Komoditas : Kacang hijau
Tahun 2004-2008 (54 judul)

Elena Penas, Rosario Gomez, Juana Frias, Concepcion Vidal-Valverde, Effects of combined treatments of high pressure, temperature and antimicrobial products on germination of mung bean seeds and microbial quality of sprouts, Food Control, Volume 21, Issue 1, January 2010, Pages 82-88, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.04.008.
(http://www.sciencedirect.com/science/article/B6T6S-4W6Y5GR-1/2/b0b97672c0579daae875679afa0a186a)
Abstract:
The effects of several combinations of pressure, temperature and two antimicrobial agents, hypochlorite and carvacrol, applied separately on mung bean seeds, on their germination capability and on native microbial loads of sprouts developed from treated seeds, was studied by using response surface methodology (RSM). Seed viability decreased as pressure increased, at all concentrations of both hypochlorite and carvacrol. Enhanced reductions of total aerobic mesophilic bacteria, total and faecal coliforms and yeast and moulds populations were observed as pressure and hypochlorite/carvacrol concentrations increased. The optimal treatment at 250 MPa of seeds soaked in 18000 ppm and 1500 ppm of calcium hypochlorite and carvacrol, respectively, maintained an acceptable germination rate (80% and 60%, respectively) and improved the microbial quality of the respective sprouts with reductions of more than 5 log cfu/g. These reduction levels can be considered a preservative goal for industrial mung bean sprout production.
Keywords: High pressure; Sprouts; Mung bean; Seed hygenisation

Yu-Zhen Ding, Shao-Ying Zhang, Peng Liu, Wenqiao Yuan, Jin-Yi Liang, Zhe Zhao, Yu-Dong Zhang, Microbiological and biochemical changes during processing of the traditional chinese food douzhi, Food Control, Volume 20, Issue 12, December 2009, Pages 1086-1091, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2009.02.005.
(http://www.sciencedirect.com/science/article/B6T6S-4VNH3TD-3/2/63b9c825be444d157e25d538dc27efed)
Abstract:
The microbiological and biochemical changes during douzhi processing were studied. The sedimentation process was shown to follow a lactic fermentation course. The main fermenting bacteria were identified to be Lactococcus lactis and Leuconostoc citreum; the former played the main role in producing acids, and the latter ensured a better flavor of douzhi. Yeasts thrived during the late part of fermentation were believe to account for the decrease in acidity. Tracing the change of chemical compounds suggested that active metabolic activity was induced when beans were steeped in water, in which significant reduction in crude protein and sugars were observed, but levels of soluble proteins, free amino acids increased. Fermentation by lactic acid bacteria caused a rapid reduction of soluble proteins, soluble sugars and reducing sugars, but significant accumulation of free amino acids and slight changes in crude protein. Mung bean endogenous protease and amylase activity dropped significantly during fermentation.
Keywords: Mung bean; Lactococcus lactis; Leuconostoc citreum

Chuan-He Tang, Xin Sun, Shou-Wei Yin, Physicochemical, functional and structural properties of vicilin-rich protein isolates from three Phaseolus legumes: Effect of heat treatment, Food Hydrocolloids, Volume 23, Issue 7, October 2009, Pages 1771-1778, ISSN 0268-005X, DOI: 10.1016/j.foodhyd.2009.03.008.

(http://www.sciencedirect.com/science/article/B6VP9-4VYXMS7-2/2/11fc5f4e101d977537a9ee24cc3afaca)
Abstract:
The physicochemical, functional and structural properties of vicilin-rich protein isolates from kidney, red and mung beans (KPI, RPI and MPI) were investigated, and the influences of heating (at 95 [degree sign]C for 30 min) were also evaluated and compared. In the untreated samples, the thermal stability, free SH contents and surface hydrophobicity were different. The differences seemed to be closely related to the differences in extent of aggregation and/or tertiary and secondary conformational structures among proteins. The heating resulted in extensive denaturation of the protein, significant decreases in free SH groups and increases in surface hydrophobicity, but to a varying extent, depending on the type of protein isolates. The protein solubility and emulsifying activities were significantly improved by the heating. The tertiary and secondary structures of these proteins were also to a various extent affected. The conformational structures of proteins in RPI were most flexible, and susceptible to the heating, while the proteins in KPI were most heat-stable in structures. The results clearly indicated close relationships between functional properties of these vicilin-rich protein isolates and their conformational structures.
Keywords: Phaseolus legume; Vicilin; Heat treatment; Modification; Functional property; Structural conformation

Karin Kollarova, Danica Richterova, Ludmila Slovakova, Maria Henselova, Peter Capek, Desana Liskova, Impact of galactoglucomannan oligosaccharides on elongation growth in intact mung bean plants, Plant Science, Volume 177, Issue 4, October 2009, Pages 324-330, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2009.06.002.
(http://www.sciencedirect.com/science/article/B6TBH-4WH8C2K-1/2/17ce3ed5f72698d76d23a24ea0884ac0)
Abstract:
The impact of exogenously applied galactoglucomannan oligosaccharides (GGMOs) and their structurally modified forms (GGMOs-r--galactoglucomannosyl alditols, GGMOs-g--with reduced galactose content) on the growth of mung bean (Vigna radiata (L.) Wilczek) intact plants cultured in hydroponics has been determined. GGMOs alone or in combination with exogenously added IBA have influenced (with stimulation and/or inhibition effect) hypocotyl and seminal root elongation, adventitious and lateral roots formation and elongation in dependency on their concentration used. The inhibition of elongation growth in hypocotyls as well as in roots was connected with changes of cell wall-associated peroxidases activity and is probably associated with the beginning of cell wall rigidification. Data presented in this paper confirm the hypothesis that exogenously added GGMOs may have antiauxin activity and may interact also with endogenous growth regulators. Certain monosaccharide sequences with terminal galactose in the side chain of GGMOs probably play important role in their biological activity in intact plants as it was demonstrated previously in individual parts of plants.
Keywords: Cell wall-associated peroxidase; Galactoglucomannan oligosaccharides; IBA; intact plant; Vigna radiata (L.) Wilczek

Shi-Weng Li, Lingui Xue, Shijian Xu, Huyuan Feng, Lizhe An, IBA-induced changes in antioxidant enzymes during adventitious rooting in mung bean seedlings: The role of H2O2, Environmental and Experimental Botany, Volume 66, Issue 3, September 2009, Pages 442-450, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2009.03.005.
(http://www.sciencedirect.com/science/article/B6T66-4VWB19C-1/2/1d7c65c129afdeb0ec11ff1874f622a1)
Abstract:

The changes in antioxidant enzyme activity during the induction of adventitious roots in mung bean seedlings treated with Indole-3-butyric acid (IBA), hydrogen peroxide (H2O2), ascorbic acid (ASA) and diphenylene iodonium (DPI) were investigated. As compared with the controls, treatments of seedlings with 10 [mu]M IBA significantly decreased POD activity by 55% and 49.6% at 3 h and 12 h of incubation, respectively, and significantly increased by 49.8% at 36 h of incubation; treatments of seedlings with 10 mM H2O2 significantly decreased POD activity by 42%, 60%, 39% and 38% at 3 h, 12 h, 24 h and 48 h of incubation, respectively, the changes in POD activity were coincident with those in IBA-treated seedlings during the 0-12 h incubation period; treatments of seedlings with 2 mM ASA significantly decreased APX activities by 27% only at 3 h of incubation, the varying trend of POD activity was similar to incubation with water; 10 [mu]M DPI treatments significantly decreased POD activity by 42%, 40%, 54% and 28% at 3 h, 6 h, 12 h and 48 h of treatment, respectively. CAT activities remained at relatively stable levels and no major changes occurred from 0 h to 48 h during the incubation phase of adventitious rooting. The results may imply that CAT, an H2O2-metabolizing enzyme, is inactivated by H2O2 during the formation of adventitious roots. As compared with the controls, IBA treatments significantly decreased APX activities by 48%, 53% and 66% at 3 h, 9 h and 12 h of treatment, respectively; H2O2 treatments significantly decreased APX activities by 59%, 51% and 57% at 3 h, 12 h and 36 h of incubation, respectively; ASA treatments significantly decreased APX activities by 37% only at 3 h of incubation; DPI treatments significantly decreased APX activities by 54%, 53% and 63% at 3 h, 6 h and 12 h of incubation, respectively, and significantly increased APX activity by 106% at 24 h. These results indicated that the influence of IBA, H2O2, ASA and DPI on the changes in APX activity were the same as on the changes in POD activity. Furthermore, similar trends in the changes of APX activity and POD activity were observed during the induction and initiation rooting phase. This finding implies that APX and POD serve the same functions, possibly related to the level of H2O2, during the formation of adventitious roots. The early decrease of POD and APX activities in the initiation phase of IBA- and H2O2-treated seedlings may be one mechanism underlying the IBA- and H2O2-mediated facilitation of adventitious rooting.
Keywords: Hydrogen peroxide; Peroxidase (POD); Catalase (CAT); Ascorbate peroxidase (APX); Adventitious roots; Mung bean; Mucuna pruriens L

Frank J. Messina, Jake C.Jones, Does rapid adaptation to a poor-quality host by Callosobruchus maculatus (F.) cause cross-adaptation to other legume hosts?, Journal of Stored Products Research, Volume 45, Issue 3, July 2009, Pages 215-219, ISSN 0022-474X, DOI: 10.1016/j.jspr.2009.02.004.
(http://www.sciencedirect.com/science/article/B6T8Y-4WBB70F-1/2/4fa4afd29f08333a5255be6d3fda7728)
Abstract:
Initial assays indicated that lentil is a very poor host for an Asian population of the seed beetle Callosobruchus maculatus (F.). Larval survival was near zero, and females laid few or no eggs on lentil seeds. However, mass selection in the laboratory consistently produced a rapid increase in survival (from <2% to >80% in <20 generations) as well as a moderate increase in host acceptance. We investigated whether adaptation to lentil simultaneously causes cross-adaptation to other grain legumes, particularly those closely related to lentil. After 30 generations of selection, survival in lentil exceeded 90% in the lentil line, but remained near zero in a line maintained on the ancestral host, mung bean. Despite this extreme divergence in performance in lentil, the lines did not differ in their survival on eight other legume hosts, including two hosts (pea and fava bean) that belong to the same tribe (Vicieae) as lentil. Similarly, females from the lentil line laid more than three times as many eggs on lentil as females from the mung bean line did, but the lines exhibited only minor differences in their acceptance of eight alternative hosts. Lentil-line females did not show greater acceptance of artificial seeds (glass balls), as might be expected if increased egg-laying on lentil was simply due to a reduction in the overall threshold for oviposition. We conclude

that the changes in larval physiology and adult behavior that permitted rapid colonization of a marginal host were largely specific to that host, and not likely to promote a further expansion of the beetle's host range.
Keywords: Adaptation; Callosobruchus maculatus; Grain legume; Host range; Lentil; Oviposition

Jehan Bakht, Mohammad Shafi, Mohammad Tariq Jan, Zahir Shah, Influence of crop residue management, cropping system and N fertilizer on soil N and C dynamics and sustainable wheat (Triticum aestivum L.) production, Soil and Tillage Research, Volume 104, Issue 2, July 2009, Pages 233-240, ISSN 0167-1987, DOI: 10.1016/j.still.2009.02.006.
(http://www.sciencedirect.com/science/article/B6TC6-4W1JY1N-1/2/131bfc04c5d083201fffb53d52acb211)
Abstract:
Management of N is the key for sustainable and profitable wheat production in a low N soil. We report results of irrigated crop rotation experiment, conducted in the North West Frontier Province (NWFP), Pakistan, during 1999-2002 to evaluate effects of residue retention, fertilizer N application and mung bean (Vigna radiata) on crop and N yields of wheat and soil organic fertility in a mung bean-wheat sequence. Treatments were (a) crop residue retained (+residue) or (b) removed (-residue), (c) 120 kg N ha-1 applied to wheat, (d) 160 kg N ha-1 to maize or (e) no nitrogen applied. The cropping system was rotation of wheat with maize or wheat with mung bean. The experiment was laid out in a spit plot design. Postharvest incorporation of crop residues significantly ($p < 0.05$) increased the grain and straw yields of wheat during both years. On average, crop residues incorporation increased the wheat grain yield by 1.31 times and straw yield by 1.39 times. The wheat crop also responded strongly to the previous legume (mung bean) in terms of enhanced grain yield by 2.09 times and straw yield by 2.16 times over the previous cereal (maize) treatment. Application of fertilizer N to previous maize exerted strong carry over effect on grain (1.32 times) and straw yield (1.38 times) of the following wheat. Application of N fertilizer to current wheat produced on average 1.59 times more grain and 1.77 times more straw yield over the 0 N kg ha-1 treatment. The N uptake in wheat grain and straw was increased 1.31 and 1.64 times by residues treatment, 2.08 and 2.49 times by mung bean and 1.71 and 1.86 times by fertilizer N applied to wheat, respectively. The soil mineral N was increased 1.23 times by residues, 1.34 times by mung bean and 2.49 times by the application of fertilizer N to wheat. Similarly, the soil organic C was increased 1.04-fold by residues, 1.08 times by mung bean and 1.00 times by the application of fertilizer N. We concluded that retention of residues, application of fertilizer N and involvement of legumes in crop rotation greatly improves the N economy of the cropping system and enhances crop productivity in low N soils.
Keywords: Crop residues; Cropping system; N; C; Wheat

