provided *ad-libitum* throughout the study period of 56 days. Feed intake, water consumption, weight gain and mortality were recorded. Results showed no significant difference ($P > 0.05$) in total feed intake, weight gain, feed efficiency, water consumption, mortality rate, feed cost/kg weight gain. However, there was

significant difference ($P < 0.001$) in feed cost/kg feed across the treatments. Carcass characteristics showed significant difference ($P < 0.05$) with no established trends in live weight, length of small and large intestines, liver, legs and tail. There was no significant difference ($P > 0.05$) in carcass weight, dressing percentage, heart, shoulder, loin, thigh, lungs, kidneys, spleen and head. The results indicated that feeding QPM to rabbits without lysine supplementation could sustain rabbits without affecting their performance, health and reduced cost of production. *(Pakistan Journal of Nutrition 8 (2): 106-111, 2009; **doi**: 10.3923/pjn.2009.106.111)*

Replacement Value of Normal Maize with Quality Protein Maize (*Obatampa)* in Broiler Diets

P.A. Onimisi, J.J. Omage, I.I. Dafwang and G.S. Bawa

Three hundred and sixty days old Ross Broiler Chicks were used in a completely randomized design feeding trial to evaluate the benefits of replacing Normal Maize (NM) with Quality Protein Maize (QPM) (*Obatampa* variety) in Broiler diets. There were 6 treatments of 3 replicates each and each replicate had 20 chicks. Six diets were formulated in which the NM in diet was replaced by QPM at 0, 25, 50, 75 and 100% representing T1, T2, T3, T4 AND T5, respectively while T6 was normal maize base diet balanced for lysine. The appropriate diets were fed to the birds for 4 weeks in the starter phase and 4 weeks in the finisher phase. At the starter phase, there was gradual numerical increase in weight gain as QPM increased in the diet. T5 was significantly better than T1-T4 but T6 was the overall best performance. Feed consumption was similar for T1-T5 but significantly higher for T6. Feed/gain ratio improved as QPM increased in the diet ($p<0.05$). Dressing % and weights of organs expressed as % of live weight and body parts expressed as % of dressed weight were not different statistically ($p>0.05$). *(Pakistan Journal of Nutrition 8 (2): 112-115, 2009; **doi**: 10.3923/pjn.2009.112.115)*

Effect of Oilseed Diets on Plasma Lipid Profile in Albino Rats

Ajayi, Olubunmi Bolanle and Ajayi, David Dais

The effect of fermented melon seed oil *(Citrullus lanatus)* (Ogiri) and palm kernel oil on the plasma lipid profile of female albino rats were investigated. Rats were randomly assigned into three groups and fed diet composed with fermented melon seed oil, palm kernel oil and control diet for seven weeks. After the feeding trial, plasma total cholesterol, low density lipoprotein cholesterol were significantly higher ($p<0.05$) than control in palm kernel oil diet while there was no significant difference in high density lipoprotein cholesterol. In contrast, the total cholesterol

and high density lipoprotein cholesterol were significantly higher ($p<0.5$) than control while the low density lipoprotein cholesterol was significantly lower ($p<0.05$) in the fermented melon seed oil diet. The Ogiri oil diet had significantly reduced LDL/HDL ratio compared with the control while the palm kernel oil diet had a higher LDL/HDL ratio. The result implies that fermented melon seed oil (Ogiri oil) appears to have hypolipidemic effect while dietary intake of palm kernel oil could pose a risk for coronary artery disease on long term basis. *(Pakistan Journal of Nutrition 8 (2): 116-118, 2009; **doi:** 10.3923/pjn.2009.116.118)*

Determination of Chemical Composition of *Senna-siamea* (Cassia Leaves)

