1. Biotechnological valorization of cashew apple: A review

2. Effect of extraction and concentration processes on properties of longan syrup

3. Exopolysaccharides from lactic acid bacteria: Structural analysis, molecular weight effect on immunomodulation

4. Verification of a simple product weight loss model for refrigerated storage of foods

5. Quality changes in ripened mango and litchi flesh after cryogenic freezing and during Storage

6. Investigating the Commercial Microwave Vacuum Drying Conditions on Physicochemical Properties and Radical Scavenging Ability of Thai Green Tea

7. Deacetylation of chitin and the properties of chitosan films with various deacetylation degrees

8. Bioactive compound contents in germinated unpolished purple glutinous rice from Kum Doi Saket and Kum Phayao varieties

9. High efficacy bioconversion of starch to lactic acid using an amylolytic lactic acid bacterium isolated from Thai indigenous fermented rice noodles

10. Enhancement and optimization of exopolysaccharide production by Weissella confusa TISTR 1498 in pH controlled submerged fermentation under high salinity stress

11. Identification of antioxidants in young mango leaves by LC-ABTS and LC-MS

12. Production of xylooligosaccharides from corncob using a crude thermostable endo-xylanase from Streptomyces thermovulgaris TISTR1948 and prebiotic properties

13. Comparison of ultrasonic extraction with conventional extraction methods of phenolic compounds in longan (Euphoria longana Lamk.) seed

14. Physical and biochemical qualities of pressurized and pasteurized longan juices upon storage
15. Effects of spray-drying temperatures on powder properties and antioxidant activities of encapsulated anthocyanins from black glutinous rice bran

16. Response surface optimization of exopolysaccharide production from sugarcane juice by Lactobacillus confusus TISTR 1498

17. Protease treatment for the stabilization of rice bran: Effects on lipase activity, antioxidants, and lipid stability

18. The split plot with repeated randomised complete block design can reduce psychological biases in consumer acceptance testing

19. Ultrasonic-assisted extraction of phenolic and antioxidative compounds from lizard tail (Houttuynia cordata Thunb.)

20. Rheological properties of mango puree and process development of mango sheet

21. Physicochemical, antioxidant and sensory properties of puffed longan-rice snack by extrusion process
Biotechnological valorization of cashew apple: A review

Prommajak T., Leksawasdi N., Rattanapanone N., Rattanapanone, N.,

Division of Food Science and Technology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai 50100, Thailand
Division of Food Engineering, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai 50100, Thailand
Postharvest Technology Research Institute, Chiang Mai University, Chiang Mai 50200, Thailand

ABSTRACT

Cashew apple, the peduncle of cashew fruit, is an agricultural waste byproduct from harvesting cashew nuts. Cashew apple juice contains about 10% reducing sugar. Its bagasse contains about 20% of cellulose. The byproducts can be used as a substrate for several microbial fermentation processes. Wine and bioethanol were produced by Saccharomyces cerevisiae. Probiotic beverage and lactic acid were produced by Lactobacillus casei. Biosurfactants-rhamnolipids, emulsan and surfactin were synthesized by Pseudomonas aeruginosa, Acinetobacter calcoaceticus and Bacillus subtilis, respectively. Tannase and pectinase were produced during solid-state fermentation of Aspergillus spp. Prebiotic oligosaccharides were synthesized by the activity of dextranucrase produced by Leuconostoc spp. Cashew apple is a potential substrate for producing a variety of products, depending on the type of microorganisms used.
Effect of extraction and concentration processes on properties of longan syrup

Phimolsiripol, Y., Surin S., Thakeow P., Seesuriyachan P., Angeli S.
Phimolsiripol Y.,

1 Division of Product Development Technology, Faculty of Agro-Industry, Chiang Mai University, Thailand
2 Division of Product Development Technology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand
3 Division of Biotechnology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand
4 Faculty of Science and Technology, Free University of Bozen-Bolzano, Bolzano, Italy