Hong-Zhuo Tan, Zai-Gui Li, Bin Tan, Starch noodles: History, classification, materials, processing, structure, nutrition, quality evaluating and improving, Food Research International, Volume 42, Issues 5-6, June-July 2009, Pages 551-576, ISSN 0963-9969, DOI: 10.1016/j.foodres.2009.02.015.
(http://www.sciencedirect.com/science/article/B6T6V-4VNH3T4-2/2/c3948d847a32676d34463f1ea99d343b)
Abstract:
Starch noodles, produced from purified starch of various plant sources, are a major category of Asian noodles. This review summarizes the current knowledge on: (1) Definition, naming, history and categories of starch noodles. (2) The morphological, physico-chemical, thermal, rheological characteristics and molecular structure of materials including mung bean starch, pea starch, sweet potato starch, potato starch and corn starch. (3) Processing technology of starch noodles including dropping, extruding and cutting. (4) Structure of starch noodles: it is composed of hydrolysis-resistant crystalline zone, network-like framework and filler mass. (5) Nutrition of starch noodles: it

could be evaluated by the digestibility of starch, hydrolysis properties of gelatinized and retrograded starches, hydrolysis property of starch noodles. (6) Quality evaluating of starch noodles: it includes sensory, cooking and texture property. Correlation between the physical properties of starch, processing variables and the sensory, cooking and texture property of starch noodles are summarized. (7) Quality improving for non-mung bean starch noodles: (a) using other materials such as red bean starch, pigeonpea starch, potato starch, sweet potato starch, corn starch, to substitute totally or partly mung bean starch; (b) adding chemically modified starch; (c) adding physically modified starch; (d) biologically treating starch; (e) using additives such as chitosan, polysaccharide gums.
Keywords: Starch noodles; History; Classification; Starches; Processing; Structure; Nutrition; Quality evaluating; Quality improving

Chuan-He Tang, Ling Chen, Ching-Yung Ma, Thermal aggregation, amino acid composition and in vitro digestibility of vicilin-rich protein isolates from three Phaseolus legumes: A comparative study, Food Chemistry, Volume 113, Issue 4, 15 April 2009, Pages 957-963, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.08.038.
(http://www.sciencedirect.com/science/article/B6T6R-4T84K6R-2/2/11edf3b0a223c76cabc3467e7d835e70)
Abstract:
The heat-induced aggregation and the in vitro digestibility of vicilin-rich protein isolates from three Phaseolus legumes, including kidney bean, red bean and mung bean were investigated and compared, and their amino acid composition and free sulfhydryl (SH) group contents also evaluated. The results showed that the extent in the heat-induced aggregation varied with the type of the protein isolates, and the formation of new disulphide bonds (at the expense of free SH contents) was involved in the formation of the aggregates. The protein isolates with higher levels of hydrophobic and uncharged polar amino acids, and lower basic amino acid contents exhibited lower extent of their heat-induced aggregation. The in vitro pepsin plus trypsin digestibility was different for various native protein isolates. The digestibility was to a varying extent affected by the heat treatment. The influences of heating on the digestibility of these proteins were closely related to the extent of their heat-induced aggregation. The results suggest that the improvement of nutritional property of those vicilin-rich protein isolates by heat treatment is largely dependent upon their amino acid composition as well as the extent of heat-induced aggregation.
Keywords: Vicilin; Phaseolus legume; Thermal aggregation; Amino acid composition; In vitro digestibility

Raj K. Sairam, Kumutha Dharmar, Viswanathan Chinnusamy, Ramesh C. Meena, Waterlogging-induced increase in sugar mobilization, fermentation, and related gene expression in the roots of mung bean (Vigna radiata), Journal of Plant Physiology, Volume 166, Issue 6, 1 April 2009, Pages 602-616, ISSN 0176-1617, DOI: 10.1016/j.jplph.2008.09.005.
(http://www.sciencedirect.com/science/article/B7GJ7-4TRHC0D-2/2/243f6a1848180cf987676a4372b3e436)
Abstract: Summary
The objective of this study was to examine the role of root carbohydrate levels and metabolism in the waterlogging tolerance of contrasting mung bean genotypes. An experiment was conducted with two cultivated mung bean (Vigna radiata) genotypes viz., T44 (tolerant) and Pusa Baisakhi (PB) (susceptible), and a wild Vigna species Vigna luteola under pot-culture to study the physiological and molecular mechanism of waterlogging tolerance. Waterlogging resulted in decrease in relative water content (RWC), membrane stability index (MSI) in root and leaf tissues, and chlorophyll (Chl) content in leaves, while the Chl a/b ratio increased. Waterlogging-induced decline in RWC, MSI, Chl and increase in Chl a/b ratio was greater in PB than V. luteola and T44. Waterlogging caused decline in total and non-reducing sugars in all the genotypes and reducing

sugars in PB, while the content of reducing sugar increased in V. luteola and T44. The pattern of variation in reducing sugar content in the 3 genotypes was parallel to sucrose synthase (SS) activity. V. luteola and T44 also showed fewer declines in total and non-reducing sugars and greater increase in reducing sugar and SS activity than PB. Activity of alcohol dehydrogenase (ADH) increased up to 8 d of waterlogging in V. luteola and T44, while in PB a marginal increase was observed only up to 4 d of treatment. Gene expression studies done by RT-PCR in 24 h waterlogged plants showed enhanced expression of ADH and SS in the roots of V. luteola and T44, while in PB there was no change in expression level in control or treated plants. PCR band products were cloned and sequenced, and partial cDNAs of 531, 626, and 667; 702, 736, and 744 bp of SS and ADH, respectively were obtained. The partial cDNA sequences of cloned SS genes showed 93-100 homologies among different genotypes and with D10266, while in case of ADH the similarity was in the range of 97-100% amongst each other and with Z23170. The results suggest that the availability of sufficient sugar reserve in the roots, activity of SS to provide reducing sugars for glycolytic activity and ADH for the recycling of NADH, and for the continuation of glycolysis, could be one of the important mechanisms of waterlogging tolerance of V. radiata genotype T44 and wild species V. luteola. This was reflected in better RWC and Chl content in leaves, and membrane stability of leaf and root tissue in V. luteola and T44.
Keywords: Alcohol dehydrogenase; Gene expression; Mung bean; Sucrose synthase; Waterlogging

Sanoe Chairam, Channarong Poolperm, Ekasith Somsook, Starch vermicelli template-assisted synthesis of size/shape-controlled nanoparticles, Carbohydrate Polymers, Volume 75, Issue 4, 24 February 2009, Pages 694-704, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2008.09.022.
(http://www.sciencedirect.com/science/article/B6TFD-4TJTX7N-2/2/3cd339ec3e9e830518718e6f5529c2a5)
Abstract:
Size- and shape-controlled syntheses of silver and gold nanoparticles have been successfully developed using partially hydrolyzed starch vermicelli templates as green nanoreactors for the growth of nanoparticles. Mung bean vermicelli is of interest due to the higher amylose content and its transparency, allowing the formation of coloured particles on the vermicelli to be observed. The as-prepared silver and gold nanoparticles were characterized by UV-Visible spectroscopy, transmission electron microscopy (TEM), and X-ray diffraction (XRD). The carbonization of as-prepared vermicelli at 200 [degree sign]C, 300 [degree sign]C, and 500 [degree sign]C was carried out to investigate nanoparticles embedded in the starch vermicelli templates. TEM of carbonized samples revealed the interesting patterns of gold nanorods and silver nanowire-liked assemblies along with carbon nanotubes. The carbonization of silver nanoparticles at 500 [degree sign]C resulted to the loss of starch vermicelli capping nanoparticles and this led to the higher diffusion rate of nanoparticles to generate silver nanodendrites on TEM images. XRD data of carbonized yellow and purple silver nanoparticles revealed the presence of silver nanoparticles and a mixture of silver and silver chloride nanoparticles, respectively. This approach offers a great potential to design new fine structures of vermicelli and utilize its structure as a template for the large-scale synthesis of size- and shape-controlled silver and gold nanoparticles for chemical and biological applications.
Keywords: Silver nanoparticles; Gold nanoparticles; Silver chloride nanoparticles; Starch; Green chemistry; Starch vermicelli

Shi-Weng Li, Lingui Xue, Shijian Xu, Huyuan Feng, Lizhe An, Hydrogen peroxide acts as a signal molecule in the adventitious root formation of mung bean seedlings, Environmental and Experimental Botany, Volume 65, Issue 1, January 2009, Pages 63-71, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2008.06.004.

(http://www.sciencedirect.com/science/article/B6T66-4STYTY4-1/2/acaf542ab9779213f44e2a62340b924b)
Abstract:
Hydrogen peroxide (H_2O_2), an active oxygen species, is widely generated in many biological systems and mediates various physiological and biochemical processes in plants. In this study we demonstrated that the exogenous H_2O_2 was able to promote the formation and development of adventitious roots in mung bean seedlings. Treatments with 1-100 mM H_2O_2 for 8-18 h significantly induced the formation and development of adventitious roots. Catalase (CAT) and ascorbic acid, which are H_2O_2 scavengers or inhibitors, eliminated the adventitious root-promoting effects of exogenous H_2O_2. H_2O_2 may have a downstream signaling function in the auxin signaling pathway and be involved in auxin-induced adventitious root formation. 2,3,5-Triiodobenzoic acid (TIBA), an inhibitor of auxin polar transport, strongly inhibited adventitious rooting of mung bean seedlings; however, the inhibiting effects of TIBA on adventitious rooting can be partially reversed by the exogenous IBA or H_2O_2. Diphenylene iodonium (DPI) strongly inhibits the activity of NADPH oxidase, which is one of the main sources of H_2O_2 formation in plant cells. DPI treatment strongly inhibited the formation of adventitious roots in mung bean, but the inhibitory effects of DPI on rooting can be partially reversed by the exogenous H_2O_2 or IBA. This indicates that the formation of adventitious roots was blocked once the generation of H_2O_2 through NADPH oxidase was inhibited, and H_2O_2 mediated the IBA-induced adventitious root formation. Furthermore, a rapid increase in the endogenous level of H_2O_2 was detected during incubation with water 12-36 h after the primary root removal in mung bean seedlings. Three hours after the primary root removal, the generation of endogenous H_2O_2 was markedly induced in IBA-treated seedlings in comparison with water-treated seedlings. This implies that IBA induced overproduction of H_2O_2 in mung bean seedlings, and that IBA promoted adventitious root formation via a pathway involving H_2O_2. Results obtained suggest that H_2O_2 may function as a signaling molecule involved in the formation and development of adventitious roots in mung bean seedlings.
Keywords: Hydrogen peroxide; Signaling; Adventitious roots; Mung bean; Mucuna pruriens L

Mandira Malhotra, Sheela Srivastava, Stress-responsive indole-3-acetic acid biosynthesis by Azospirillum brasilense SM and its ability to modulate plant growth, European Journal of Soil Biology, Volume 45, Issue 1, Ecology and application of Azospirillum and other plant growth promoting bacteria (PGPB), January-February 2009, Pages 73-80, ISSN 1164-5563, DOI: 10.1016/j.ejsobi.2008.05.006.
(http://www.sciencedirect.com/science/article/B6VR7-4SVD596-1/2/72f0e23dfd5a760e2269174a08ffc774)
Abstract:
Plant growth promotion by Azospirillum brasilense SM has been attributed to its indole-3-acetic acid (IAA) production. Analysis of IAA biosynthesis by this strain under nutrient stresses, likely environmental fluctuations and long-term batch cultures suggested that they significantly influenced this function, with some conditions (fluctuations in temperature) triggering IAA accumulation. In long-term batch cultures (of 30 days), the bacterial population was maintained at a specific cell density and produced IAA even after a sharp decline in population size, albeit fluctuations were observed in both the parameters. Long-term bacterial cultures under nitrogen starvation showed the same trend in cell viability; however, a continuous increase in IAA accumulation was seen over time. This study has shown that A. brasilense strain SM has the potential to be a competent rhizospheric bacterium as it can beneficially influence the growth of sorghum. Further, it also has the ability to promote the growth of a number of other plants like mung bean, maize, and wheat. The benefit of this characteristic of strain SM can be directly accrued to a range of plants with which it may associate so as to improve their yield.