Y.R. Alli Smith

The study on the chemical composition of the leaves of one of the most popularly known tropical plants, *Senna siamea (*Cassia leaves) has been carried out by analyzing samples of the plant leaves collected from Ado-Ekiti in Ekiti State for chemical composition. The proximate, elemental, phytochemicals and toxicant composition of the leaves of *senna siamea* were determined by analyzing samples of identified leaves using recommended method of analysis. The result of the analysis shows that the percentage crude protein, crude fibre, moisture content, ash content, carbohydrate and crude fat of the leaves are 4.01%, 12.36%, 46.01%, 17.93%, 7.67% and 12.02% respectively. The result of the mineral composition in PPM (Part per million) shows that iron, magnesium, manganese, potassium, calcium, sodium, copper, phosphorus and lead are 112.00, 876.00, 35.10, 812.00, 932.00, 612.00, 0.84 and 0.34 respectively while cadmium and vanadium was not detected in the leaves. The photochemical analysis shows that the leaves contain anthraquinones, alkaloids, phylobatannins and saponin and the toxicant composition shows the presence of tannin, oxalate and phytate. The minerals present in leaves shows that the leaves are good sources of essential nutrients but the presence of the toxicants shows that these leaves should be properly processed before consuming them. *(Pakistan Journal of Nutrition 8 (2): 119-121, 2009; **doi:** 10.3923/pjn.2009.119.121)*

Clinical Manifestation of Onchocerciasis in Ise-Orun Local Government, Ekiti State, Nigeria

S.O. Adewole and S.K. Ayeni

Survey of Onchocerciasis syndrome in Ise - Orun local Government Area of Ekiti State was carried out. Village in Ise - Orun Local Government Area of Ekiti State, Nigeria are at risk of Onchocerciasis parademic of the 4,100 subjects examined,

2008 representing 51.3% of 95% CI 0.49 - 0.53 were found to be suffering from Onchocerciasis infections. The highest infection rate of 50.4% at 95% CI 0.43 - 0.63 was recorded in Temidire and least percentage of 46.7% at 95% CI 0.3 - 0.64 was found in Aba Ada. The people of 56 years of age accounted for the highest prevalence of 50.3% at 95% CI 0.49 - 0.59 and least was found in 25 - 35 age cohort representing 43.3% at 95% CI 0.34 - 0.52 of the 2008 subjects infected, 29.1%, 50.9%, 4.5% and 15.5% were observed to be suffering from leopard skin, craw - craw, partial blindness and nodules respectively. The prevalence of Onchocerciasis infection was 48.9% in male, while female has the same 48.9% but with differences in the number of individual infected with onchocerciasis. Also, there was a significant difference ($P < 0.05$) between male and female susceptibility to onchocerciasis infection. The prevalence of onchocerciasis infection varied from village to village. *(Pakistan Journal of Nutrition 8 (2): 122-124, 2009; **doi:** 10.3923/pjn.2009.122.124)*

The Effect of *Phyllantus emblica* Linn on Type - II Diabetes, Triglycerides and Liver-Specific Enzyme

Shamim A. Qureshi, Warda Asad and Viqar Sultana

The effect of aqueous fruit extract of *Phyllanthus emblica* Linn was studied on type-II diabetes, triglycerides (TG) and liver-specific enzyme, alanine transaminase (ALT). Our study showed that aqueous fruit extract, in a dose of 200mg/kg body weight, significantly decreased the blood glucose level after its intra-peritoneal administration in alloxan-induced diabetic rats ($p<0.05$). Almost similar decreased in glucose level was also observed by chlorpropamide, a known antidiabetic drug in a dose of 84 mg/kg. The aqueous extract also induced hypotriglyceridemia by decreasing TG levels at 0, 1, 2 and 4 hours in diabetic rats ($p<0.05$). In addition, the extract was also found to improve liver function by normalizing the activity of liver-specific enzyme alanine transaminase (ALT). *(Pakistan Journal of Nutrition 8 (2): 125-128, 2009; **doi:** 10.3923/pjn.2009.125.128)*

Production and Characterization of Juice from Mucilage of Cocoa Beans and its Transformation into Marmalade