ABSTRACT

Longan (Dimocarpus longan Lour.) syrup is a novel liquid sweetener produced from longan, one of the traditional and economic fruits in the Northern of Thailand. In this research, the effect of extraction and concentration processes on properties of longan syrup was investigated. There were two extraction methods (juice extractor and hydraulic press) and three concentration methods (direct heating, steam heating and vacuum evaporation). Results overall showed that the extraction method had no significant (p > 0.05) effect on longan syrup properties, while concentration resulted in the quality changes of longan syrup. Concentration using direct heating of longan juice caused reduction of sucrose content, and longan syrup dark in color. The headspace volatile compounds of longan syrup were sampled using direct headspace technique and further characterized using gas chromatography-mass spectrometry. The identified volatile compounds could be divided into two groups of aroma characteristics which were (1) floral aroma: 3-methylbutyl acetate, (2)-ocimene and 2-phenylethyl alcohol and (2) caramel aroma: butyraldehyde, furfural and benzaldehyde. 2-Phenylethyl alcohol, contributing to floral odor, was retained using vacuum evaporation as a concentration method. Result revealed that the optimal concentration process for longan syrup production was vacuum evaporation, providing the highest floral volatile and lowest caramel volatile. Sensory tests confirmed that longan flavor of the syrup produced from the vacuum evaporation process had significantly higher hedonic scores than other processes. © 2014, Association of Food Scientists & Technologists (India).
Exopolysaccharides (EPS) obtained from the culture medium of Lactobacillus confusus TISTR 1498 were investigated to determine their molecular characteristics and the effect of molecular weight (Mw) on immunomodulatory activity. The EPS mainly consisted of carbohydrates (81.9±2.4%) with only one type of monosaccharide, D-glucose, which was mostly connected by \( \beta-(1\rightarrow6) \) glycosidic linkages. The EPS itself was unable to stimulate RAW264.7 cells to produce pro-inflammatory mediator nitric oxide (NO) and cytokines. However, considerable stimulation of RAW264.7 cells was observed by the low Mw of EPSs having Mw values \( \leq 70 \times 10^3 \) g/mol. The partially hydrolyzed EPS stimulated RAW264.7 cells to induce considerable NO and various cytokine production such as TNF-\( \alpha \), IL-1\( \beta \), IL-6 and IL-10 via up-regulation of their mRNA expression. In addition, the degradation I\( \alpha \)-B and the phosphorylation of c-Jun NH2-terminal kinase (JNK) were facilitated by BW-30 and MW-40, suggesting that the partially hydrolyzed EPS stimulated RAW264.7 cells through the activation of NF-\( \kappa \)B and JNK pathways. © 2014 Elsevier B.V.
Verification of a simple product weight loss model for refrigerated storage of foods

1Cleland D.J., 2Cleland, D.J., 1Love R.J., 3Phimolsiripol Y.,

1 Massey University, Private Bag 11 222, Palmerston North, New Zealand
2 Massey University, Private Bag 11 222, New Zealand
3 Faculty of Agro-Industry, Chiang Mai University, Thailand

ABSTRACT

Evaporative weight loss in the food cold chain can lead to both significant loss of product quality (and hence value) and to the loss of saleable weight. During cold storage of many food products, heat transfer processes are fast relative to the required heat of vaporization, so weight loss can be modelled by a simple model of convective mass transfer from the surface of the product in the gas phase. Measured data from the literature was used to validate the model by assessing whether the rate of weight loss was proportional to the partial pressure driving force for data measured for the same product and packaging stored in similar cold storage facilities. The trends in rate of weight loss were close to linear (R² > 0.90) for most data suggesting that the simple model was adequate for a wide range of products and storage situations. The model indicates that for cold storage the most cost-effective options to reduce weight loss are colder storage temperatures, high air relative humidity and tighter temperature control. Lower air velocity also reduces weight loss but the effect may not be as significant as anticipated due to the convective resistance being small, relative to packaging or product skin resistances to mass transfer. Packaging films reduce weight loss but must be tight-fitting to avoid moisture transfer between the product and packaging "headspace", and thus within package frosting or condensation, when there are temperature fluctuations.
Quality changes in ripened mango and litchi flesh after cryogenic freezing and during Storage

Rattanapanone, N., Rattanapanone N., Leksawasdi N., Tangtua J.

