

Chemical Characterization and Molecular Weight of Sulfated Polysaccharides from *Ulva intestinalis*

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Sulfated polysaccharides were isolated from green seaweed *Ulva intestinalis* by water and dilute alkaline extraction. The extraction temperature at 80°C for 1, 3 and 6 h. Chemical compositions were determined. Alkaline extraction gave higher yield (14.30%), total sugars (38.77 g/100g), sulfate (43.96g/100g) and proteins (5.50 g/100g) than water extraction. Structure of sulfated polysaccharide was characterized. Monosaccharide composition was analyzed by High Performance Liquid chromatography equipped with evaporative light scattering detector (ELSD), sulfated polysaccharide extracted by water consisted of arabinose (3.52%), galactose (3.52%), galacturonic acid (1.94%), mannose (1.95%) and xylose (9.82%), respectively. For alkaline extraction, sulfated polysaccharide contained arabinose, galactose, galacturonic acid, mannose and xylose of 8.36%, 2.88%, 6.54%, 1.29% and 2.20% respectively. Glucose and glucuronic acid were not found in sulfated polysaccharides from both extraction methods. The FT-IR showed the most important bands were hydroxyl groups (2935 cm⁻¹), carboxyl groups (1380cm⁻¹) and sulfate groups (1126cm⁻¹), respectively. Water extraction gave higher molecular weight (300 kDa) of sulfated polysaccharide than alkaline extraction analyzed by High Performance Size-Exclusion chromatography

Keywords *Ulva intestinalis*; Water extraction; Alkaline extraction

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Effect of Pretreatments on Naringin and Pectin Contents in Pomelo (*Citrus grandis*(L.) Osbeck) Albedo

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Citrus fruits are rich source of pectin and phytochemicals. Processing citrus fruits into ready-to-eat product or citrus juice creates significant waste. For pomelo, the peels (albedo and flavedo) accounts for almost one-fourth of the whole fruit mass. To add value to these by-products, the residues can be transformed into food supplement or food ingredient in the form of DF powder. One important problem that limits the use of pomelo albedo is the bitterness causing from naringin. The effect of various pretreatments, i.e., hot water blanching at 95 °C (HWB) for 30 min, HWB followed by soaking in NaCl solution (3% w/v) for 30 min and HWB followed by soaking in ethanol (95% v/v) for 30 min, on the naringin and pectin contents in pomelo (*Citrus grandis*(L.) cv. Kao Yai) were investigated in this study. The naringin and pectin contents in pomelo albedo were approximately 33.28 µg/100g dry mass and 31.15 g/100g dry mass, respectively. The results showed that HWB followed by NaCl soaking provided the highest reduction of naringin; approximately 60% of the initial naringin content remained in the pretreated albedo. Pectin content was slightly reduced after pretreatments and there was no significant difference in pectin content among the samples (approximately 27.20-32.45 g/100 g dry mass) undergone different pretreatments.

Keywords Pomelo albedo; Pretreatment; Blanching; Soaking; Naringin

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Dietary Fiber and Glucosinolate Contents in Outer Leaves of Thai *Brassica* Vegetables

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Brassica vegetables have been reported to contain significant amounts of dietary fiber (DF) as well as various phytochemicals. Glucosinolates, a group of sulfur containing compounds naturally found in *Brassica* vegetables, have been reported to possess anticarcinogenic properties. This work aimed at studying the DF and glucosinolate contents in the outer leaves of Thai *Brassica* vegetables which are usually discarded during preparation for consumer market. The samples used in this work were the outer leaves of Chinese cabbage (*Brassica rapa* subsp. *pekinensis*), Chinese kale (*Brassica alboglabra*) and Chinese mustard (*Brassica juncea*). The results showed that the samples contained similar amounts of total dietary fiber (TDF) (47-53 g/ 100 g dry mass) with the high proportion of insoluble dietary fiber (IDF). The highest amount of total glucosinolate content was found in the outer leaves of Chinese mustard (3392.97±52.27 μmol/100 dry mass) followed by Chinese kale (2452.04± 63.67 μmol/100 dry mass) and Chinese cabbage (1522.59±62.52 μmol/100 dry mass), respectively. The results imply that outer leaves of *Brassica* vegetables may be used as a starting raw material to produce DF powder associated with anticarcinogenic properties.