Keywords: Indole-3-acetic acid; Plant growth promotion; Tryptophan; Environment stress; Long-term stationary phase

Hudaa Neetoo, Mu Ye, Haiqiang Chen, Potential application of high hydrostatic pressure to eliminate Escherichia coli O157:H7 on alfalfa sprouted seeds, International Journal of Food Microbiology, Volume 128, Issue 2, 10 December 2008, Pages 348-353, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2008.09.011.
(http://www.sciencedirect.com/science/article/B6T7K-4TJTX38-2/2/0006a90d198d940332bbb1cd3e5228cb)
Abstract:
Sprouts eaten raw are increasingly being perceived as hazardous foods as they have been implicated in Escherichia coli O157:H7 outbreaks where the seeds were found to be the likely source of contamination. The objective of our study was to evaluate the potential of using high hydrostatic pressure (HHP) technology for alfalfa seed decontamination. Alfalfa seeds inoculated with a cocktail of five strains of E. coli O157:H7 were subjected to pressures of 500 and 600 MPa for 2 min at 20 [degree sign]C in a dry or wet (immersed in water) state. Immersing seeds in water during pressurization considerably enhanced inactivation of E. coli O157:H7 achieving reductions of 3.5 log and 5.7 log at 500 and 600 MPa, respectively. When dry seeds were pressurized, both pressure levels reduced the counts by < 0.7 log. To test the efficacy of HHP to completely decontaminate seeds whilst meeting the FDA requirement of 5 log reductions, seeds inoculated with a ~ 5 log CFU/g of E. coli O157:H7 were pressure-treated at 600 and 650 MPa at 20 [degree sign]C for holding times of 2 to 20 min. A > 5 log reduction in the population was achieved when 600 MPa was applied for durations of >= 6 min although survivors were still detected by enrichment. When the pressure was stepped up to 650 MPa, the threshold time required to achieve complete elimination was 15 min. Un-inoculated seeds pressure-treated at 650 MPa for 15 min at 20 [degree sign]C successfully sprouted achieving a germination rate identical to untreated seeds after eight days of sprouting. These results therefore demonstrate the promising application of HHP on alfalfa seeds to eliminate the risk of E. coli O157:H7 infections associated with consumption of raw alfalfa sprouts.
Keywords: Alfalfa; Mung bean; Seeds; Sprouts; Escherichia coli O157:H7; High hydrostatic pressure

Rebeca Fernandez-Orozco, Juana Frias, Henryk Zielinski, Mariusz K. Piskula, Halina Kozlowska, Concepcion Vidal-Valverde, Kinetic study of the antioxidant compounds and antioxidant capacity during germination of Vigna radiata cv. emmerald, Glycine max cv. jutro and Glycine max cv. merit, Food Chemistry, Volume 111, Issue 3, 1 December 2008, Pages 622-630, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2008.04.028.
(http://www.sciencedirect.com/science/article/B6T6R-4S98V33-2/2/83c133a230e019129847e52be2e49082)
Abstract:
The purpose of this study was to determine the antioxidant capacity and the content of antioxidant compounds in raw mung bean seeds and sprouts (Vigna radiata cv. emmerald) germinated for 2, 3, 4, 5 and 7 days and of soybean seeds of Glycine max cv. jutro germinated for 2, 3 and 4 days and of Glycine max cv. merit germinated for 2, 3, 4, 5 and 6 days. Antioxidant compounds, such as vitamin C and E, total phenolic compounds and reduced glutathione (GSH) were studied. Antioxidant capacity was measured by superoxide dismutase-like activity (SOD-like activity), peroxyl radical-trapping capacity (PRTC), trolox equivalent antioxidant capacity (TEAC) and inhibition of lipid peroxidation in unilamellar liposomes of egg yolk phosphatidylcholine (PC). The results indicated that changes in the contents of vitamin C, vitamin E and GSH depended on the type of legume and germination conditions. Sprouts of mung bean and soybeans provided more total phenolic compounds than did raw seeds. The SOD-like activity increased after germination of

mung bean seeds for 7 days, by 308%, while no change was observed in sprouts of Glycine max cv. jutro and an increase was observed after 5 and 6 days of germination (~20%) in Glycine max cv. merit. PRTC and TEAC increased during the germination process and retentions of 28-70% and 11-14%, respectively, for soybean, and 248% and 61%, respectively, for mung bean were observed at the end of germination. The inhibition of lipid peroxidation increased by 389% in 5-7 days' germination of Vigna radiata cv. emmerald sprouts, and 66% in Glycine max cv. merit sprouts whilst, in Glycine max cv. jutro, germination did not cause changes in lipid peroxidation inhibition. According to the results obtained in this study, germination of mung bean and soybean seeds is a good process for obtaining functional flours with greater antioxidant capacity and more antioxidant compounds than the raw legumes.
Keywords: Mung bean; Soybean; Germination; Antioxidant capacity; Vitamin C; Vitamin E; Phenolic compounds; Reduced glutathione; Lipid peroxidation

Chuan-He Tang, Thermal denaturation and gelation of vicilin-rich protein isolates from three Phaseolus legumes: A comparative study, LWT - Food Science and Technology, Volume 41, Issue 8, November 2008, Pages 1380-1388, ISSN 0023-6438, DOI: 10.1016/j.lwt.2007.08.025.
(http://www.sciencedirect.com/science/article/B6WMV-4PMJK70-1/2/15a0bce40ca60a5e4210584d6cc68011)
Abstract:
The thermal denaturation and gelation properties of vicilin-rich protein isolates from red bean, red kidney bean and mung beans (further denoted as RPI, KPI and MPI) were investigated by differential scanning calorimetry (DSC) and dynamic oscillatory measurements. The relation between the properties of these proteins to their free sulphydryl (SH)/disulfide bond (SS) contents was also evaluated. DSC analyses showed that many DSC characteristics of major endothermic peak (corresponding to vicilin component), including its denaturation temperature (Td), enthalpy changes ([Delta]H) and width at half-peak height ([Delta]T1/2), significantly varied with the type of protein isolates. Furthermore, the heat-induced gelation, including onset of gelation and the development of mechanical moduli, was also dependent on the type of protein isolates. The thermal denaturation of these proteins was nearly unaffected by the presence of reducing agent dithiothreitol (DTT), while the presence of DTT weakened the gel formation. The Td of vicilin components and the mechanical moduli of corresponding formed gels were positively related to their SS contents. Additionally, the formed gels were thermo-irreversible, and heat pretreatment (carried out at temperatures higher than or close to the Td of these vicilins) could improve the gel network formation. These results confirm that vicilin-rich protein isolates from various legumes show different patterns of thermal denaturation and gelation, and these properties are to a great extent related to their SH and/or SS contents.
Keywords: Vicilin; Phaseolus legume; Protein denaturation; Thermal gelation

Trent W. Biggs, Prasanta K. Mishra, Hugh Turral, Evapotranspiration and regional probabilities of soil moisture stress in rainfed crops, southern India, Agricultural and Forest Meteorology, Volume 148, Issue 10, 3 September 2008, Pages 1585-1597, ISSN 0168-1923, DOI: 10.1016/j.agrformet.2008.05.012.
(http://www.sciencedirect.com/science/article/B6V8W-4SY5WTK-1/2/6a106c985e4663a3c1b09c82e4c4ed90)
Abstract:
The long-term probability of soil moisture stress in rainfed crops was mapped at 0.5[degree sign] resolution over the Krishna River basin in southern India (258,948 km2). Measurements of actual evapotranspiration (Ea) from 90 lysimeter experiments at four locations in the basin were used to calibrate a non-linear regression model that predicted the combined crop coefficient (KcKs) as a function of the ratio of seasonal precipitation (P) to potential evapotranspiration (Ep). Crops included sorghum, pulses (mung bean, chickpea, soybean, pigeonpea) and oilseeds (safflower

and sunflower). Ep was calculated with the Penman-Monteith equation using net radiation derived from two methods: (1) a surface radiation budget calculated from satellite imagery (EpSRB) and (2) empirical equations that use data from meteorological stations (EpGBE). The model of Ks as a function P/Ep was combined with a gridded time series of precipitation (0.5[degree sign] resolution, 1901-2000) and maps of EpSRB to define the probability distributions of P, P/Ep and Ks for sorghum at each 0.5[degree sign] cell over the basin. Sorghum, a C4 crop, had higher Ea and Ks values than the C3 plants (oilseeds, pulses) when precipitation was low (P < 1 mm d-1) but lower maximum Ea rates (3.3-4.5 mm d-1) compared with C3 crops (oilseeds and pulses, 4.3-4.9 mm d-1). The crop coefficient under adequate soil moisture (Kc) was higher than the FAO-56 crop coefficients by up to 56% for oilseeds and pulses. The seasonal soil moisture coefficient (Ks) for sorghum ranged from 1.0 under high rainfall (July-October) to 0.45 in dry seasons (November-March), showing strong soil moisture controls on Ea. EpSRB calculated at the lysimeter stations was 4-20% lower than EpGBE, with the largest difference in the dry season. Kc derived from EpSRB was only slightly (2-4%) higher than Kc derived from EpSRB, because the maximum Ea occurred during the monsoon when the differences between EpSRB and EpGBE were small. Approximately 20% of the basin area was expected to experience mild or greater soil moisture stress (Ks < 0.80) during the monsoon cropping season 1 year in every 2 years, while 70% of the basin experienced mild or greater stress 1 year in 10. The maps of soil moisture stress provide the basis for estimating the probability of drought and the benefits of supplemental irrigation.
Keywords: Crop water use; Evapotranspiration; Soil moisture; Semi-arid tropics; India; Satellite methods; Regional

Elena Penas, Rosario Gomez, Juana Frias, Concepcion Vidal-Valverde, Application of high-pressure treatment on alfalfa (Medicago sativa) and mung bean (Vigna radiata) seeds to enhance the microbiological safety of their sprouts, Food Control, Volume 19, Issue 7, July 2008, Pages 698-705, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2007.07.010.
(http://www.sciencedirect.com/science/article/B6T6S-4P940KC-1/2/a57061aa5de3d0a00fe059a0eedda2bd)
Abstract:
The effect of several combinations of time, pressure and temperature applied on mung bean and alfalfa seeds, on the germination capacity as well as on the reduction of the native microbial load of sprouts developed from treated seeds was studied by using response surface methodology (RSM). The germination capability of mung bean seeds was unaffected with increasing temperature and pressures up to 250 MPa. Increase of temperature from 10 to 40 [degree sign]C has a positive effect on the viability of alfafa seeds, which decreased however as pressure increased from 100 to 400 MPa. Enhanced reductions of total aerobic mesophilic bacteria, total and faecal coliforms and yeast and moulds populations were observed with increased pressure and temperature. The optimal treatment conditions for improving the safety of sprouts without impairing the germination capability of seeds were 40 [degree sign]C and 100 and 250 MPa for alfalfa and mung bean seeds, respectively.
Keywords: High-pressure; Sprouts; Mung bean; Alfalfa; Microbiological safety

Jiang Ke Yang, Tian Ying Yuan, Wei Tao Zhang, Jun Chu Zhou, You Guo Li, Polyphasic characterization of mung bean (Vigna radiata L.) rhizobia from different geographical regions of China, Soil Biology and Biochemistry, Volume 40, Issue 7, July 2008, Pages 1681-1688, ISSN 0038-0717, DOI: 10.1016/j.soilbio.2008.02.002.
(http://www.sciencedirect.com/science/article/B6TC7-4SDFR5G-1/2/e377cefd7f0f180498ca81bb44784d7d)
Abstract:
Polyphasic characterization of 54 indigenous mung bean (Vigna radiata L.) rhizobia from different geographic regions of China was determined by analyzing the variability of 16S rRNA gene RFLP,

16S-23S rRNA gene Intergenetic Spacer (IGS) RFLP, G-C rich RAPD and phenotype assays. Based on these characteristics, mung bean rhizobia were clustered into four groups. Group I comprised 16 slow-growing isolates from a variety of geographic regions. This group was genetically distinct from Bradyrhizobium japonicum and Bradyrhizobium liaoningense, and may represent a new species. Group II was composed of 18 isolates, which could be sub-divided into two sub-groups that were respectively related to B. japonicum and B. liaoningense. Group III comprised 12 isolates from South China and clustered together with Bradyrhizobium elkanii. Group IV formed a miscellany of 8 fast-growing isolates variously related to the genera Sinorhizobium, Rhizobium and Mesorhizobium.
Keywords: Mung bean; Rhizobia; 16S rRNA gene RFLP; IGS RFLP; RAPD; Phenotype

