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Series B: Biological Sciences

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Effect of Different Concentrations of Sucrose and Honey on the Physiochemical and Sensory Properties of Strawberry Leather

Muhammad Kaleem[a], Ihsan Mabood Qazi[a], Arsalan Khan[b]*, Muhammad Ali Khan[c], Ibrar Hussain[b], Muhammad Ayub[a], Abid Shah Shinwari[b], Falak Naz Shah[b] and Ata Ur Rehman[a]

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(received March 21, 2016; revised October 13, 2016; accepted October 14, 2016)

Abstract. The aim of the present research work was to study the effect of different levels of sucrose and honey content on strawberry leather stored at room temperature for a total period of 90 days. The sucrose and honey was added at the level of 300:0, 250:50, 200:100, 150:150, 100:200, 50:250 and 0:300, representing each treatment. The prepared strawberry leather were analysed physiochemically for pH, acidity, ascorbic acid, reducing and non-reducing sugar content, sugar acid ration and organoleptically for colour, taste, texture and overall acceptability for a total period of 90 days. Statistical results revealed that treatment and storage interval had a significant ($P< 0.05$) effect on both physiochemical and organoleptic evaluation. Results also revealed that the decrease occurred in moisture content from (18.17-13.53%), pH (3.58 to 3.43), ascorbic acid (34.41 to 25.53), non-reducing sugar (5.09 to 4.85), sugar-acid ratio (71.03-65.37%), and sensory evaluation included colour (8.17 to 5.10), texture (8.31 to 5.69), taste (8.37 to 6.04) and overall acceptability (8.37 to 5.61), while increase was found in total acidity (1.137-1.267%), total soluble solid (80.96 to 83.04 °Brix) and reducing sugar (19.09-19.45%) during storage. The maximum mean values were observed for moisture in SL_5 (16.37), ascorbic acid SL_4 (31.59), pH SL_4 (3.57), titratable acidity SL_4 (1.230), total soluble solid SL_4 (82.80), total solid SL_4 (82.80), reducing sugar SL_4 (26.47), non-reducing sugar SL_1 (6.20), colour SL_4 (7.13), texture SL_4 (7.54), taste SL_4 (7.79), overall acceptability SL_4 (7.5) and sugar-acid ratio SL_6 (70.76). Among all the treatments, T_4 was found to be the best both physiochemically and organoleptically.

Keywords: strawberry fruit, leather, sucrose, honey

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Development and Quality Evaluation of Banana Mushroom Blended Jam

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(received October 1, 2015; revised June 7, 2016; accepted June 13, 2016)

Abstract. The effect of various blends of banana (B) and mushroom (M) as well as storage time on the overall quality characteristics of jam at ambient temperature were studied for three months of storage period. All the treatments were analysed for physicochemical properties (total soluble solids (°Brix), pH, reducing sugars (%), non-reducing sugars (%), ascorbic acid (mg/100 g) and percent acidity) and sensory properties (taste, colour, texture and overall acceptability). Significant ($P < 0.05$) increase were examined in total soluble solids (67.94-69.78 °brix), percent acidity (0.71-0.87%) and reducing sugars (18.17-29.33%) during the storage period. While, significant ($P < 0.05$) reduction in pH (3.45 to 3.26), non reducing sugars (44.90-30.83%), ascorbic acid (7.81 to 5.52 mg/100 g), colour (7.34 to 4.84), taste (7.27 to 4.51), texture (7.06 to 4.60) and overall acceptability (7.17 to 4.69) were observed. Physicochemical and sensory analyses showed that jam prepared from BM_6 (400 g banana + 600 g mushroom + 1kg sugar + 2 g citric acid) was of good quality attributes among the treatments.