ABSTRACT

This study investigated a methodology to cease the activity of polyphenol oxidase (PPO) enzyme and peroxidase (POD) enzyme on ripened mango flesh cv. Maha Chanok and litchi flesh cv. Hong Huay before storage using liquid nitrogen. The immersion of halved-ripened mango flesh in a mixture solution of 1% citric acid and 1% calcium chloride for 2 min resulted in the optimal activity decrease of PPO and POD at 64.0 and 48.3%, respectively. Compared to the control, which was soaked in the previously stated mixture solution before freezing by liquid nitrogen and kept at -24°C for 6 months, the PPO and POD enzyme activities of the frozen ripened mango flesh only slightly increased during the storage period. The average enzyme activities in the control group were lower by 53.4 and 40.8%, respectively. In case of litchi flesh, the implementation of 0.5% calcium chloride solution for 5 min inactivated PPO and POD enzyme activities by 39.9 and 34.2%, respectively, whereas the texture of the flesh was improved, without leaving a bitter taste. In addition, the measured compression force of the litchi flesh texture, which belonged to the experimental set, was higher than the control set and differed significantly (p < 0.05) from each other. When the presoaked litchi flesh in 0.5% calcium chloride solution was frozen in the liquid nitrogen and maintained at -24°C for 6 months, the firmness of frozen litchi flesh after thawing was relatively stable throughout the storage period. The activity of PPO enzyme dropped slightly, whereas POD activity only decreased during the first month and the activities increased afterwards. The activities of enzymes in the experimental set were significantly lower than the control set (p < 0.05).
Innovating the Commercial Microwave Vacuum Drying Conditions on Physicochemical Properties and Radical Scavenging Ability of Thai Green Tea

Hirun S., Utama-ang N., Vuong Q.V., Scarlett C.J., Hirun, S.,

1 Food Bioactives and Pancreatic Cancer Biology Group, School of Environmental and Life Sciences, The University of Newcastle, Ourimbah, Australia
2 Division of Product Development Technology, Chiang Mai University, Chiang Mai, Thailand
3 Food Bioactives and Pancreatic Cancer Biology Group, School of Environmental and Life Sciences, The University of Newcastle, 10 Chittaway Road, Ourimbah, NSW 2258, Australia

ABSTRACT

The effects of drying conditions using a commercial microwave vacuum dryer on the physicochemical properties and antioxidant activity of Thai green tea were investigated. Nine different drying conditions (power 3200, 3600, and 4000 Watts vs. radiation time 20, 25, and 30 min) were applied in this study. The results showed that individual catechins, their total quantities, radical scavenging ability, and moisture content were significantly affected; however, total polyphenol content and color parameters were not significantly affected by these drying conditions. Based on this data, to obtain optimal physicochemical properties of green tea, drying conditions at 3600 Watts for 30 min were recommended. © 2014 Copyright Taylor and Francis Group, LLC.

Published in Drying Technology Volume 32 Issue 1 DOI 10.1080/07373937.2013.811249
Deacetylation of chitin and the properties of chitosan films with various deacetylation degrees

Potivas T., Laokuldilok T., Laokuldilok, T.,

Department of Food Science and Technology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand
Department of Marine Product Technology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