Zaigui Li, Wenju Liu, Qun Shen, Wei Zheng, Bin Tan, Properties and qualities of vermicelli made from sour liquid processing and centrifugation starch, Journal of Food Engineering, Volume 86, Issue 2, May 2008, Pages 162-166, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.09.013.
(http://www.sciencedirect.com/science/article/B6T8J-4PPF5XX-1/2/e8693b4d760b5f8e34d2130bebd9639a)
Abstract:
Properties and qualities of vermicelli made from two different techniques of processing starches were studied in this paper. Vermicelli made from sour liquid starch had more significant mesh structure than vermicelli made from centrifugation. TCL(total cooking loss) value of vermicelli made from sour liquid starch was significantly lower than that from centrifugation starch. Amylose content of starch and TCL of vermicelli, degradation rate and TCL of vermicelli all had significance negative correlation. Amylose content had significance positive correlation with the degradation rate of vermicelli. The swelling index and TCL had no significance correlation.
Keywords: Mung bean starch; Sour liquid processing; Centrifugation; Vermicelli; Properties

B. Ali, S.A. Hasan, S. Hayat, Q. Hayat, S. Yadav, Q. Fariduddin, A. Ahmad, A role for brassinosteroids in the amelioration of aluminium stress through antioxidant system in mung bean (Vigna radiata L. Wilczek), Environmental and Experimental Botany, Volume 62, Issue 2, March 2008, Pages 153-159, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2007.07.014.
(http://www.sciencedirect.com/science/article/B6T66-4PC3SFW-1/2/4bd04e9bec49a3b8a0f82f4c5f90194b)
Abstract:
Brassinosteroids (BRs) elicit diverse physiological responses and ameliorate various biotic and abiotic stresses. With an aim to further explore and elaborate their role in plants subjected to abiotic stress, more specifically the heavy metal stress, the seedlings of mung bean were grown in a plant growth chamber under controlled conditions, on a sandy substratum. The seedlings were subjected to aluminium (0.0, 1.0 or 10.0 mM) stress, at 1-week-old stage and were sprayed with 0 or 10-8 M of 24-epibrassinolide (EBL) or 28-homobrassinolide (HBL) at 14-day stage. The analysis of the plants at the completion of 3 weeks of growth revealed that the presence of aluminium in the nutrient medium caused a sharp reduction in growth (length, fresh and dry mass of root and shoot), the activity of carbonic anhydrase (E.C. 4.2.1.1), relative water content, water use efficiency, chlorophyll content and the rate of photosynthesis. However, the activity of antioxidative enzymes [catalase (E.C. 1.11.1.6), peroxidase (E.C. 1.11.1.7) and superoxide dismutase (E.C. 1.15.1.1)] in leaves and the content of proline, both in leaves and roots increased in the aluminium-stressed plants. The spray of EBL or HBL, in absence of aluminium strongly favoured the above parameters and also improved them, in the plants grown under aluminium stress. Moreover, it is also noteworthy that EBL and HBL caused a further stimulation of antioxidative enzymes and proline content, which were already enhanced by aluminium stress. This led us to the conclusion that the elevated level of proline in association with antioxidant system, at least in part, was responsible for the amelioration of Al stress in mung bean seedlings.

Keywords: Aluminium; Antioxidants; Brassinosteroids; Carbonic anhydrase; Mung bean; Photosynthesis; Proline

Mei-Lan Yuan, Zhan-Hui Lu, Yong-Qiang Cheng, Li-Te Li, Effect of spontaneous fermentation on the physical properties of corn starch and rheological characteristics of corn starch noodle, Journal of Food Engineering, Volume 85, Issue 1, March 2008, Pages 12-17, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2007.06.019.
(http://www.sciencedirect.com/science/article/B6T8J-4P6M5WF-1/2/164da428f604559bf3c02be7788161c5)
Abstract:
Starch was isolated from spontaneously fermented corn to study the effect of fermentation on the physical properties of corn starch and the suitability of fermented corn for starch noodle. Considering the security of fermentation, aflatoxin B1 content in fermented samples was also tested. Results showed that above 75 [degree sign]C, fermented samples had significantly lower swelling power and solubility than control samples ($p < 0.05$). The peak viscosity and breakdown initially increased and then decreased, while final viscosity and setback decreased gradually with fermentation time. Fermented samples had significantly higher gel strength ($p < 0.05$) and noodles from them had higher maximum tensile stress, maximum tensile strain and work to break the noodle. Results of sensory evaluation indicated that fermentation significantly improved quality of corn starch noodle, and quality of starch noodle from corn fermented for 19 days was comparable to mung bean starch noodle. The spontaneous fermentation was safe based on the results of toxin test.
Keywords: Corn starch; Noodle; Spontaneous fermentation; Tensile properties; Sensory evaluation

Daizy R. Batish, Harminder Pal Singh, Shalinder Kaur, Ravinder Kumar Kohli, Surender Singh Yadav, Caffeic acid affects early growth, and morphogenetic response of hypocotyl cuttings of mung bean (Phaseolus aureus), Journal of Plant Physiology, Volume 165, Issue 3, 18 February 2008, Pages 297-305, ISSN 0176-1617, DOI: 10.1016/j.jplph.2007.05.003.
(http://www.sciencedirect.com/science/article/B7GJ7-4P83CXY-2/2/99f4b6e75272bdb505b71a65dfefa802)
Abstract: Summary
Caffeic acid (CA) is one of the most common cinnamic acids ubiquitously present in plants and implicated in a variety of interactions including allelopathy among plants and microbes. This study investigated the possible interference of CA with root growth and the process of rhizogenesis in hypocotyl cuttings of mung bean (Phaseolus aureus=Vigna radiata). Results indicated that CA (0-1000 [mu]M) significantly suppressed root growth of mung bean, and impaired adventitious root formation and root length in the mung bean hypocotyl cuttings. Further investigations into the role of CA in hampering root formation indicated its interference with the biochemical processes involved in rooting process at the three stages - root initiation (third day; RI), root expression (fifth day; RE), and post-expression (seventh day; PE) - of rhizogenesis. CA caused significant changes in the activities of proteases, peroxidases (PODs), and polyphenol oxidases (PPOs) during root development and decreased the content of total endogenous phenolics (TP) in the hypocotyl cuttings. The enhanced activity of PODs and PPOs, though, relates to lignification and/or phenolic metabolism during rhizogenesis; yet their protective role to CA-induced stress, especially during the PE phase, is not ruled out. At 1000 [mu]M CA, where rooting was significantly affected, TP content was very high during the RI phase, thus indicating its non-utilization. The study concludes that CA interferes with the rooting potential of mung bean hypocotyl cuttings by altering the activities of PODs and PPOs and the endogenous TP content that play a key role in rhizogenesis.
Keywords: Adventitious root formation; Endogenous phenolics; Enzyme activities; Peroxidases; Polyphenol oxidases

Kawaljit Singh Sandhu, Seung-Taik Lim, Digestibility of legume starches as influenced by their physical and structural properties, Carbohydrate Polymers, Volume 71, Issue 2, 24 January 2008, Pages 245-252, ISSN 0144-8617, DOI: 10.1016/j.carbpol.2007.05.036.
(http://www.sciencedirect.com/science/article/B6TFD-4NXRMJ1-1/2/911d061d396ff2819958b43e36aca91c)
Abstract:
Digestibility of common legumes in India (black gram, chickpea, mung bean, lentil, field pea and pigeon pea) was studied and related to their physical (thermal and pasting) and structural (amylose content and crystallinity) properties. All legume starches exhibited a characteristic C-type diffraction pattern with relative crystallinity ranging between 27.2% and 33.5%. Pigeon pea starch showed the highest values for molecular weight (Mw) of amylopectin (389 x 106 g/mol) and amylose (3.64 x 106 g/mol) whereas, field pea starch showed the lowest values for Mw of amylopectin (239 x 106 g/mol). The enthalpy for melting ([Delta]H) was the highest for field pea starch whereas, mung bean showed the lowest. Peak viscosity (PV) ranged from 3942 mPa s (chickpea) to 6107 mPa s (mung bean). Slowly digestible starch (SDS) content followed the order: mung bean > chickpea > field pea > lentil > black gram > pigeon pea, whereas, the resistant starch (RS) content followed the following order: pigeon pea > lentil > black gram > field pea > chickpea > mung bean. The hydrolysis indices (HI) of the legume starches ranged from 8.2 to 20.0, and the estimated glycemic indices (GI) based on the HI were between 44.2% and 50.7%. Several significant correlations were observed among different starch properties as revealed both by Pearson correlation (PC) and principal component analysis (PCA). Together, the first two PCs represent 86.6% of total variability. Digestibility of starch was negatively correlated with starch granule diameter ($r = -.791$, $p < .05$) and Mw of amylopectin and amylose ($r = -.845$ and $-.837$, respectively, $p < .05$). A negative correlation between relative crystallinity and amylose content was observed ($r = -.775$, $p < .5$). Mw of amylopectin was positively correlated to relative crystallinity ($r = .914$, $p < .01$) and negatively correlated to amylose content ($r = -.874$, $p < .05$).
Keywords: Legume starch; Physical; Thermal; Molecular; Digestibility

Xiaofang Peng, Zongping Zheng, Ka-Wing Cheng, Fang Shan, Gui-Xing Ren, Feng Chen, Mingfu Wang, Inhibitory effect of mung bean extract and its constituents vitexin and isovitexin on the formation of advanced glycation endproducts, Food Chemistry, Volume 106, Issue 2, 15 January 2008, Pages 475-481, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2007.06.016.
(http://www.sciencedirect.com/science/article/B6T6R-4P2J0CW-2/2/ce6500b47b42dc2140e13efbc4698150)
Abstract:
The anti-glycation activity of four kinds of beans including mung bean, black bean, soybean and cowpea were evaluated. Aqueous alcohol extract of mung bean exhibited the strongest inhibitory activity against the formation of fluorescent advanced glycation endproducts (AGEs) in a bovine serum albumin (BSA)-glucose model, and the inhibitory activities of extracts of the four beans were found to be highly correlated with their total phenolic contents (R2 = 0.95). Subsequent HPLC analysis of mung bean extract revealed two major phenolics which were purified and identified as vitexin and isovitexin by spectral methods. In the anti-glycation assays, both vitexin and isovitexin showed significant inhibitory activities against the formation of AGEs induced by glucose or methylglyoxal with efficacies of over 85% at 100 [mu]M. In another assay, vitexin and isovitexin failed to directly trap reactive carbonyl species, such as methylglyoxal, suggesting that their anti-glycation activities may mainly be due to their free radical scavenging capacity.
Keywords: AGEs; Diabetic complications; Mung bean; Anti-glycation; Vitexin; Isovitexin

Santhanee Puncha-arnon, Worayudh Pathipanawat, Chureerat Puttanlek, Vilai Rungsardthong, Dudsadee Uttapap, Effects of relative granule size and gelatinization temperature on paste and gel

properties of starch blends, Food Research International, Volume 41, Issue 5, 2008, Pages 552-561, ISSN 0963-9969, DOI: 10.1016/j.foodres.2008.03.012.
(http://www.sciencedirect.com/science/article/B6T6V-4S4JYN2-1/2/9d40ecde0bbe7e145c57c893988187b1)
Abstract:
Canna, potato, mung bean and rice starches having mean granule size of 52, 48, 24 and 7 [mu]m and gelatinization temperature of 72.4, 65.8, 70.1 and 75.2 [degree sign]C, respectively, were used for evaluating the effects of relative granule size and gelatinization temperature on pasting and gelation behaviors of starch blends. Blends of canna starch with others at ratios of 100:0, 75:25, 50:50, 25:75, and 0:100 were investigated for their pasting profile, thermal property, gel morphology and texture. DSC gelatinization thermograms of starch blends indicated that canna starch gelatinized independently of the potato starch, whereas a mutual effect was found for a mixture of canna and rice starches. Independent gelatinization behavior of the canna and potato starch blend, slightly dependent for canna and mung bean starch blend, and significantly dependent for rice and canna starch blend were evidenced by RVA analysis. The results suggested that gelatinization behavior of starch blend could be either additive or nonadditive, and relative granule size rather than gelatinization temperature of the starch components may be responsible for this behavior. Gelation behavior of starch blends evaluated by setback value during cooling down in RVA, and hardness value by texture analyzer, indicated the inexact additive type for canna-potato starch blend and nonadditive type for canna-mung bean and canna-rice starch blends. The deviations from additive type were stronger with greater differences in granule size. Therefore, the relative granule size was also supposed to affect the gelation behavior of the starch blends.
Keywords: Starch; Canna; Blend; Mixture; Pasting; Physicochemical properties