Keywords: banana, mushroom, jam, storage time, physicochemical properties, sensory properties

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Barley and Oat Meal Supplemented Chapaties and its Impact on Serum Biochemical Profile in Normal Individuals

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(received August 4, 2015; revised June 13, 2016; accepted June 19, 2016)

Abstract. The present study was taken to prepare barley and oat meal supplemented flours with special reference to chapati making quality. For this purpose, nine treatments of supplemented flours were prepared by gradually replacing whole wheat. Chapaties were prepared from all compositions along with control (100% whole wheat flour) and analysed for dietary fibre content and sensory attributes like colour, taste, aroma, texture, breakability, folding ability, chewability and overall acceptability at stated intervals. Efficacy study was carried out on healthy individuals to explore the hypocholesterolemic and hypoglycemic worth of chapaties prepared from supplemented flours. Results of dietary fibre analysis showed that there was significant increase in level of soluble 0.96 to 3.13%, insoluble 1.92 to 5.57% and total dietary fibre content 2.88 to 8.13% with increase in the supplementation level of barley and oat meal. The highest soluble (3.13), insoluble (5.57) and total dietary fibre (8.13) content were found in wheat flour supplemented with 7.5% oat meal and 7.5% barley flour while their concentration was not changed during storage. Sensory attributes showed that chapaties prepared from wheat flour supplemented with 7.5% oat meal and 7.5% barley flour were liked the most due to better overall acceptability. On the basis of nutritional and sensory characteristics, three best chapaties along with control were served to normal humans. The results revealed that consumption of chapaties supplemented with 15% oat meal greatly reduced serum cholesterol (7.7%), low density lipoprotein (6.8%), triglycerides (28.5%), blood glucose (5.5%) and weight (4.7%) while increased high density lipoprotein (2.0%), serum protein (12.5%) and albumin protein (15.7%) as compared to other two chapaties. It is concluded that the consumption of barley and oat meal supplemented chapaties tackle the hyperglycemia and hypercholesterolemia in healthy humans as well as in obese persons because it deliver three times more dietary fibre as compared to chapaties prepared from wheat flour only.

Keywords: barley, oat meal, β-glucan, chapaties, hyperglycemia

Pak. j. sci. ind. res. Ser. B: biol. sci. 2017 **60**(1) 27-35

Development of Buckwheat Cookies Supplemented with Wheat Flour

Nisar Hussain[a]*, Javid Ullah[a], EhsanElahi[b], Sajjad Ahmad[a], Muhammad Zakaria[a], Murtaza[a], Saeed Ahmed[c], Nazeer Ahmed[d] and Zelle Huma[e]

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(received February 15, 2016; revised September 4, 2016; accepted September 9, 2016)

Abstract. The present study was conducted to develop buckwheat cookies supplemented with wheat flour. Buckwheat and wheat flour were examined for their proximate composition. Buckwheat flour contained 11.6% moisture, 15.79% crude protein, 1.81% crude fat, 1.83% ash, 0.70% crude fibre content and 68.27% NFE, while wheat flour contained moisture content 13.12%, crude fibre content 1.93%, crude fat 1.42%, crude protein content 12.53%, ash content 1.57% and 69.43% NFE, respectively. Wheat flour was incorporated into buckwheat flour at 10, 20, 30, 40 and 50% ratio to make composite flour and the developed cookies were analysed for quality evaluation. Supplementation of wheat flour significantly influenced the proximate and mineral composition of buckwheat flour based cookies. Moisture contents, crude fibre contents and NFE (Nitrogen Free Extract) increased, whereas crude fat, crude protein and ash contents decreased. Mineral contents (Fe, Ca, K, Zn and Mg) of developed buckwheat cookies decreased with increase in wheat flour supplementation levels. Sensory characteristics of supplemented cookies increased with increase in supplementation levels of wheat flour and were acceptable by judges in terms of test, colour, texture and overall acceptability. Cookies developed from C 50% C supplementation level of wheat flour got maximum scored points while C_0 control C_0 was found to be more nutritious and gluten free having more crude protein and mineral contents when compared to supplemented cookies.