The degree of deacetylation is the proportion of glucosamine monomer residues in chitin. It affects many properties of chitosan. The objectives of this research were to study the deacetylation of chitin by alkaline and to investigate chitosan film properties with different degrees of deacetylation. Chitin was deacetylated by boiling (95°C) in concentrated sodium hydroxide (50%) solution for 120-300 minutes. The degree of deacetylation of chitosan was determined by potentiometric titration method. Chitin possessed a degree of deacetylation of 7.74%. The alkaline deacetylation produced chitosan with a degree of deacetylation of 15.24-70.19%. We found a linear relationship between the degree of deacetylation and deacetylation time (degree of deacetylation = 2.476 + 0.230t, R² = 0.915). The deacetylation time had no effect on the yield and whiteness of the obtained chitosans. Film was formed from the obtained chitosan at each deacetylation time and their properties investigated. Increasing the deacetylation time increased the tensile strength, elongation and water vapor transmission rate of the films. In contrast, redness (a*) and yellowness (b*) of the films decreased.
Bioactive compound contents in germinated unpolished purple glutinous rice from Kum Doi Saket and Kum Phayao varieties

Jomduang S., Jomduang, S.,

1 School of Agro-Industry, Faculty of Agro-Industry, Chiang Mai University, Thailand
2 School of Agro-Industry, Faculty of Agro-Industry, Chiang Mai University Thailand

ABSTRACT

This research studied the bioactive compounds in unpolished purple glutinous rice and germinated unpolished purple rice produced from two rice varieties: Kum Doi Saket and Kum Phayao. Unpolished purple glutinous rice grains were produced by grain dehusking without polishing. The quality of their physical, chemical and bioactive compounds was analyzed. Kum Doi Saket unpolished purple glutinous rice had a statistically significant (p
High efficacy bioconversion of starch to lactic acid using an amylolytic lactic acid bacterium isolated from Thai indigenous fermented rice noodles

Khanongnuch, C., Khanongnuch C., Lumyong S., Pathom-aree W., Pratanaphon R., Rieantrakoonchai W., Kanpiengjai A.,

Division of Biotechnology, School of Agro-Industry, Chiang Mai University, Thailand
Division of Biotechnology, School of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand
Materials Science Center, Chiang Mai University, Chiang Mai, Thailand
Microbiology Section, Department of Biology, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

Amylolytic lactic acid bacterium (ALAB) strain S21 was isolated from Thai indigenous fermented rice noodles and identified as Lactobacillus plantarum, based on 16S rDNA sequence and recA gene analysis. L. plantarum S21 exhibited a specific growth rate (\(\mu\)) of 0.24 1/h in modified MRS broth containing 10 g/L of starch as the sole carbon source, and a high efficacy in producing lactic acid (9.41, 24.48, 41.84, 74.33, and 94.04 g/L from 10, 25, 50, 75, and 100 g/L of cassava starch, respectively), which are higher values than previously reported for ALAB. Crude amylase from L. plantarum S21 had broad pH stability (3.5–8.0), and hydrolyzed starch to maltose and glucose as the major and minor products. L. plantarum S21 should be considered useful for industrial bioconversion of starch to lactic acid. © 2014, The Korean Society of Food Science and Technology and Springer Science+Business Media Dordrecht.
Enhancement and optimization of exopolysaccharide production by Weissella confusa TISTR 1498 in pH controlled submerged fermentation under high salinity stress

Seesuriyachan, P., Techapun C., Leksawasdi N., Hanmoungjai P., Chaiyaso T., Kuntiya A., Seesuriyachan P.,

ABSTRACT

There have been many reports that high concentrations of NaCl suppress the production of exopolysaccharide (EPS) in lactic acid bacteria (LAB). New evidence in this area has just revealed an enhancement of EPS production with a constant pH controlled (pH at 5.53) in submerged fermentation with a high concentration of NaCl (4%) and 100 g/l of sucrose. The high yield of EPS under the optimized condition was 63.8 g/l in the modified MRS medium. The EPS yield was 3.7 times higher than the yield (17.2 g/l of EPS) produced in an uncontrolled system. Moreover, the biosynthesis of EPS by Weissella confusa TISTR 1498 was independent of the biomass production. This evidence suggests that the controlled pH in submerged fermentation can compensate for the inhibitory effect under high salinity stress on EPS production.