K.Y.B. Anvoh, A. Zoro Bi and D. Gnakri

More than 550,000m^3 of juice from mucilage of cocoa beans are produced and abandoned in farms each year. This cloudy substance is composed of 85.3% of moisture. Production and transformation into marmalade were made. High

performance liquid chromatography was used to identify reducing sugars and organic acids and gas liquid chromatography was used for minerals identification. Physical parameters were also determined. The results of analyses showed that the pH of the juice from cocoa beans was 3.14 and its glucose content was very high with around 214.2±6.2g/L. The total soluble solids were 16.17°Brix. The crude proteins and ascorbic acid contents of this natural syrup were evaluated at 7.2±0.21g/L and 18.3±7.5mg/L, respectively. Analyses also revealed that potassium and calcium contents of the cocoa beans syrup were 950±16.32mg/L and 171.5±34.1mg/L, respectively. Other minerals like sodium, magnesium and phosphorus are lower. This juice was high in citric acid at 9.1±0.6mg/L, malic acid at 3.6±0.5mg/L and acetic acid at 2.28±0.7mg/L. It was lower in fumaric acid, oxalic and lactic acid. Marmalade was produced with cocoa bean juice with additional sugar and cocoa placenta (11.5%) to the mucilage (44.72%). The output of the manufacture was 46.2%. Cellulose and fat contents were 5.36±0.43% and 5.23±0.15%, respectively. Total soluble solids were 67.14° Brix. Sensory evaluation was conducted on 1-5 point hedonic scale. The results of sensory rating were statically analyzed with student t-test. Analyses did not show any significant difference ($p = 0.5$) in taste, color and consistency compared with a commercial apricot marmalade. Appearance and acceptability were found significantly different ($p = 0.5$). On a 1-5 rating scale, the acceptability of cocoa marmalade (3.56±0.7) was fairly lower than that of commercial marmalade (3.96±0.5). Considering the output of manufacture, more than 239.2 tons of marmalade are expected to be produced each year. *(Pakistan Journal of Nutrition 8 (2): 129-133, 2009; **doi:** 10.3923/pjn.2009.129.133)*

Solubility of Solar Dried Jameed

Jihad M. Quasem, Ayman Suliman Mazahreh, Ibrahim Abdullah Afaneh and Amer Al Omari

Jameed is a fermented dried dairy product in the form of stone hard balls or other shapes produced by straining the heated buttermilk on cloth mesh bags, salting the formed paste by kneading, shaping and drying in the sun. This product is reconstitute after disintegration to be used in the preparation of Mansaf, the national dish in Jordan, which is basically lamb meat cooked in Jameed sauce (Sharab, Mareece) and served on cooked rice. This study aimed at improving the solubility of jameed and the colloidal stability of it is dispersion for this purpose a wettability and a syneresis test of dispersion were developed for the measurement of jameed solubility. Treating butter milk at 55°C for 3 min had the best result regarding jameed paste yield and solubility, along with enhancement of jameed

paste texture compared with the other heat treatment. The addition of Carrageenan (0.15%), to the Jameed paste resulted in improvement of solar dried Jameed with significant result for Carrageenan treatment as evaluated by wettability and syneresis test. Whipping of the paste to which carrageenan was used, added an additional improvement to the solubility of Jameed and stability of its dispersion. *(Pakistan Journal of Nutrition 8 (2): 134-138, 2009; **doi**: 10.3923/pjn.2009.134.138)*

A Survey on Antibody Levels among Individuals at Risk of Brucellosis in Khorasan Razavi Province, Iran

Seyed Mohammad Javad Parizadeh, Mohsen Seyednozadi, Majid Reza Erfanian and Mohsen Azimi Nezhad

Brucellosis is being reported with exceeding frequency in Iran. Serum antibodies in high-risk and general populations help to determine cut-off points and could be used as simple and fast diagnostic tests in involved areas. We have conducted the serum agglutination test, Combs' Wright and 2-mercaptoethanol titer determination on 908 healthy people. The analysis of our data shown that 275 out of healthy subjects, 30.3% were serum agglutination test and Combs' Wright test positive that 12% of them had titer more than 1:80 and 82.2% had titer less than 1:80. 56.3% of them were 2 mercaptoethanol titer positive. Basic and medium titers in whole of population were between 1:20-1:40. There are no high titers of these antibodies in endemic areas of Iran. *(Pakistan Journal of Nutrition 8 (2): 139-144, 2009; **doi**: 10.3923/pjn.2009.139.144)*