Keywords *Brassica* vegetables; Dietary fiber; Glucosinolates

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Natural Sweeteners in Selected Thai Plant Origin

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Nine plants species Cha-em Thai (*Albiziamyriophylla* Benth.), safflower (*Carthamustinctorius* L.), Tan Mon (*Vernoniaelliptica* DC.), Siamese Ixora (*Ixorafinlaysoniana* Wall.), blady grass blady grass (*Imperatacylindrica* L.), Raksamsib (*Asparagus racemosus* Wild.), Emblica (*Phyllanthusemblica* L.), yellow myrobalan (*Terminaliachebula* Retz.) and bastard myrobalan (*Terminaliabelirica* Roxb.) were selected for natural sweeteners of plant. Proximate analysis; carbohydrate, fiber, protein and lipid contents (% dry weight basis) of nine plants origin were ranged from 39.49 to 69.19%, 8.80 to 47.47%, 1.98 to 11.14%, and 0.14 to 2.84%, respectively. Although, the minimum carbohydrate content was found in Siamese Ixora, the maximum was in Raksamsib. The highest percentage yield of ethanolic extract was found in yellow my robalan (10.35%), but safflower had the lowest yield (1.44%). However, aqueous extracts of Tan Mon had the highest percentage yield (12.01%), and aqueous extracts of Siamese Ixora had the lowest percentage yield (3.33%). In this study, phytochemical compounds were identified by chemical analyses and thin layer chromatography technique. Their phytochemicals of water orethanolic extracts were coumarins, flavonoids, saponins, terpenoids and sugars.

Keywords Cha-em Thai; Phytochemicals; Thin layer chromatography

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Chemical Compositions of Coriander (*Coriandrum sativum* L.) and Cassod Tree(*Cassia siamea* Lamk.) Essential Oil

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Coriander (*Coriandrum sativum* L.) and cassod tree (*Cassia siamea* Lamk.) are domestic herbs of Thailand which have medical properties. This study aimed to extract essential oil from leaves of coriander and leaves of cassod tree by simultaneous distillation extraction method (SDE). The yield of coriander oil and cassod tree oils was 0.103% and 0.020%, respectively. Both essential oils were bright yellow color. The chemical compositions of coriander and cassod tree essential oils were analyzed by gas chromatography mass spectrometry (GC-MS). It was found that coriander oil consisted of 29 compounds which the major components were 2-decanal (19.62%), decanal (19.05%) and thymol (10.60%). There were 18 compounds found in essential oil of cassod tree which its main components were thymol (24.01%), geranylacetone (20.72%) and β -damascenone (8.11%). Moreover, the oils were tested as antimicrobial which they could inhibit *Escherichia coli*, *Staphylococcus aureus* and *Salmonella* sp.

Keywords Coriander; Cassod tree; Essential oil; GC-MS

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Toxicity and Repellent Effects of *Moringa oleifera* Lam. Leaf Crude Extracts on Broad Mite (*Polyphagotarsonemus latus*) (Banks)

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In order to discover the benefits of *Moringa oleifera* Lam. leaves for pest control, its toxicity and repellent effects were studied by indirect contact of *Moringa oleifera* Lam. leaves on female broad mites (*Polyphagotarsonemus latus* (Banks)). A crude extract from dry *M. oleifera* leaves was made by moving bed methods with three different solvents successively: *n*-hexane, dichloromethane, and methanol. Then the extracts were dried by using rotary evaporation. A mixed solution of 10% ethanol and 2% Tween 80® was used to dissolve the crude extracts to prepare test concentrations (1% w/v of each extract in dissolved solution) and this also served as control. In comparison, two commercial chemicals (Neem and Amitaz) were selected as positive controls. All test solutions significantly reduced the number of broad mites on leaf discs than by natural death in control conditions. The dichloromethane crude extract of *M. oleifera* leaves was the most effective and toxic with the highest reduction of broad mite numbers on leaf disc than other tested extracts at the same concentration (1% w/v), but the toxic effects were not significantly different from commercial pesticides. The dichloromethane crude extracts were further tested with different concentrations of 0.5%, 1%, 3%, 5% and 10% w/v. The numbers of broad mites that died and left the leaf disc were used to calculate the median effective concentration (EC₅₀), while only the numbers of dead broad mites on the disc were used for the median lethal concentration (LC₅₀). The EC₅₀ and LC₅₀ of dichloromethane crude extracts were at 2.165 % w/v and 4.217 % w/v, respectively. Moreover, the inhibition of broad mite's ovi position rates on leaf disc was increased with increasing concentration of dichloromethane crude extracts at 8 hours.