Published in Chiang Mai Journal of Science Volume 41 Issue 3DOI
Identification of antioxidants in young mango leaves by LC-ABTS and LC-MS

Surawang S., Kim S.M., Pan C.-H., Frommajak T., Rattanapanone N.,
Rattanapanone, N.,

1 Division of Food Science and Technology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand
2 Functional Food Center, Korea Institute of Science and Technology, Gangneung, South Korea
3 Department of Marine Food Science and Technology, Gangneung-Wonju National University, Gangneung, South Korea
4 Postharvest Technology Research Institute, Chiang Mai University, Chiang Mai, Thailand
5 Division of Food Science and Technology, Faculty of Agro-Industry, Chiang Mai University Thailand

ABSTRACT

Thai eat the young leaves of mango as vegetables. Antioxidants in young leaves of mango cultivars 'Talapnak', 'Chok Anan' and 'Nam Dok Mai' were identified by high-performance liquid chromatography coupled with an online ABTS assay (HPLC-ABTS) and electrospray ionization mass spectrometer (HPLC-ESI-MS). Young leaves of mango cv. 'Nam Dok Mai' had the highest antioxidant capacity. Major antioxidants in young mango leaves were mangiferin and benzophenones (maclurin and iriflophenone derivatives). Mangiferin presented in higher quantities than other compounds in each cultivar, with cv. 'Talapnak' containing the most (37.92±0.98 mg/g DW). The compound with the highest antioxidant capacity in all cultivars was mangiferin pentoside (from 1.19±0.25 mmol TE/g DW in cv. 'Chok Anan' to 2.13±0.04 mmol TE/g DW in cv. 'Talapnak'). The compound with the highest Trolox equivalent antioxidant capacity was maclurin galloyl glucoside (1.75±0.62 mol TE/mol).

Published in Chiang Mai University Journal of Natural SciencesVolume 13Issue 3DOI 10.12982/CMUJNS.2014.0038
Production of xylooligosaccharides from corncob using a crude thermostable endo-xylanase from Streptomyces thermovulgaris TISTR1948 and prebiotic properties

Chaiyaso, T., Chaiyaso T., Boonchuay P., Techapun C., Seesuriyachan P.,

Bioprocess Research Cluster (BRC), Chiang Mai University, Thailand
Bioprocess Research Cluster (BRC), Chiang Mai University, Chiang Mai, Thailand
Biotechnology Program, Graduate School, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

Production of xylooligosaccharides (XOs) from corncob using the thermostable endo-xylanase from Streptomyces thermovulgaris TISTR1948 was investigated using KOH pretreatment, followed by enzymatic hydrolysis. The optimal reaction time for production of XOs was 12 h, after which xylobiose comprised a majority of products, and a low xylose content was observed. The optimal conditions for production of XOs were studied using a central composite design. At an enzyme concentration of 129.43 U/g of substrate, 53.80°C, and pH 6.17, the yield of XOs reached 162.97 mg/g of substrate or 752.15 mg/g of hemicellulose in KOH-pretreated corncob. The prebiotic properties of XOs derived from corncob were also investigated using in vitro fermentation of those XOs with the known probiotic strains Lactobacillus casei TISTR1463, L. lactis TISTR1464, and L. plantarum TISTR1465. XOs derived from corncob were comparable to commercial XOs for an ability to enhance the growth of the specified probiotic lactobacilli. © 2014, The Korean Society of Food Science and Technology and Springer Science+Business Media Dordrecht.
Comparison of ultrasonic extraction with conventional extraction methods of phenolic compounds in longan (Euphoria longana Lamk.) seed

Chindaluang Y., Sriwattana S., Sriwattana, S.,

1 Division of Product Development Technology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand
2 Division of Product Development Technology, Faculty of Agro-Industry, Chiang Mai University, Thailand