Effect of Storage Period on Chemical Composition and Sensory Characteristics of Vacuum Packaged White Soft Cheese

Mohamed Osman Mohamed Abdalla and Sohair Nusr Mohamed

The effect of storage period on chemical composition and sensory characteristics of white soft cheese was studied. Cheese was made from pasteurized cow milk, cooked and vacuum packaged. Chemical composition and sensory characteristics were determined at 0, 15, 30 and 45 day intervals. Results showed that fat, protein and total solids content decreased with the advancement of storage period, while ash content and titratable acidity increased throughout storage period. Formal Ripening Index and Shilovish Ripening Index increased as storage period progressed. Sensory evaluation indicated that colour and body of cheese did not significantly change during storage period, while flavour, taste, saltiness and overall

acceptability gradually improved throughout the storage period. *(Pakistan Journal of Nutrition 8 (2): 145-147, 2009; **doi:** 10.3923/pjn.2009.145.147)*

The Effects of Cola Acuminata on Arterial Blood Pressure

E.N.S. Igbinovia, A.C. Ugwu, A.O. Nwaopara, H.O. Otamere and W.A. Adisa

Caffeine has been proven to be vasoactive and augments the release of calcium from sarcoplasmic reticulum. Interestingly, caffeine is the most active principle of Cola acuminata-commonly consumed in Nigeria. This study is designed to determine its effects on blood pressure using 20 Sprague dawley rats with an average weight of 150g. The animals were subdivided into 2 groups of 10 rats each (control and test groups). The control rats were fed with rat chow while the test groups were fed with salt diet that was prepared by adding 7.7g of salt to 92.3g of normal rats chow in order to achieve hypertension. Substance extraction was by chloroform extraction. With the extract, different levels of the substance concentration were prepared and subsequently infused in sequence to the test rats. The results showed that diastolic blood pressure was more responsive to changes in concentration of Cola acuminata extract with a significant concentration dependent increase in the arterial blood pressure of both the normotensive and hypertensive rats. Considering the fact that Cola acuminata consumption is part of our culture and the fact that some become addicted, it is our opinion therefore, that the need for efforts towards identifying the cardiovascular implications of caffeine containing consumables, can never be over emphasized. *(Pakistan Journal of Nutrition 8 (2): 148-150, 2009; **doi:** 10.3923/pjn.2009.148.150)*

Studies of *Irvingia gabonensis* Seed Kernels: Oil Technological Applications

L. Matos, J.M. Nzikou, E. Matouba, V.N. Pandzou-Yembe, T. Guembot Mapepoulou, M. Linder and S. Desobry

Irvingia gabonensis seed kernels of two Congo Brazzaville localities (Ouesso and Sibiti) were analyzed for their main chemical composition. Studies were also conducted on properties of oil extracted from *Irvingia gabonensis* seed kernels and margarines. The following values were obtained for two seed kernels cultivars respectively: protein (8.33-8.71%), oil (34.28-73.82%), ash (2.06-3.8%) and carbohydrate (15.71-55%). Gas-liquid chromatography revealed that the major fatty acid was, C12:0 (36.6-39.37%), C14:0 (50.92-53.71%) and C16:0 (4.97-5.23%) in oil extracted from *Irvingia gabonensis* and in the margarines, there is C12:0 (13.7-14.5%), C14:0 (18.46-18.54%), C16:0 (18.81-19.3%) and

C18:1n-9 (36.35%), the unsaturated fatty acids such as C16:1 (0.33-0.385%), C18:3n-3 (0.62-0.64%) and C22:1n-9 (0.35-0.38%) are present. The margarines thus manufactured can tolerate temperatures of crackling because their linolenic acid content is lower than 2%. The differential thermal analysis shows the existence of two processes; crystallization and fusion. Crystallization in oil is done between 2 and 2.5°C and between -3.88 and 5.13°C in the margarine on the other hand fusion is carried out at high temperatures between 30 and 40°C. The addition of thin oils to *Irvingia gabonensis* oil during the margarine manufacture causes: increase in the unsaturated fatty acid content which results in the displacement of the peaks into the low melting point. The small percentages in lauric acid indicate that these greasy substances can be stored for a long time without fearing deterioration due to oxidizing rancidity. The margarine based on *Irvingia gabonensis* oil is an alternative to the Trans fatty acids obtained during hydrogenation and other reactions used in margarinery. *(Pakistan Journal of Nutrition 8 (2): 151-157, 2009; **doi:** 10.3923/pjn.2009.151.157)*