Alonzo A. Gabriel, Mirasol C. Berja, Ana Marie P. Estrada, Ma. Gracia Angelica A. Lopez, John Gilbert B. Nery, Edwin Jaimes B. Villaflor, Microbiology of retail mung bean sprouts vended in public markets of National Capital Region, Philippines, Food Control, Volume 18, Issue 10, October 2007, Pages 1307-1313, ISSN 0956-7135, DOI: 10.1016/j.foodcont.2006.09.004.
(http://www.sciencedirect.com/science/article/B6T6S-4M6454N-3/2/b40060a5b09b50ba9c4bd48051b7ebf1)
Abstract:
This study is the first attempt in the Philippines to conduct a region-wide assessment of the microbiological quality of retailed mung bean sprouts. Production and vending practices of selected stakeholders were also determined. Ninety-four percent of the samples tested positive for the presence of Salmonella spp. and some samples had Coliform and Escherichia coli counts as high as 5.90 and 5.50 log10 CFU [middle dot] g-1, respectively. The TPC, YMC and LAB were established to be as high as 11.38, 5.90 and 10.47 log10CFU [middle dot] g-1, respectively. The poor microbiological quality of most of the tested sprouts was attributed to unhygienic sprout production and retailing practices. To improve the microbiological quality of the retailed sprouts, adherence to sprouting industry best practices is strongly recommended.
Keywords: Mung bean sprouts; Microbiological quality; Sprout production; Sprout retailing

Alexander Weiss, Christian Hertel, Silke Grothe, Diep Ha, Walter P. Hammes, Characterization of the cultivable microbiota of sprouts and their potential for application as protective cultures, Systematic and Applied Microbiology, Volume 30, Issue 6, 10 September 2007, Pages 483-493, ISSN 0723-2020, DOI: 10.1016/j.syapm.2007.03.006.
(http://www.sciencedirect.com/science/article/B7GVX-4NS36B5-1/2/b45ffb186cb860e6822568687f091121)
Abstract:

The microbiota of ten seeds and ready-to-eat sprouts produced thereof was characterized by bacteriological culture and denaturing gradient gel electrophoresis (DGGE) of amplified DNA fragments of the 16S rRNA gene. The predominant bacterial biota of hydroponically grown sprouts mainly consisted of enterobacteria, pseudomonades and lactic acid bacteria (LAB). For adzuki, alfalfa, mung bean, radish, sesame and wheat, the ratio of these bacterial groups changed strongly in the course of germination, whereas for broccoli, red cabbage, rye and green pea the ratio remained unchanged. Within the pseudomonades, Pseudomonas gesardii and Pseudomonas putida have been isolated and strains of the potentially pathogenic species Enterobacter cancerogenes and Pantoea agglomerans were found as part of the main microbiota on hydroponically grown sprouts. In addition to the microbiota of the whole seedlings, the microbiota of root, hypocotyl and seed leafs were examined for alfalfa, radish and mung bean sprouts. The highest and lowest total counts for aerobic bacteria were found on seed leafs and hypocotyls, respectively. On the other hand, the highest numbers for LAB on sprouts were found on the hypocotyl. When sprouting occurred under the agricultural conditions, e.g. in soil, the dominating microbiota changed from enterobacteria to pseudomonades for mung beans and alfalfa sprouts. No pathogenic enterobacteria have been isolated from these sprout types. Within the pseudomonades group, Pseudomonas jessenii and Pseudomonas brassicacearum were found as dominating species on all seedling parts from soil samples. In practical experiments, a strain of P. jessenii was found to exhibit a potential for use as protective culture, as it suppresses the growth of pathogenic enterobacteria on ready-to-eat sprouts.
Keywords: Pseudomonades; Protective culture; Soil; Sprouts; Mung bean; Rhizosphere; Microbiota; PCR-DGGE

Michael Rychlik, Katja Englert, Susanne Kapfer, Eva Kirchhoff, Folate contents of legumes determined by optimized enzyme treatment and stable isotope dilution assays, Journal of Food Composition and Analysis, Volume 20, Issue 5, August 2007, Pages 411-419, ISSN 0889-1575, DOI: 10.1016/j.jfca.2006.10.006.
(http://www.sciencedirect.com/science/article/B6WJH-4MSXT69-1/2/f6e4b61051caa6edcdfc98bde71dbeb6)
Abstract:
Stable isotope dilution assays (SIDAs) were adopted to quantify folates in legumes. Deconjugation of polyglutamic to monoglutamic vitamers was achieved by a combined treatment with rat plasma and chicken pancreas conjugase. Additionally, conjugase inhibitors were effectively removed by strong anion exchange prior to deconjugation. Determination of various dried legume seeds by the optimized SIDA technique revealed total folate contents between 10 [mu]g/100 g (green peas; Pisum sativum) and 318 [mu]g/100 g (soybean; Glycine max). Total folate concentrations of canned legumes were analyzed in a concentration range between 4 [mu]g/100 g (green beans; Phaseolus vulgaris) and up to 69 [mu]g/100 g (black-eyed peas, cow peas; Vigna unguiculata). Deep frozen products of green peas and green beans were found to contain relatively high folate concentrations up to 146 [mu]g/100 g (green peas). A comparison to literature data, analyzed by means of microbiological assays, indicated significant lower SIDA values for some dried legume seeds. The folate pattern measured by SIDA revealed 5-methyltetrahydrofolate as the predominant vitamer in frozen peas, dried lentils, dried black-eyed peas and mung beans, whereas in fresh beans and soybeans tetrahydrofolate was most abundant and in peanuts 5-formyltetrahydrofolate was found to be the most important folate vitamer.
Keywords: Conjugase; Folates; LC-MS/MS; Legumes; Stable isotope dilution assay

Reena Randhir, Kalidas Shetty, Mung beans processed by solid-state bioconversion improves phenolic content and functionality relevant for diabetes and ulcer management, Innovative Food Science & Emerging Technologies, Volume 8, Issue 2, June 2007, Pages 197-204, ISSN 1466-8564, DOI: 10.1016/j.ifset.2006.10.003.

(http://www.sciencedirect.com/science/article/B6W6D-4MJS05C-1/2/3cf6fd9978c2df8c9b4f113393f9a7ea)
Abstract:
Mung bean substrate was enriched with phenolic antioxidants and levo-dihydroxy phenylalanine (l-DOPA) through solid-state bioconversion (SSB) by Rhizopus oligosporus, with the goal to enhance health-linked functionality. The alpha-amylase inhibition linked to diabetes management and Helicobacter pylori inhibition linked to peptic ulcer management were investigated in bioprocessed extracts. The protein content and [beta]-glucosidase activity of the substrate which are indicators of effective fungal colonization, increased with growth. The phenolic content increase with growth was linked to fungal [beta]-glucosidase activity, indicating phenolic mobilization. The antioxidant activity as measured by DPPH (1,1-diphenyl-2-picrylhydrazyl) inhibition method were high (65%) initially and increased to 90% on day 12, than maintained higher levels during the rest of growth. The antioxidant activity measured by [beta]-carotene assay was high between days 4-8 when phenolic levels increased. Fungal-linked superoxide dismutase (SOD) activity was high in late stages indicating quenching of reactive oxygen species. The l-DOPA content was low during early growth stage (0.6-0.7 mg/g DW) and gradually doubled to 1.2 mg/g DW in late stages. The [alpha]-amylase inhibition potential was moderately high during early stages (days 0-2) followed by higher inhibition during days 4-10 which correlate to higher phenolic content. The change in the antimicrobial activities of the extracts against H. pylori was high on day 4 and was associated with high antioxidant activity but not high phenolic content. Elevated inhibition on day 8 directly correlated with high total phenolics content suggesting the role of phenolic mobilization. The major implication from this research is that SSB is a good strategy to improve the phenolic content of mung beans for enhanced functionality with improved antioxidant activity that contributes to [alpha]-amylase inhibition relevant to potential diabetes management and H. pylori inhibition linked to peptic ulcer management.Industrial relevance
Solid State Bioconversion (SSB) of mung bean by R. oligosporus is a good strategy to enhance ingredient functionality due to mobilization of phenolic antioxidants. Such enhanced phenolic antioxidant activity potentially contributes to health-relevant functionality such as amylase inhibition for diabetes management and H. pylori inhibition for peptic ulcer management. Optimization of such SSB systems at industrial scale can help large-scale low cost production of such health-relevant ingredients.
Keywords: Mung bean (Vigna radiata); Type 2 diabetes; Solid-state bioconversion (SSB); Rhizopus oligosporus; [beta]-Glucosidase; Phenolics; Antioxidant activity; Levo-dihydroxy phenylalanine (l-DOPA); Superoxide dismutase (SOD); [alpha]-Amylase inhibition; Antimicrobial; Helicobacter pylori

Pallavi Tripathi, Leila Lo Leggio, Johanna Mansfeld, Renate Ulbrich-Hofmann, Arvind M. Kayastha, [alpha]-Amylase from mung beans (Vigna radiata) - Correlation of biochemical properties and tertiary structure by homology modelling, Phytochemistry, Volume 68, Issue 12, June 2007, Pages 1623-1631, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2007.04.006.
(http://www.sciencedirect.com/science/article/B6TH7-4NT250W-2/2/a4cc15c15046e12d5a2d1ff43f62b427)
Abstract:
[alpha]-Amylase from germinated mung beans (Vigna radiata) has been purified 600-fold to electrophoretic homogeneity and a final specific activity of 437 U/mg. SDS-PAGE of the final preparation revealed a single protein band of 46 kDa. The optimum pH was 5.6. The energy of activation was determined to be 7.03 kcal/mol in the temperature range 15-55 [degree sign]C. Km for starch was 1.6 mg/mL in 50 mM sodium acetate buffer, pH 5.5. Thermal inactivation studies at 70 [degree sign]C showed first-order kinetics with rate constant (k) equal to 0.005 min-1. Mung bean [alpha]-amylase showed high specificity for its primary substrate starch. Addition of EDTA (10 mM) caused irreversible loss of activity. Mung bean [alpha]-amylase is inhibited in a non-

competitive manner by heavy metal ions, for example, mercury with a Ki of 110 [mu]M. Homology modelling studies with mung bean [alpha]-amylase using barley [alpha]-amylases Amy 1 and Amy 2 as templates showed a very similar structure as expected from the high sequence identity. The model showed that [alpha]-amylase from mung beans has no sugar-binding site, instead it has a methionine. Furthermore, instead of two trptophans, it has Val277 and Lys278, which are the conserved residues, important for proper folding and conformational stability.
Keywords: [alpha]-Amylase; Vigna radiata; Enzyme purification; Characterization; Homology modelling

Wenju Liu, Qun Shen, Structure analysis of mung bean starch from sour liquid processing and centrifugation, Journal of Food Engineering, Volume 79, Issue 4, April 2007, Pages 1310-1314, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.04.012.
(http://www.sciencedirect.com/science/article/B6T8J-4JW0WRB-7/2/1a4f01af4559de73d300b5ce78e6258a)
Abstract:
Mung bean starch produced by sour liquid processing had better quality than that from centrifugation which is widely used in China to produce starch noodle. The structures of mung bean starch from two different processing methods were studied in this paper. It showed that light transmissivity of mung bean starch from sour liquid processing was higher than that from centrifugation. The size of mung bean starch from sour liquid processing was as large as that from centrifugation; both of them had obvious concentric circles and polarization cross. It was showed by statistical analysis that 25.47%, 32.37% of 100 photographs of starch granules from sour liquid processing and centrifugation had axes slit on electron microscopy, respectively. From X-ray pattern, we found that both starches belonged to the A type and there was no obvious difference between two kinds of mung bean starches.
Keywords: Mung bean starch; Structure analysis; Sour liquid processing; Centrifugation

Wenju Liu, Qun Shen, Studies on the physicochemical properties of mung bean starch from sour liquid processing and centrifugation, Journal of Food Engineering, Volume 79, Issue 1, March 2007, Pages 358-363, ISSN 0260-8774, DOI: 10.1016/j.jfoodeng.2006.01.065.
(http://www.sciencedirect.com/science/article/B6T8J-4JHMF99-4/2/2a711f704ceca61796041ba9bea6285a)
Abstract:
Mung bean starch from sour liquid processing leads to better quality for starch noodles. The physicochemical properties of mung bean starch from two different techniques of processing were studied in this paper. It was shown that yield, protein, moisture, fat and amylose content of mung bean starch from sour liquid processing were higher than that from centrifugation, and light transmissivity was also better. The size of mung bean starch from sour liquid processing was as large as that from centrifugation; both of them had obvious concentric circles and polarization cross. Swelling powder and solubility of starch from centrifugation were higher than that from sour liquid processing. From 65 to 95 [degree sign]C, the viscosity of mung bean starch from centrifugation increased gently, but starch from sour liquid processing increased sharply from 75 to 95 [degree sign]C. At 75 [degree sign]C, the viscosity of starch from sour liquid processing had an obvious inflection point.
Keywords: Mung bean starch; Physicochemical properties; Sour liquid processing; Centrifugation

K.P. Kumaraguru Vasagam, T. Balasubramanian, R. Venkatesan, Apparent digestibility of differently processed grain legumes, cow pea and mung bean in black tiger shrimp, Penaeus monodon Fabricius and associated histological anomalies in hepatopancreas and midgut, Animal Feed Science and Technology, Volume 132, Issues 3-4, 15 January 2007, Pages 250-266, ISSN 0377-8401, DOI: 10.1016/j.anifeedsci.2006.03.022.