ABSTRACT

Three different extraction methods – hot water (HWE), ethanol (EE) and ultrasonic-assisted water extraction (UAE) – were evaluated for extraction of phenolic compounds in longan (cultivar Edor) seed. The findings indicated that longan seed extracts contained three major phenolic compounds, analyzed by HPLC, including gallic acid, corilagin and ellagic acid. The content of total polyphenolic compounds and antioxidant activities was determined using the Folin-Ciocalteu method and the DPPH assay, respectively. Longan seed extraction by HWE contained the highest yield, total polyphenol content and antioxidant activities (42.80%, 41.250mg gallic acid/g and IC50 = 0.017 mg/ml, respectively). UAE produced a higher yield than EE, but lower than HWE, with the lowest extraction time. Moreover, gallic acid content (16.55 mg/g) and corilagin content (35.62 mg/g) extracted by UAE were higher than those of HWE and EE. Ellagic acid content obtained from UAE was significantly (P
Physical and biochemical qualities of pressurized and pasteurized longan juices upon storage

Chaikham P., Apichartsrangkoon A., Seesuriyachan P., Apichartsrangkoon, A.,

1 Faculty of Science and Technology, Phranakhon Si Ayutthaya Rajabhat University, Phranakhon Si Ayutthaya 13000, Thailand
2 Postharvest Technology Research Institute, Chiang Mai University, Chiang Mai 50200, Thailand
3 Division of Biotechnology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai 50100, Thailand

ABSTRACT

The physical and biochemical properties of pressurized longan juice at 500 MPa; 25°C for 30 min and pasteurized juice at 90°C for 2 min were investigated during storage at 4°C for 4 weeks. Color parameters indicated that although enzymatic degradation in pressurized longan juice was the primary cause of lower L parameter (lightness) during storage, its magnitude was apparently lesser than browning caused by Maillard reaction in pasteurized juices reflected by b* (yellowness) and BI (browning index) parameters. The results of residual enzymes showed that during storage, polyphenol-oxidase had greater rate of degradation and was more resistant to pressure than peroxidase. The bioactive components like ascorbic acid in pressurized juice exhibited higher reduction during storage than that of pasteurized juice. However, residual ascorbic acid in pressurized juice was still higher than that thermal treated juice throughout the storage period. The other bioactive components in pressurized juice were also gradually degraded during storage by 71%, 66%, 28% and 37%, while in pasteurized products substantially reduced by 60%, 69%, 23% and 35% for gallic acid, ellagic acid, total phenols and antioxidant activity (DPPH assay), respectively.

Published in Emirates Journal of Food and Agriculture Volume 26 Issue 3 Doi 10.9755/ejfa.v26i3.16576
Effects of spray-drying temperatures on powder properties and antioxidant activities of encapsulated anthocyanins from black glutinous rice bran

Kanha N., Laokuldilok T., Laokuldilok, T.,

Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand
Lanna Rice Research Center, Chiang Mai University, Chiang Mai, Thailand
Faculty of Agro-Industry, Chiang Mai University, Thailand

ABSTRACT

The objective of this study was to determine the effects of spray drying temperature on the powder properties and antioxidant activities of encapsulated black glutinous rice (BGR) bran anthocyanins. The anthocyanins in BGR bran was extracted using acidified ethanol. The extract was encapsulated with maltodextrin (DE10) using spray drying at various inlet air temperatures (IAT; 140, 160 and 180°C). The results revealed that increasing IAT enhanced productivity with lower energy consumption, encapsulation efficiency, solubility, dispersibility, wettability, flowability and surface smoothness of the microcapsules. In contrast, total anthocyanin content (TAC), bulk density and color values (a*, C* and h°, respectively) of the microcapsules were decreased by increasing the IAT. Reducing power and DPPH radical scavenging activity of anthocyanin powders were not significantly different. In addition, anthocyanin powder produced using 180°C IAT showed the greatest encapsulation efficiency (96.72 ± 0.61%), solubility (87.42 ± 1.26%), dispersibility (86.45 ± 0.93%) and repose angle (23.50 ± 0.61 degree).
Response surface optimization of exopolysaccharide production from sugarcane juice by Lactobacillus confusus TISTR 1498

Manochai P., Phimolsiripol Y., Seesuriyachan P., Phimolsiripol, Y.,

Division of Product Development Technology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand
Division of Biotechnology, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand
Division of Product Development Technology, Faculty of Agro-Industry, Chiang Mai University, Thailand