Chemical Composition of Ice Cream Produced in Khartoum State, Sudan

El Owni, O.A.O. and Zeinab, K.O. Khater

The objective of this study was to examine the effect of chemical composition on the quality of ice cream. The study was conducted during the period from September, 2003 to March, 2004, in the Laboratory of Dairy Production, Faculty of Animal Production University of Khartoum. Hundred samples were examined from ice cream machines and a modern factory. The results revealed a highly significant differences ($p < 0.001$) in all chemical components except protein and Sucrose. The results showed non significant differences ($p > 0.05$) in all chemical components due to flavor except total solids. There was non significant differences ($p > 0.05$) between machines and factory ice cream with respect to type of flavor in all chemical components except total solids. *(Pakistan Journal of Nutrition 8 (2): 158-160, 2009; **doi:** 10.3923/pjn.2009.158.160)*

Hypocholesteremic and Antioxidant Effects of Garlic (*Allium sativum L.*) Extract in Rats Fed High Cholesterol Diet

Khalid S. Al-Numair

The present study is designed to evaluate the effect of garlic extract on lipid profiles and oxidative stress in male albino rats fed a high cholesterol diet (HCD). A group of 24 male albino rats each weighing 125±5.0g, was divided into four

groups. Group I was used as negative control and fed on standard diet and orally administered 1 ml distilled water. Group II was used as positive control and fed on high cholesterol diet and orally administered 1ml distilled water. Groups III and IV were fed on high cholesterol diet and orally administered garlic extract (0.2 and 0.4g/kg body weight/day, respectively). Garlic extract significantly increased ($p < 0.05$) plasma HDL-Cholesterol and decreased plasma TC, LDL-Cholesterol and TG as well as liver TC and TG as compared with positive control (group II). No significant difference was observed in plasma LDL-Cholesterol, HDL-Cholesterol as well as plasma and liver TG between the rats ingested with high or low dose of garlic extracts. However, there was a significant ($p < 0.05$) decrease in plasma and liver TC in rats ingested with a high dose of garlic extract (Group IV) as compared to low dose ingestion. Garlic extract significantly increased ($p < 0.05$) total antioxidant capacity, SOD and GSH-Px activities as compared to negative or positive control (group I and group II, respectively). No significant difference was observed in total antioxidant capacity, SOD and GSH-Px activities between the rats ingested with high or low dose of garlic extract. There was a significant decrease ($p < 0.05$) in plasma malondialdehyde in rats ingested with a high or low dose of garlic extract as compared to negative or positive control rats. *(Pakistan Journal of Nutrition 8 (2): 161-166, 2009; **doi:** 10.3923/pjn.2009.161.166)*

Effect of Gamma Irradiation on the Nutritional Quality of Maize Cultivars (*Zea mays*) and Sorghum (*Sorghum bicolor*) Grains

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To investigate the effect of gamma irradiation on the nutritional quality of maize and sorghum grains, packs were exposed to doses of 0 and 2 kGy in a 60 Co package irradiator. Irradiated and non-irradiated samples were stored at refrigeration temperatures. Proximate composition, minerals content, minerals bio-availability, tannins content, phytic acid content, protein fractions and *in vitro* protein digestibility were evaluated. The results indicated that gamma irradiation caused no effect on proximate composition, minerals content and minerals bioavailability. For protein fractions, in both maize cultivars no significant differences were observed in all fractions, except in prolamins and glutelins of Maize 75. While for sorghum significant increase in globulins, prolamins and glutelins was observed. While, gamma irradiation reduced the phytic acid and tannins contents significantly. The *in vitro* protein digestibility of maize cultivars was increased significantly, while the digestibility of sorghum was reduced. *(Pakistan Journal of Nutrition 8 (2): 167-171, 2009; **doi:** 10.3923/pjn.2009.167.171)*