(http://www.sciencedirect.com/science/article/B6T42-4PNJ1MF-8/2/d32886e8b4696d851ef4e22ca6dcb8da)
Abstract:
Experiments were conducted to test the effect different treatment process like dehulling, soaking, autoclaving, germination and germination in combination with autoclaving on proximate composition and antinutritional factors (ANFs) of legume seeds, cow pea and mung bean. An in vivo digestibility trial was conducted in black tiger shrimp Penaeus monodon to determine the coefficient of total tract apparent digestibility (CTTAD) of differently processed legume seeds. The CTTADs were determined by comparing the concentrations of digestibility marker (Cr_2O_3) in the feed and faeces of the juvenile shrimp (4 +/- 0.5 g). Seeds processed by germination in combination with autoclaving were low in ANFs and higher in proximate composition with increased protein contents of 18.3 and 15.6% in cow pea and mung bean, respectively. Though trypsin inhibitor activity was significantly ($P<0.05$) high in germinated seeds, there was a significant reduction by 83.3 and 81.21% on germination followed by autoclaving. Due to unexpected mortality of shrimp, dietary treatments containing raw, soaked, and germinated cow pea and mung bean were removed from the trial. There was a significant difference ($P<0.05$) in the CTTAD values between the feedstuffs and various treatment processes made. Higher CTTAD dry matter (DM), crude protein (CP) and nitrogen free extract (NFE) were obtained with seeds processed with germination in combination with autoclaving and the trend is similar in both the seeds tested. CTTAD for DM, CP and crude lipid of the grain legumes ranged between 0.683-0.885, 0.684-0.834 and 0.704-1.302, respectively. Histological examinations on hepatopancreas and midgut of shrimp sampled at slaughter revealed some common anomalies. With the exception of the shrimp fed dehulled cowpea, histology was normal in all the shrimps sampled at the end of the digestibility trial.
Keywords: Penaeus monodon; Digestibility; Plant feedstuffs; Dehulling; Soaking; Autoclaving; Germination; ANFs; Histology

S.B. Agrawal, Dheeraj Rathore, Changes in oxidative stress defense system in wheat (Triticum aestivum L.) and mung bean (Vigna radiata L.) cultivars grown with and without mineral nutrients and irradiated by supplemental ultraviolet-B, Environmental and Experimental Botany, Volume 59, Issue 1, January 2007, Pages 21-33, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2005.09.009.
(http://www.sciencedirect.com/science/article/B6T66-4J2W0HH-3/2/ca752c24454392d9c7770a807c580af5)
Abstract:
Field study was conducted to evaluate the inter- and intra-specific variations in sensitivity of two cultivars each of wheat (Triticum aestivum L. cv. HD 2329 and HUW 234) and mung bean (Vigna radiata L. cv. Malviya Jyoti and Malviya Janpriya) to supplemental levels of UV-B irradiation (sUV-B, 280-315 nm) with and without recommended levels of mineral nutrients. Results showed decrease in photosynthetic pigments and biomass of all the four cultivars due to sUV-B radiation. Antioxidative defense system was activated in all the cultivars after irradiation with sUV-B. SOD, peroxidase and total thiol contents increased, while catalase activity and ascorbic acid contents decreased under sUV-B irradiation. On the basis of biomass, UV-B sensitivity can be arranged in decreasing order as: Malviya Janpriya < Malviya Jyoti < HD 2329 < HUW 234. Application of mineral nutrients (N, P and K) showed significant positive response in all cultivars by ameliorating the negative impact of sUV-B.
Keywords: Ultraviolet-B radiation; Mineral nutrients; Wheat (Triticum aestivum L.); Mung bean (Vigna radiata L.); Photosynthetic pigments; Antioxidant defense system; Biomass

D.R. Batish, H.P. Singh, N. Setia, S. Kaur, R.K. Kohli, 2-Benzoxazolinone (BOA) induced oxidative stress, lipid peroxidation and changes in some antioxidant enzyme activities in mung bean

(Phaseolus aureus), Plant Physiology and Biochemistry, Volume 44, Issues 11-12, November-December 2006, Pages 819-827, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2006.10.014.
(http://www.sciencedirect.com/science/article/B6VRD-4M6S921-6/2/d7d48cccff84bf6af3c28a3574d3ce73)
Abstract:
2-Benzoxazolinone (BOA), a well-known allelochemical with strong phytotoxicity, is a potential herbicidal candidate. The aim of the present study was to determine whether phytotoxicity of BOA is due to induction of oxidative stress caused by generation of reactive oxygen species (ROS) and the changes in levels of antioxidant enzymes induced in response to BOA. Effect of BOA was studied on electrolyte leakage, lipid peroxidation (LP), hydrogen peroxide (H_2O_2) generation, proline (PRO) accumulation, and activities of antioxidant enzymes--superoxide dismutase (SOD, 1.15.1.1), ascorbate peroxidase (APX, 1.11.1.11), guaiacol peroxidase (GPX, 1.11.1.7), catalase (CAT, 1.11.1.6) and glutathione reductase (GR, 1.6.4.2) in Phaseolus aureus (mung bean). BOA significantly enhanced malondialdehyde (MDA) content, a product of LP, in both leaves and roots of mung bean. The amount of H_2O_2, a product of oxidative stress, and endogenous PRO increased many-fold in response to BOA. Accumulation of PRO, MDA and H_2O_2 indicates the cellular damage in the target tissue caused by ROS generated by BOA. In response to BOA, there was a significant increase in the activities of scavenging enzymes SOD, APX, GPX, CAT, and GR in root and leaf tissue of mung bean. At 5 mM BOA, GR activity in roots showed a nearly 22-fold increase over that in control. The present study concludes that BOA induces oxidative stress in mung bean through generation of ROS and upregulation of activities of various scavenging enzymes.
Keywords: Antioxidative enzymes; 2-Benzoxazolinone; Membrane damage; Oxidative stress; Phaseolus aureus (mung bean); Reactive oxygen species

Eun-Mi Eom, Jun-Kyong Cho, Seoung-Ok Lim, Youn-Jung Byun, Dong-Hee Lee, Molecular cloning and expression of a small GTP-binding protein of the Rop family from mung bean, Plant Science, Volume 171, Issue 1, July 2006, Pages 41-51, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2006.02.011.
(http://www.sciencedirect.com/science/article/B6TBH-4JFHB9R-1/2/e5c2f9327695558004f5c39b010c9dc9)
Abstract:
The Rho family, a group of small GTP-binding proteins, consists of Rho, Rac and Cdc42 subfamilies in animals and yeasts, and modulates many cellular processes related to the actin cytoskeleton. According to recent study, ROP, a Rho subfamily, is a distinct subgroup found in plant, where it is also involved in the regulation of the cytoskeleton, especially in growth of the tip of the pollen tube. In this study, a rho-related gene was isolated from a mung bean cDNA library and characterized. This gene contains five conserved regions (G1-G5) including the effector-binding domain of many small GTP-binding proteins, and CAAL motif at the C-terminus, suggesting that it might be localized in the membrane. Based on overall homology in its effector-binding domain to those of the Rho family, and to those of plant ROPs, this gene was named VrRop1. The phylogenetic analysis also confirmed that it is related to the Rho families of various species. The VrROP1 protein appears be a member of a subgroup of the ROP family, which includes AtROP1, OsROP5, AtROP7, AtROP3, AtROP4 based on phylogenetic relationship and differential distribution in tissues, especially preferable expression in roots. The transcript of VrRop1 is about 1000 nt long and this gene is likely to exist as a multigene family. Purified recombinant VrROP1 protein can bind to the guanosine nucleotide and has an intrinsic GTP hydrolysis activity, confirming the VrROP1 protein as a typical small GTP-binding protein. However, VrRop1 did not complement rho3 and cdc42 in yeasts. Although the other yeast RHO genes need to be tested, it is likely that VrRop1 might have unique signaling pathways in plants, different from those in yeasts, including controlling actin cytoskeleton.

Keywords: A small GTP-binding protein; ROP; Mung bean

Shalini Kaushik, Inderjit, Phytotoxicity of selected herbicides to mung bean (Phaseolus aureus Roxb.), Environmental and Experimental Botany, Volume 55, Issues 1-2, January 2006, Pages 41-48, ISSN 0098-8472, DOI: 10.1016/j.envexpbot.2004.09.010.
(http://www.sciencedirect.com/science/article/B6T66-4DS6J9H-1/2/f6f6f47c09490be5052f2b9f3ab54a2d)
Abstract:
Mung bean (Phaseolus aureus Roxb.) is grown after harvest of wheat during the fallow period. Herbicides such as metsulfuron, atrazine and isoxaflutole are recommended to control weeds in wheat-rice cropping system including weeds of fallow crop. The effects of three herbicides with different modes of action--atrazine, photosystem II inhibitor; metsulfuron, acetolactate synthase inhibitor; and isoxaflutole, 4-hydroxyphenylpyruvatedioxygenase inhibitor--on shoot height, chlorophyll concentrations and cellular damage in herbicide-treated mung bean were studied. While isoxaflutole inhibited shoot growth and chlorophyll concentration of mung bean, atrazine and metsulfuron did not cause reduction in the shoot growth of mung bean. Metsulfuron (226, 452, 1356 and 2260 [mu]g/kg soil) and isoxaflutole (452, 1356 and 2260 [mu]g/kg soil) in soil reduced the concentration of leaf chlorophyll of mung bean compared to the control. Atrazine in soil did not affect the total chlorophyll concentration of mung bean leaves. Electron micrographs showed that untreated mung bean had elongated chloroplasts, thylakoids organized as intact grana, distinct starch grains and a small number of plastoglubuli. Mesophyll cells of atrazine-treated mung bean leaves had swollen chloroplasts and thylakoids with disorganized grana. Leaves of metsulfuron-treated mung bean had swollen chloroplasts with a large number of starch grains. Starch grains were not observed in leaves of mung bean treated with either atrazine or isoxaflutole. Complete disruption of thylakoids was observed in isoxaflutole-treated mung bean leaves. Leaves of atrazine-treated mung bean showed detached microfibrils along with distorted and degenerated secondary walls. Metsulfuron-treated mung bean leaves showed aggregated microfibrils with completely dissolved secondary walls, while isoxaflutole-treated leaves had completely degenerated secondary walls with complete loss of microfibrils. We conclude that isoxaflutole at higher doses, influence mung bean at the morphological, physiological and cellular levels.
Keywords: Atrazine; Herbicides; Isoxaflutole; Littleseed canarygrass; Metsulfuron; Mung bean; Phaselous aureus Roxb.; Oryza sativa L.; Triticum aestivum L.