ABSTRACT

Lactobacillus confusus TISTR 1498, isolated from Thai traditional fermented pork (Nham), could secrete large amounts of exopolysaccharides (EPS). Response surface methodology was applied to optimize the culture conditions for EPS production using Central Composite Design (CCD). The effects of three variables including pH (4-7), temperature (20-40°C) and nitrogen source (0.25-1.75 PYB) on EPS yield and biomass were investigated. The 1PYB was the mixtures of 5 g/L peptone (P), 2.5 g/L yeast extract (Y) and 2.5 g/L beef extract (B). Response surface methodology showed that the data were adequately fitted to a second-order polynomial model via quadratic regression relationships. The optimal culture conditions for EPS production in sugarcane juice were pH of 5.55, 29.75°C and 1.22PYB, which was composed of 6.1 g/L peptone, 3.05 g/L yeast extract and 3.05 g/L beef extract. Under the optimum condition, the predicted maximum EPS production was 107.5 g/L and the predicted biomass was 1.92 g/L. In submerged fermentation, sugarcane juice enhanced EPS yield twice as well as the modified MRS sucrose medium. In addition, the cost of medium can be lowered to 0.53 THB/g EPS, which was lower than that of the medium from the mixtures of the PYB (0.78 THB/gEPS).
Protease treatment for the stabilization of rice bran: Effects on lipase activity, antioxidants, and lipid stability

Laokuldilok T., Rattanathanan Y., Laokuldilok, T.,

1 Faculty of Agro-Industry, Chiang Mai University, Thailand
2 Lanna Rice Research Center, Chiang Mai University, Thailand
3 Faculty of Agro-Industry, Chiang Mai University, Thailand

ABSTRACT

Rice bran lipid is rapidly made rancid by endogenous lipase enzymes. To inactivate rice bran lipase, an enzymatic hydrolytic method was developed and then compared with the thermal method. The efficiency of five proteolytic enzymes including trypsin, chymotrypsin, papain, bromelain, and Flavourzyme enzyme to stabilize rice bran was investigated. Moreover, the antioxidant content and storage stability of enzymatically stabilized rice bran (ESRB), thermally stabilized rice bran (TSRB), and raw rice bran (RRB) were studied. Trypsin, chymotrypsin, and papain showed a higher rate of hydrolysis than bromelain and Flavourzyme enzyme. After 120 min of hydrolysis, rice bran hydrolyzed by trypsin, chymotrypsin, and papain inactivated 80, 86, and 79% of lipase activity, respectively, whereas lipase activity of rice bran hydrolyzed by bromelain and Flavourzyme enzyme was higher than the initial rice bran. With a similar lipase inactivation level, the cheaper papain was used to produce ESRB. Total phenolics content of ESRB was 52.89 and 94.10% higher than in RRB and TSRB, respectively. In addition, ?-oryzanol content in ESRB was 2.23- and 2.05-fold of that in RRB and TSRB, respectively. Lipase activity of RRB increased throughout the two months of storage, whereas no change in lipase activity was observed in ESRB and TSRB. At the end of storage, free fatty acid contents of RRB, TSRB, and ESRB were 15.30, 4.67, and 3.92%, respectively. We propose enzymatic hydrolysis by papain for stabilization of rice bran with high antioxidant content and storage stability. © 2014 AACC International, Inc.
The split plot with repeated randomised complete block design can reduce psychological biases in consumer acceptance testing

Jirangrat W., Wang J., Sriwattana S., No H.K., Prinyawiwatkul W., Prinyawiwatkul W.,

School of Nutrition and Food Sciences, Louisiana State University Agricultural Center, Baton Rouge, LA, 70803, United States
Department of Biostatistics, School of Public Health, Saint Louis University, St. Louis, MO, 63104, United States
Sensory Evaluation and Consumer Testing Unit, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, 50100, Thailand
Department of Food Science and Technology, Catholic University of Daegu, Hayang, 712-702, South Korea