Comparative Study of Artemia and Liqui-Fry in the Rearing of *Clarias gariepinus* Fry

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Clarias gariepinus fry with initial total length and mean total weight of 7.00 mm and 0.18 g respectively and initial condition factor of 0.052 were stocked in six glass aquaria measuring 60×30×30 cm each. There were two treatments with three replicates each. Treatment one (T1) (Artemia fed fry) and treatment two (T2) (liquid-fry fed fry). Each aquarium was stocked with 50 fry and reared for 42 days. The water quality parameters (Temperature, pH and Dissolved Oxygen) were monitored. At the end of the experiment, the final mean total length for T1 and T2 were 38.67 mm and 25.00 mm respectively while the final mean total weight were 35.25 and 0.63 for T1 and T2 respectively. The statistical analysis of the results showed that there were significant differences ($p<0.05$) in the mean total weight and survival rate of T1 and T2 fry. Also, there was no significant difference ($p>0.05$) in the mean total length of the two treatments. The Specific Growth Rates (SGR) were 12.56 day^{-1} and 2.98 day^{-1} for T1 and T2 respectively. The final condition factors were 0.061 and 0.004 for T1 and T2 respectively. Based on these findings it was concluded that fry fed on Artemia diet had better growth and survival rates. *(Pakistan Journal of Nutrition 8 (2): 176-180, 2009; **doi:** 10.3923/pjn.2009.176.180)*

Effect of Naturally Contaminated Feed with Aflatoxins on Performance of Laying Hens and the Carryover of Aflatoxin B_1 Residues in Table Eggs

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The aim of this study was to evaluate the effect of naturally contaminated feed with aflatoxin on performance of laying hens fed for 60 days and the carryover of AFB_1 residues in eggs as well as the stability of AFB_1 in naturally contaminated eggs to boiling process. Forty, 30 weeks old, White Leghorn laying hens were randomly assigned into four experimental groups and after 2 weeks were given naturally contaminated feed containing zero (control), 25, 50 and 100 μg aflatoxin/kg feed. Twenty eggs per treatment were collected on days (1-7); 10; 20, 30, 40, 50 and 60 and submitted to aflatoxin B_1 analysis using ELISA. Average egg production and egg weight were not affected by aflatoxin ($P>0.05$), while a significant decrease in feed intake ($p<0.05$) was appeared in the 2 groups fed on 50 and 100 aflatoxin ug/kg feed. Residues of aflatoxin B_1 were detected in eggs at levels that

ranged from 0.02 to 0.09 with a mean value of 0.04, 0.05 and 0.07 µg/kg respectively. Aflatoxin B_1 was almost stable in naturally contaminated egg for up to 20 minutes of boiling, so avoiding aflatoxin B_1 transmission into egg appears to be the only practical way to ensure their safety for human consumption. Conclusively, the excretion of aflatoxin B_1 residues in hens' eggs might occur at relatively low concentrations under conditions of long term exposure of laying hens to low level of aflatoxin in naturally contaminated feed with reduction in feed intake started at 50 µg/kg. *(Pakistan Journal of Nutrition 8 (2): 181-186, 2009;* ***doi:*** *10.3923/pjn.2009.181.186)*

Comparison of Growth Rate of Male Buffalo Calves under Open Grazing and Stall Feeding System

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This study was conducted to compare the effect of open grazing system and feeding green fodder at the stall (cut and carry system) on the growth of male buffalo calves. Twelve male buffalo calves (of Nili Ravi breed) were either grazed (n = 5) on natural pasture or were offered seasonal green fodder ad lib in the manger (n = 7). The calves were kept on these treatments for 9 months. Live body weight of the calves was recorded at the start of trial and then fortnightly. The overall weight gain per day over nine months of feeding period did not differ significantly between open grazing (0.415±0.028kg) and stall fed groups (0.433±0.056kg) (P > 0.05). It is concluded that grazing on natural pasture may result in growth of male buffalo calves comparable to that after feeding them cultivated green fodder at the manger. *(Pakistan Journal of Nutrition 8 (2): 187-188, 2009;* ***doi:*** *10.3923/pjn.2009.187.188)*