Yung-Ho Chang, Chia-Long Lin, Jia-Chi Chen, Characteristics of mung bean starch isolated by using lactic acid fermentation solution as the steeping liquor, Food Chemistry, Volume 99, Issue 4, 2006, Pages 794-802, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2005.07.060.
(http://www.sciencedirect.com/science/article/B6T6R-4HDP7F6-2/2/9c64d885bb3a5b795948e0d3952275d4)
Abstract:
Physicochemical properties of commercial mung bean starch isolated with lactic acid fermentation solution (LFS) and starches laboratory-prepared by using NaOH, Na2SO3 and distilled water as steeping liquors were examined with the aim of elucidating the effect of different steeping liquors on the properties of starches. Results indicated that the amylose content, granular morphology and X-ray diffraction pattern of starches isolated with different steeping liquors did not show obvious differences. However, the LFS-isolated starch had significantly ($p < 0.05$) higher weight percentage of longer B chains and B1 chains, a lower weight percentage of A chains and a lower ratio of short-to-long chains in amylopectin than those of the other preparations. Moreover, the LFS-isolated starch showed significantly ($p < 0.05$) lower pasting viscosity, a higher onset temperature, a narrower temperature range and a lower enthalpy of gelatinization than the other preparations. No significant differences on the physicochemical properties mentioned above were found among the laboratory-prepared starches. The results suggest that mung bean starch is

degraded during isolation with lactic acid fermentation solution, which leads to the loss of starch granules with less integrity.
Keywords: Mung bean starch; Lactic acid fermentation solution; Chain length distribution; Pasting properties; Gelatinization thermal properties

Soong Yu Kuo, Lee Feng Chien, Ru Chun Van, Kun Huang Yan, Pei Feng Liu, Wen Chi Chang, Jung Kai Wang, Rong Long Pan, Purification and subunit determination of H+-pyrophosphatase from endoplasmic reticulum-enriched vesicles of mung bean seedlings, Plant Science, Volume 169, Issue 5, November 2005, Pages 847-853, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2005.06.001.
(http://www.sciencedirect.com/science/article/B6TBH-4GFV297-3/2/9f72a9e9d03a154fd410e342fe18e280)
Abstract:
Endoplasmic reticulum (ER)-enriched vesicles from etiolated hypocotyls of mung bean seedlings (Vigna radiata L.) were isolated by Ficoll gradient and two-polymer phase partition. These ER-enriched vesicles contain a new type of H+-pyrophosphatase (H+-PPase) distinct from that of tonoplasts in higher plants. H+-PPase was then solubilized differentially by deoxycholic acid and lyso-phosphatidylcholine. The solubilized fraction was then subjected to Sephacryl S-200 gel filtration and Mono-Q anion exchange chromatography. The final purified protein complex of ER H+-PPase (ER-PPase) was successfully obtained to high homogeneity. An approximate molecular mass of 170 kDa was determined for the purified ER-PPase by size-exclusion gel filtration chromatography. However, only a single polypeptide of 74 kDa was observed on sodium dodecyl sulfate-polyacrylamide gel electrophoresis. Moreover, radiation inactivation analysis of ER-enriched vesicles and purified ER-PPase yielded functional masses of 178.6 +/- 9.2 and 143.4 +/- 4.7 kDa for inorganic pyrophosphate hydrolysis activity, respectively, indicating that ER-PPase was functionally homodimeric.
Keywords: Endoplasmic reticulum; H+-pyrophosphatase; Mung bean; Functional mass; Radiation inactivation

B.K. Salunke, H.M. Kotkar, P.S. Mendki, S.M. Upasani, V.L. Maheshwari, Efficacy of flavonoids in controlling Callosobruchus chinensis (L.) (Coleoptera: Bruchidae), a post-harvest pest of grain legumes, Crop Protection, Volume 24, Issue 10, October 2005, Pages 888-893, ISSN 0261-2194, DOI: 10.1016/j.cropro.2005.01.013.
(http://www.sciencedirect.com/science/article/B6T5T-4FNP2BS-3/2/2b068169d32c6e0d2cf8713f8a031c6f)
Abstract:
The effects of partially purified flavonoids obtained from Calotropis procera (Ait.) R. Br. and six standard flavonoids on the adults and eggs of Callosobruchus chinensis (L.), reared on mung beans (Vigna radiata L.), were studied. All flavonoids were toxic to adults and eggs depending on dose and exposure period. Flavonoids obtained from C. procera showed the highest contact toxicity followed by standard quercetin, rutin and quercitrin at 10 mg mL-1 doses in filter paper diffusion assay. Significant reduction in oviposition was found for all flavonoids at the doses of 5 and 10 mg mL-1 on grains in plastic jars. Flavonoids also showed an ovicidal effect on bruchid eggs as well as affecting the number and weight of the emerging adults as a function of concentration.
Keywords: Flavonoids; Calotropis procera; Callosobruchus chinensis; Grain protection; Grain legumes

Tadashi Ishii, Teruko Konishi, Yuki Ito, Hiroshi Ono, Mayumi Ohnishi-Kameyama, Ikuko Maeda, A [beta]-(1 --> 3)-arabinopyranosyltransferase that transfers a single arabinopyranose onto arabino-

oligosaccharides in mung bean (Vigna radiate) hypocotyls, Phytochemistry, Volume 66, Issue 20, October 2005, Pages 2418-2425, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2005.08.007.
(http://www.sciencedirect.com/science/article/B6TH7-4H4T374-1/2/b441a7525cac21301eef1c81856f6323)
Abstract:
Arabinopyranosyltransferase (ArapT) activity that results in the transfer of a single arabinopyranose (Arap) residue from UDP-[beta]-l-arabinopyranose (UDP-Arap) to exogenous (1 --> 5)-linked [alpha]-l-arabino-oligosaccharides labeled with 2-aminobenzamide (2-AB) at their reducing ends was identified in a particulate preparation obtained from 3-day-old mung bean (Vigna radiate L. Wilezek) hypocotyls. The transferred Ara residue was shown to be [beta]-(1 --> 3)-linked to O-3 of the non-reducing terminal Araf residues of the oligosaccharide using nuclear magnetic resonance spectroscopy together with glycosyl composition and glycosyl linkage composition analyses. The 2AB-labeled arabino-octasaccharide was the most effective acceptor substrate analyzed, although arabino-oligosaccharides with a degree of polymerization between 4 and 7 were also acceptor substrates. Maximum ArapT activity was obtained at pH 6.5-7.0, and 20 [degree sign]C in the presence of 25 mM Mn2+ and 0.5% Triton X-100.
Keywords: Vigna radiate; Arabinogalactan; Arabinan; Arabino-oligosaccharide; Pectin; Rhamnogalacturonon I; [beta]-(1 --> 3)-Arabinopyranosyltransferase

Sudarat Saeseaw, Juwadee Shiowatana, Atitaya Siripinyanond, Sedimentation field-flow fractionation: Size characterization of food materials, Food Research International, Volume 38, Issue 7, August 2005, Pages 777-786, ISSN 0963-9969, DOI: 10.1016/j.foodres.2005.04.001.
(http://www.sciencedirect.com/science/article/B6T6V-4G9GN5N-1/2/587dfdf88d89e068f36d2847f0000481)
Abstract:
Sedimentation field-flow fractionation (SdFFF) was applied to characterize particle size distributions of food materials. Two types of food particles were examined, including milk suspensions and flour samples. Milk eluted in the normal mode SdFFF, whereas the steric mode of retention was used for flour samples. Various types of milk being investigated were from cereal and cow's origins. The cereal milk samples included corn, job's tear, rice, and soy milk, whereas the bovine milk included chocolate and fresh full-fat milk. Most samples exhibited monomodal size distributions, whereas corn milk displayed a slight deviation from monomodal characteristic. The mean particle sizes were detected to be approximately 0.4 [mu]m for all cereal milk, except that they were approximately 0.5 [mu]m for corn and all bovine milk. The application of SdFFF for micrometer size food particles was demonstrated for four types of flour samples, including corn, mung bean, rice, and tapioca flours. Significantly differences in the particle size characteristics of all flour samples were observed, by which corn, mung bean, rice, and tapioca yielded mean particle sizes of 16.7, 31.5, 13.5, and 19.9 [mu]m, respectively. The ability of SdFFF for size separation of flours was confirmed by comparing the results obtained with those from scanning electron microscopy (SEM). Further, a new way to examine flour swelling was proposed. This study has demonstrated the potential value of SdFFF technique for food scientists.
Keywords: Sedimentation field-flow fractionation; Size distribution; Milk; Flour

Ashish Lal, William C. Plaxton, Arvind M. Kayastha, Purification and characterization of an allosteric fructose-1,6-bisphosphate aldolase from germinating mung beans (Vigna radiata), Phytochemistry, Volume 66, Issue 9, May 2005, Pages 968-974, ISSN 0031-9422, DOI: 10.1016/j.phytochem.2005.03.009.
(http://www.sciencedirect.com/science/article/B6TH7-4G1PKMF-2/2/fcc95c07c1e0cb174c4116d3f0fc8511)
Abstract:

Cytosolic fructose-1,6-P2 (FBP) aldolase (ALDc) from germinated mung beans has been purified 1078-fold to electrophoretic homogeneity and a final specific activity of 15.1 [mu]mol FBP cleaved/min per mg of protein. SDS-PAGE of the final preparation revealed a single protein-staining band of 40 kDa that cross-reacted strongly with rabbit anti-(carrot ALDc)-IgG. The enzyme's native Mr was determined by gel filtration chromatography to be 160 kDa, indicating a homotetrameric quaternary structure. This ALD is a class I ALD, since EDTA or Mg2+ had no effect on its activity, and was relatively heat-stable losing 0-25% of its activity when incubated for 5 min at 55-65 [degree sign]C. It demonstrated: (i) a temperature coefficient (Q10) of 1.7; (ii) an activation energy of 9.2 kcal/mol active site; and (iii) a broad pH-activity optima of 7.5. Mung bean ALDc is bifunctional for FBP and sedoheptulose-1,7-P2 (Km [approximate] 17 [mu]M for both substrates). ATP, ADP, AMP and ribose-5-P exerted inhibitory effects on the activity of the purified enzyme. Ribose-5-P, ADP and AMP functioned as competitive inhibitors (Ki values = 2.2, 3.1 and 7.5 mM, respectively). By contrast, the addition of 2 mM ATP: (i) reduced Vmax by about 2-fold, (ii) increased Km(FBP) by about 4-fold, and (iii) shifted the FBP saturation kinetic plot from hyperbolic to sigmoidal (h = 1.0 and 2.6 in the absence and presence of 2 mM ATP, respectively). Potent feedback inhibition of ALDc by ATP is suggested to help balance cellular ATP demands with the control of cytosolic glycolysis and respiration in germinating mung beans.
Keywords: Aldolase; Plant glycolysis; Metabolic control; Carbohydrate metabolism (seed); Vigna radiata

Ju-Dong Song, Jin-Hong Kim, Dong-Hee Lee, Tae Hyong Rhew, Sung Ho Cho, Choon-Hwan Lee, Developmental regulation of the expression of 1-aminocyclopropane-1-carboxylic acid (ACC) synthase and ACC oxidase genes in hypocotyls of etiolated mung bean seedlings, Plant Science, Volume 168, Issue 5, May 2005, Pages 1149-1155, ISSN 0168-9452, DOI: 10.1016/j.plantsci.2004.11.015.
(http://www.sciencedirect.com/science/article/B6TBH-4F0G7VS-2/2/ca01ae9943fb9afe5dde85af9b2d944c)
Abstract:
Differential expression of seven 1-aminocyclopropane-1-carboxylate (ACC) synthase and two ACC oxidase genes during the developmental process was investigated in etiolated mung bean seedlings. Among these genes, VR-ACS1, VR-ACS6, VR-ACS7, VR-ACO1, and VR-ACO2 were expressed in the subhook regions of hypocotyls. Except for VR-ACO1, the expression levels of these genes were correlated with the amount of ethylene produced. VR-ACO1 expression was largely constitutive. During hypocotyl growth, the expression of VR-ACS1, VR-ACS6, and VR-ACS7 was maintained at a high level. After the growth stopped, their expression levels became negligible, but the decrease in the VR-ACO2 transcript was much slower. These results suggest that the expression of each of the five genes in the subhook regions of hypocotyls is kinetically distinct, temporally and spatially regulated, and especially high in the tissues of rapidly elongating cells. However, endogenously produced ethylene had no stimulating effect on the growth of hypocotyls or roots. The expression of each of the five genes detected in intact hypocotyls was inducible with auxin. The expression of auxin-inducible VR-ACS1 and VR-ACS6 was negatively regulated in the presence of auxin action and transport inhibitors. However, the transcripts of VR-ACS7, VR-ACO1, and VR-ACO2 were rarely influenced by the treatment of these inhibitors. These results suggest that additional growth factor(s), besides auxin, was (were) involved in the regulation of endogenous ethylene synthesis in etiolated mung bean seedlings.
Keywords: ACC synthase; ACC oxidase; 1-Aminocyclopropane-1-carboxylate; Auxin; Ethylene; 1-Methylcyclopropene

William F. Fett, Peter H. Cooke, A survey of native microbial aggregates on alfalfa, clover and mung bean sprout cotyledons for thickness as determined by confocal scanning laser microscopy,