Keywords *Moringa oleifera* lam.; Crude extracts; *Polyphagotarsonemus latus* (Banks)

Ligninolytic and Cellulolytic Enzymes Production by White Rot Fungi in Vegetable Juice Medium

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In this study, four isolates of white rot fungi (I9, OP06, OP18 and OP47) which exhibited high ligninolytic enzymes activity on solid-state cultivated agricultural residues were cultured in vegetable juice medium. Growth, ligninolytic enzymes activity (Manganese peroxidase, MnP; Lignin peroxidase, LiP; Laccase) and cellulase activity were monitored during 8 days of the experiment. Although MnP, Laccase and cellulase activities were detected in all fungal isolates, I9 showed the highest Laccase activity of 47.03 U/ml in 5 days. In 6 days, OP06 and OP47 could produce the highest MnP and cellulase activity of 17.02 and 3.43 U/ml, respectively. Results indicate that vegetable juice could be used as fermentation medium for enhancing ligninolytic enzymes production since MnP and Laccase activities of those white rot fungi isolates increased ca. 17 times compared with results from solid-state fermentation.

Keywords Cellulolytic enzyme; Laccase; Ligninolytic enzymes; Vegetable juice; White rot fungi

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Effect of Frying Machine and Frying Conditions on Frying Yield of Non-coated Chicken Meat

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This research aimed to study the effects of frying machine (continuous vs batch fryers), frying time (between 25 and 50 seconds), frying temperature (between 172 and 178°C), ratio of food to oil (1:106 and 1:150 kg L⁻¹ min⁻¹), and oil quality (acid value between 0.5 and 1.5) on deep-fat frying yield of non-flour coated chicken meat. Results showed that frying yield was significantly ($p < 0.05$) affected by frying time and frying temperature. Although ratio of food to oil and oil quality did not affect frying yield significantly ($p > 0.05$), an increase in acid value of frying oil seemed to decrease frying yield. On the other hand, frying yield obtained from continuous fryer was 9% higher than that obtained from batch fryer as the same frying conditions and raw materials were used. Moreover, there was approximately 4% of yield variation; even though, all frying parameters were controlled. This might be due to uncontrolled effect; for example, the sample size distribution. The information of our study could be used as a guideline for controlling the frying parameters in manufacturing process in order to achieve the highest frying yield.

Keywords Deep-fat frying; Frying machine; Frying time; Frying temperature; Non-coated chicken meat

Effect of Sex and Size of Broiler Chicken on Blood Composition and Strength of Blood Gel

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Blood composition of Arbor Acres Plus broiler chickens aged between 38-42 days-old was evaluated as a function of sex and size. Three sizes of chicken used were M (1.86-2.19 kg), ML (2.20-2.49 kg) and L (2.50-2.80 kg). Complete blood count (CBC) was performed on 10 broilers for each sex and size combination to evaluate % Hematocrit, white blood cell (WBC), red blood cell (RBC) and platelet counts. The results indicated that sex and size had no significant effect on % Hematocrit, WBC, RBC and platelet counts ($p > 0.05$). However, plasma protein analysis indicated that blood samples obtained from female broilers had significantly higher albumin content than male broilers ($p < 0.05$), i.e. 1.73 and 1.59 g/dL, respectively. The albumin content was not affected by broiler size. Since one of the functional properties of albumin is to form protein gel, an experiment was carried out to determine if blood samples drawn from male and female broilers exhibit different gel properties. Blood gel was formed at the ratio of 1% salt solution to blood at 70:30 by weight. The strength of blood gel at 2, 3 and 4 minute-setting times was determined by blood gel diameter. Although bloods from male and female broilers have different albumen contents, there was no significant difference in blood gel diameter at each setting time ($p > 0.05$). A significant increase in gel strength was observed when setting time increase; blood gel diameter decreased from 17.5 to 15 cm when increased the setting time from 2 to 4 minutes. Thus, more attention should be paid toward optimization of the setting time not the sex or size of broilers. The insight into effect of sex and size of broiler on blood composition and strength of blood could be used to improve the process of blood cake production.

Keywords Blood composition; Broiler chicken; Gel strength; Sex; Size

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