Effect of Modified Whey Protein Concentrates on Instrumental Texture Analysis of Frozen Dough

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Modified whey protein concentrate (mWPC) is an important functional ingredient having wide range of application in food products. Important functional properties of the whey protein are hydrophilic, swelling and water retention capacity and its ability to absorb and bind water is useful in connection with frozen doughs which are mixed, formed and then held in frozen storage for some length of time before

being thawed, proofed and baked. Major objective was to determine the effect of modified whey protein concentrates on instrumental texture profile analysis (TPA) of frozen doughs made from flour with different protein contents. Three commercial wheat flours of protein contents 9.2, 12.7 and 14.2% were studied for making frozen dough. Flours with 9.2 and 14.2% protein contents were fortified with 5% mWPC while 12.7% protein contents flour with 2.5% mWPC. Doughs were prepared by mixing all the ingredients in the dough mixer and after resting divided into different pieces and stored in the walk in freezer at -4°F. The values of texture profile analysis of the frozen doughs after thawing for hardness, cohesiveness, gumminess, adhesiveness and springiness were determined with LFRA Texture Analyzer. TPA of dough samples was performed on fresh i.e. zero day and then after 15, 30 and 60 days to study the effect of storage and mWPC treatments on TPA parameters of frozen dough. Values of instrumental texture parameters of frozen dough were affected significantly by the addition of mWPC treatments and a significant decrease in the values of hardness, cohesiveness, gumminess and springiness were observed with its addition in dough samples. Results also represent significant effect of different storage periods on TPA parameters of frozen dough showing upward trends in the values of hardness and gumminess while decreasing values of cohesiveness, adhesiveness and springiness were recorded with the increasing storage periods. *(Pakistan Journal of Nutrition 8 (2): 189-193, 2009; **doi:** 10.3923/pjn.2009.189.193)*

Proximate Analysis and Physico-Chemical Properties of Groundnut (*Arachis hypogaea* L.)

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Proximate, physico-chemical and elemental analysis of groundnut were determined. The results showed that the groundnut oil contained 47.00% fat, 38.61% protein, 5.80% moisture, 1.81% carbohydrate, 3.70% crude fibre and 3.08% ash. Minerals (mg/100g) included: Na (42.00±0.71), K (705.11±0.86), Mg (3.98±0.04), Ca (2.28±1.94), Fe (6.97±1.62), Zn (3.20±0.11), P (10.55±0.68). The physico-chemical characteristics showed; saponification value, 193.20mgKOH/g, iodine value 38.71 (g/100g), acid value 5.99 (mgKOH/g), free fatty acid (mgKOH/g) 3.01 peroxide value 1.50 (meq/kg) and refractive index 1.449. The predominant fatty acid was found to be oleic acid (41.11%). The groundnut can thus be considered as a good source of protein with high nutritional value. *(Pakistan Journal of Nutrition 8 (2): 194-197, 2009; **doi:** 10.3923/pjn.2009.194.197)*

Body Composition, its Significance and Models for Assessment

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The term Body Composition is used to illustrate the different components that, when taken together, makes up a person's body weight. For analysis of body composition it is often suitable to think of the body as made of two components: fat and non-fat. The non-fat portion is called "fat free mass" or "lean body mass". However, body can be taken into different compartment models for body composition assessments. It depends upon the compartment of interest, availability of techniques, technical training of staff, condition of patient / subject and location where assessment will be done i.e., laboratory / clinic or field / remote site. Body Composition is a tool for diagnosis as it may be significantly altered in many disorders like Anorexia and obesity, Renal failure, Liver disorders: Ascites, Chronic obstructive pulmonary disease, Cancer and AIDS associated wasting, Burns and trauma, Congestive heart failure, Spinal cord injuries and Osteoporosis. This paper describes various models in use for body composition assessment and scope of their utility. *(Pakistan Journal of Nutrition 8 (2): 198-202, 2009;* ***doi:*** *10.3923/pjn.2009.198.202)*