Keywords: buckwheat cookies, chemical quality, sensory quality, wheat flour

Pak. j. sci. ind. res. Ser. B: biol. sci. 2017 **60**(1) 36-45

A Study on Molecular Diagnosis of *Theileria* Species Infection by PCR Amplification in Sheep and Goats in Multan, Pakistan

Muhammad Riaz* and Zahida Tasawar
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(received November 11, 2015; revised September 26, 2016; accepted October 17, 2016)

Abstract. In this present study polymerase chain reaction (PCR) assay was used for identification and differentiation of *Theileria* species infection in Multan, Pakistan. Out of 220 blood samples collected from sheep and goats, 31.2% (70/220) were found positive for *Theileria* species by PCR amplification compared to only 9.1% (20/220) on blood smear. *Theileria* infection was observed in 39.3% (57/145) of sheep and 18.6% (13/75) of goats sampled. The prevalence of *Theileria ovis* and *Theileria lestoquardi* in the 70 positive samples was found to be 57% (40/70) and 30% (21/70), respectively with only 12.3% (9/70) of blood samples having a mixed infection of both *T. ovis* and *T. lestoquardi.* Overall the prevalence of *T. ovis* infection was higher than *T. lestoquardi* in both sheep and goats. Herds with sheep only had significantly higher parasitic prevalence. The results confirm that PCR is direct, specific and sensitive tool for diagnosis of ovine theileriosis.

Keywords: sheep, goats, DNA extraction, PCR amplification, *Theileria ovis, Theileria lestoquardi*

Pak. j. sci. ind. res. Ser. B: biol. sci. 2017 **60**(1) 46-48

Short Communication

Photo-oxidation of Pasteurized Milk in Polyethylene Pouch Packs

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(received January 23, 2015; revised September 15, 2015; accepted December 12, 2015)

Abstract. In the present study photo-oxidative stability of pasteurized milk packaged in polyethylene pouches was investigated. Milk packaged in three layer polyethylene pouch packs was exposed to 400, 600 and 800 l× florescent light at 4 °C for 6 days, compared with a control (stored in dark). Light had a pronounced effect on fat content of milk with no effect on protein, lactose and ash content. Photo-oxidative stability of milk decreased as the intensity of light increased, peroxide value, anisidine value and conjugated dienes increased during the storage period of 6 days, higher values were observed in samples exposed to 800 l× florescent light. After 6 days of storage period, milk exposed to 400 l× florescent light did not reveal any oxidized flavour. The results of this study depicted that polyethylene pouches have the capability to resist photo-oxidation up to 400 l× light.

Keywords: pasteurized milk, photo-oxidation, polyethylene pouches, fluorescent light

Pak. j. sci. ind. res. Ser. B: biol. sci. 2017 **60**(1) 49-62

Review

Control of Avian Coccidiosis: Present and Future Strategies for Natural Alternatives of Therapeutics

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(received February 29, 2016; revised June 9, 2016; accepted July 12, 2016)

Abstract. Avian coccidiosis has great economic impacts on poultry enterprise. Coccidiosis is caused by *Eimeria* species mostly affecting epithelium of the bird's intestines causing enteric problems. Prominent clinical outcomes are bloody diarrhoea, poor FCR, weight gain and growth rate with high morbidity and mortality rate. For the control of coccidiosis various strategies have been adapted including chemical agents and feed additives. But due to their repeated use, drug resistance to *Eimeria* species emerged thus badly affecting their efficacy. Moreover, these chemical agents have adverse effects on bird's health and meat quality. Therefore, alternatives are used nowadays including natural and herbal products having the desired efficacy without harmful effects. Natural products and their anticoccidial activity have been reviewed in this study. This group comprises herbal extracts, fatty acids, fungal extracts, probiotics and immune response immunomodulators with proven anticoccidial activity. Additionally, poultry industry and economic cost of coccidiosis as well as classical strategies used in the control of avian coccidiosis are also reviewed.

Keywords: coccidiosis, natural alternatives, poultry, probiotics, herbal extracts

Erratum

Author's names Dr. Safdar Ali Mirza and Shahjehan Baig were inadvertently omitted in PJSIR Vol. 58, Ser. B: Biol. Sci. No. 1, pp.23-29 (2015). The inconvenience caused to the authors is highly regretted.

Executive Editor