ABSTRACT

A randomised complete block design (RCBD) has been extensively used in consumer testing; however, it is ineffective in preventing sample presentation biases. This study demonstrated a more efficient experimental design [i.e. split plot with repeated randomised complete block design (SPRRCBD)] to help minimise positional and first serving-order (FSO) biases in consumer tests. Results suggested that positional biases were strongly pronounced for the poor-quality sample. Comparing between RCBD and RCBD without FSO experiments, there were significant differences in overall liking (OL) scores of the same sample served at the same position. Hence, omitting the first sample score from data analysis was not recommended. The mean-squared error (MSE) of SPRRCBD was lower than RCBD and RCBD without FSO (2.28, 2.72 and 2.60, respectively), indicating a more powerful design to explain variations in mean hedonic differences. SPRRCBD extracted more explained variances, resulting in a decreased Type-II error in the model. © 2013 Institute of Food Science and Technology.
Ultrasonic-assisted extraction of phenolic and antioxidative compounds from lizard tail (Houttuynia cordata Thunb.)

1Prommajak T., 2Surawang S., 1Rattanapanone N., 1Prommajak, T.,

1 Division of Food Science and Technology, Chiang Mai University, Mueang, Chiang Mai, 50100, Thailand
2 Division of Product Development Technology, Chiang Mai University, Mueang, Chiang Mai, 50100, Thailand

ABSTRACT

Lizard tail (Houttuynia cordata Thunb.) is an Asian herb which has many biological activities, including antioxidative property from polyphenolic compounds. Response surface methodology and Box-Behnken design were employed to study the effect of extraction temperature (30 to 70°C), extraction time (10 to 30 min), ethanol concentration (30 to 70%), and solvent to sample ratio (2 to 6 ml/g) on ultrasonic-assisted extraction of phenolic compounds from lizard tail and antioxidant capacity of the herb extract. Extraction temperature was the most relevant factor on the responses. Optimal condition was the extraction temperature of 70°C for 30 min, using 60% ethanol concentration at the solvent to sample ratio of 5 ml/g. Model adequacies were confirmed by extraction at the optimal condition and normality of standardized residuals.
Rheological properties of mango puree and process development of mango sheet

Phaokuntha S., Poonlarp P.B., Pongsirikul I.,

Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

The rheological properties of mango puree were studied and measured using a controlled-stress/strain rheometer. Mango puree was prepared from naturally ripened mangoes. The rheological properties were pseudoplastic or shear thinning behavior. Mathematical models of Bingham, Power Law and Herschel-Bulkley model were used to predict the flow behavior. Root Mean Squared Error (RMSE), adjusted coefficient of determination (R2 adj) and reduced chi-square (?2) were calculated in order to verify the models. The Power Law model was found to be the best model for describing the rheological properties of mango puree. A Central Composite Design (CCD) consisting of two-factors factorial with quadratic model was used for the process development of mango sheet. The factors were citric acid and refined sugar added. Subsequently, preheated mango puree was dried using temperature of 60°C with 0.5 m/s air velocity by tray dryer. A Response Surface Methodology (RSM) was used to optimize the amount of citric acid and sugar addition. Consequently, mango sheet was evaluated for sensory characteristics. It was found that consumers (n=50) most accepted mango sheet using 1.5 g of citric acid and 10 g of refined sugar. There was no relationship found between citric acid and sugar contents on colour, flavor, and texture acceptance (P>0.05). However, the relationship between citric acid and sugar contents on sourness, sweetness and overall acceptability were found (P=0.05) with R2 adj of 92.50, 34.13 and 71.61%, respectively.
Physicochemical, antioxidant and sensory properties of puffed longan-rice snack by extrusion process

Leawtrakoon P., Naruenartwongsakul S.,

Division of Food Engineering, Faculty of Agro-Industry, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

For the development of puffed longan-rice snack, three styles of longan; namely, fresh longan, hot air-dried longan and freeze-dried longan were used. The physicochemical properties of the three longans were analyzed. The results showed that fresh longan has the lowest values of L, a and b (P