Food Microbiology, Volume 22, Issues 2-3, April-June 2005, Pages 253-259, ISSN 0740-0020, DOI: 10.1016/j.fm.2004.03.004.
(http://www.sciencedirect.com/science/article/B6WFP-4DN70R5-G/2/bc227b85fafcc87cbdb3bb59e64fe689)
Abstract:
In nature, bacteria are often organized in aggregates or biofilms rather than as solitary cells. Biofilms on inert surfaces have been studied in depth using confocal scanning laser microscopy (CSLM) with a variety of fluorescent probes. In contrast, there have been few studies of native microbial aggregates or biofilms on living surfaces, including plants. In this study we used CSLM in combination with the LIVE/DEAD(R) BacLight(TM) Viability Kit (Molecular Probes Inc.) to determine the thickness of native microbial aggregates on alfalfa, clover and mung bean sprouts purchased from retail outlets. A survey of aggregate thickness was made by use of a 20x dry lens primarily due to its large free working distance, broad field of view and the uneven topography and shape of cotyledon surfaces. Values for measured thickness (z-axis) were corrected based on the point spread function of fluorescent latex spheres (1.98 [mu]m in diameter). Aggregates consisted primarily of live bacteria. Aggregates on mung bean cotyledons were significantly (P<0.05) thicker (average=6.4+/-2.1 [mu]m, MEDIAN=6.0 [mu]m, range of 3.4-10.6 [mu]m) than those on alfalfa (average=3.3+/-2.1 [mu]m , MEDIAN=2.8 [mu]m, RANGE=1.7-12.6 [mu]m) or clover (average=3.0+/-1.1 [mu]m, MEDIAN=2.8 [mu]m , RANGE=1.7-5.4 [mu]m). Average thickness was not significantly (P>0.05) different for aggregates on clover and alfalfa. Bacteria in fully hydrated aggregates as imaged by CSLM appeared to be less densely packed when compared to sprout surface biofilms imaged previously in our laboratory with conventional scanning electron microscopy techniques, most likely due to the presence of hydrated bacterial exopolymers. Despite a lack of considerable thickness, aggregates and biofilms on plant surfaces may harbor plant and human pathogens making their eradication more problematic and also protect pathogens and native bacteria from adverse environmental conditions.
Keywords: Alfalfa; Aggregates; Biofilm; Clover; Confocal scanning laser microscopy; Mung bean; Sprouts

Seung-Joo Lee, Kwang-Geun Lee, Inhibitory effects of volatile antioxidants found in various beans on malonaldehyde formation in horse blood plasma, Food and Chemical Toxicology, Volume 43, Issue 4, April 2005, Pages 515-520, ISSN 0278-6915, DOI: 10.1016/j.fct.2004.12.004.
(http://www.sciencedirect.com/science/article/B6T6P-4FFNBW9-1/2/71209d8e854a62329f36bec7156161aa)
Abstract:
The inhibitory effect of aroma extracts isolated from dried soybeans, mung beans, kidney beans, and azuki beans on malonaldehyde (MA) formation from horse blood plasma oxidized with Fenton's reagent was determined by gas chromatography (GC) coupled with nitrogen-phosphorus detector (NPD). Aroma chemicals such as maltol, eugenol, benzyl alcohol, 1-octen-3-ol, butyrolactone, and 1-methyl-2-pyrrolidone, found in the aroma extracts of beans, were also examined for their inhibitory effect on the same system. Among the four aroma extracts tested, the aroma extract of soybeans exhibited the strongest antioxidant activity. Extracts of soybeans, mung beans, azuki beans, and kidney beans inhibited MA formation by 58%, 47%, 40%, and 23%, respectively, at the level of 400 [mu]g/mL, whereas, [alpha]-tocopherol and BHT inhibited MA formation by 52% and 70%, respectively, at the same level. Among the tested aroma chemicals, the antioxidant activity decreased in the following order: eugenol > maltol > 1-octen-3-ol > benzyl alcohol > butyrolactone > 1-methyl-2-pyrrolidone.
Keywords: Aroma extracts; Aroma chemicals; Natural antioxidants; Beans; Malonaldehyde; Blood plasma

A. E. Mubarak, Nutritional composition and antinutritional factors of mung bean seeds (Phaseolus aureus) as affected by some home traditional processes, Food Chemistry, Volume 89, Issue 4, March 2005, Pages 489-495, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.01.007.
(http://www.sciencedirect.com/science/article/B6T6R-4D7K2R3-1/2/51f382f60f44022331f1167f252a56f1)
Abstract:
The effects of some domestic traditional processes, such as dehulling, soaking, germination, boiling, autoclaving and microwave cooking, on the nutritional composition and antinutritional factors of mung bean seeds were studied. Germination and cooking processes caused significant ($p<0.05$) decreases in fat, carbohydrate fractions, antinutritional factors and total ash contents. All processes decreased the concentrations of lysine, tryptophan, threonine and sulfur-containing amino acids. However, all treatments were higher in total aromatic amino acids, leucine, isoleucine and valine contents than the FAO/WHO reference. Dehulling, soaking and germination processes were less effective than cooking processes in reducing trypsin inhibitor, tannins and hemagglutinin activity contents. Also, germination was more effective in reducing phytic acid, stachyose and raffinose. Germination resulted in a greater retention of all minerals compared to other processes. In vitro protein digestibility and protein efficiency ratio were improved by all processes. The chemical score and limiting amino acids of mung bean subjected to the various processes varied considerably, depending on the type of process.
Keywords: Mung bean; Antinutritional factors; Nutritional composition; Home traditional processes

Soong Yu Kuo, Lee Feng Chien, Yi Yuong Hsiao, Ru Chuan Van, Kun Huang Yan, Pei Feng Liu, Simon J. Mao, Rong Long Pan, Proton pumping inorganic pyrophosphatase of endoplasmic reticulum-enriched vesicles from etiolated mung bean seedlings, Journal of Plant Physiology, Volume 162, Issue 2, 21 February 2005, Pages 129-138, ISSN 0176-1617, DOI: 10.1016/j.jplph.2004.07.007.
(http://www.sciencedirect.com/science/article/B7GJ7-4DM2BKT-2/2/d41aa7110a70a61b88736fe548fe43da)
Abstract: Summary
Endoplasmic reticulum (ER)-enriched vesicles from etiolated hypocotyls of mung bean seedlings (Vigna radiata) were successfully isolated using Ficoll gradient and two-phase (polyethylene glycol-dextran) partition. The ER-enriched vesicles contained inorganic pyrophosphate (PPi) hydrolysis and its associated proton translocating activities. Antiserum prepared against vacuolar H+-pyrophosphatase (V-PPase, EC 3.6.1.1) did not inhibit this novel pyrophosphatase-dependent proton translocation, excluding the possible contamination of tonoplast vesicles in the ER-enriched membrane preparation. The optimal ratios of Mg2+/PPi (inorganic pyrophosphate) for enzymatic activity and PPi-dependent proton translocation of ER-enriched vesicles were higher than those of vacuolar membranes. The PPi-dependent proton translocation of ER-enriched vesicles absolutely required the presence of monovalent cations with preference for K+, but could be inhibited by a common PPase inhibitor, F-. Furthermore, ER H+-pyrophosphatase exhibited some similarities and differences to vacuolar H+-PPases in cofactor/substrate ratios, pH profile, and concentration dependence of F-, imidodiphosphate (a PPi analogue), and various chemical modifiers. These results suggest that ER-enriched vesicles contain a novel type of proton-translocating PPase distinct from that of tonoplast from higher plants.
Keywords: Endoplasmic reticulum; H+-pyrophosphatase; Proton translocation; Tonoplast; Vacuole

L.J. Robertson, J.D. Greig, B. Gjerde, A. Fazil, The potential for acquiring cryptosporidiosis or giardiosis from consumption of mung bean sprouts in Norway: a preliminary step-wise risk assessment, International Journal of Food Microbiology, Volume 98, Issue 3, 15 February 2005, Pages 291-300, ISSN 0168-1605, DOI: 10.1016/j.ijfoodmicro.2004.06.006.

(http://www.sciencedirect.com/science/article/B6T7K-4DBX7DV-2/2/931c75b398c3d93a75c5c2de8bad3f10)
Abstract:
The current work evolved from a microbial survey of fruits and vegetables conducted in Norway between 1999 and 2001. This survey found that mung bean sprouts were more likely to be contaminated with Cryptosporidium and Giardia than the other produce included in the survey. To support this observation and to demonstrate to public health officials that this might be a risk warranting further attention, a simple risk assessment was initiated. Assuming that 60,000 people in Norway consume a single serving of bean sprouts per week, and contamination levels are similar to those found in the survey, it was calculated that there could be in the order of 20 cases of Giardia or Cryptosporidium infection per 100,000 population attributable to consumption of mung bean sprouts. A number of assumptions were made for the calculations, including parasite factors (e.g. viability, genotype), product factors (e.g. extent of product contamination) and host factors (e.g. composition and extent of consumer group). These assumptions and areas of uncertainty, where further data would improve the risk assessment, are highlighted throughout. Not only does the risk assessment identify new areas of research, but it also demonstrates how risk assessment can be used as a tool to try to influence public health surveillance.
Keywords: Risk assessment; QRA; Cryptosporidium; Giardia; Mung bean sprouts; Norway

Isabelle Lestienne, Christele Icard-Verniere, Claire Mouquet, Christian Picq, Serge Treche, Effects of soaking whole cereal and legume seeds on iron, zinc and phytate contents, Food Chemistry, Volume 89, Issue 3, February 2005, Pages 421-425, ISSN 0308-8146, DOI: 10.1016/j.foodchem.2004.03.040.
(http://www.sciencedirect.com/science/article/B6T6R-4CHHR3J-1/2/072b3b2e8c32c05de9984eaf8de55fe8)
Abstract:
The effects of soaking whole cereal (maize, millet, rice, sorghum) and legume seeds (mung bean, cowpea, soybean) on iron (Fe), zinc (Zn) and phytate (Phy) contents were investigated. In all the above cereals, except millet, the molar ratios of Phy/Fe were above than 14, and ratios of Phy/Zn were above 20 while, in legumes, ratios were lower. Soaking whole seeds for 24 h led to leaching of iron and, to a lesser extent, of zinc ions into the soaking medium. Soaking led to a significant (P[less-than-or-equals, slant]0.05) reduction in the phytate content of millet, maize, rice and soybean, but did not improve the Phy/Fe molar ratio, while decreasing the Phy/Zn molar ratio only slightly. Soaking on its own was not found to be a good method for improving mineral bioavailability but the results showed that, in combination with other treatments, or with optimized soaking conditions, it could nevertheless prove useful.
Keywords: Phytate; Zinc; Iron; Molar ratios; Soaking

Kun H. Yan, Pei F. Liu, Huan T. Tzeng, Wen C. Chang, Wen G. Chou, Rong L. Pan, Characterization of DNA end-binding activities in higher plants, Plant Physiology and Biochemistry, Volume 42, Issues 7-8, July-August 2004, Pages 617-622, ISSN 0981-9428, DOI: 10.1016/j.plaphy.2004.06.001.
(http://www.sciencedirect.com/science/article/B6VRD-4CS4GK2-1/2/4e6f740f6bdff7804aac5361570cf42b)
Abstract:
DNA double-strand-breaks (DSB) are the most severe lesion in cells exposing to ionizing radiation and many other stress environments. Repair of DNA DSB is therefore critical to cellular survival. In this work, we observed the double-stranded DNA end-binding (DEB) like activities in rice (Oryza sativa L. cv. TN5) suspension cells and hypocotyls from etiolated mung bean (Vigna radiata L. TN5) seedlings. Higher plant DEB-like protein binds primarily to linearized double-stranded DNA ends. Competition of unlabeled probe was examined in double-stranded DEB assay of cell

extracts from rice and mung bean. DEB-like activities of higher plants did not depend on sequence and types of double-stranded DNA ends. Distinct electrophoretic mobility shift patterns and binding features further indicate that DEB-like factors from various sources might not share identical structure and function, and probably belong to different types of DEB proteins from higher plants. Our evidence suggests that DEB proteins are certainly ubiquitous in all organisms probably for repairing and processing double-stranded DNA breaks from formidable lethal lesion.
Keywords: DEB proteins; DNA double-strand breaks; DNA end-binding; Ku protein

Yun Ju Kim, Jee Eun Kim, Jae-Hoon Lee, Myoung Hui Lee, Ho Won Jung, Young Yil Bahk, Byung Kook Hwang, Inhwan Hwang, Woo Taek Kim, The Vr-PLC3 gene encodes a putative plasma membrane-localized phosphoinositide-specific phospholipase C whose expression is induced by abiotic stress in mung bean (Vigna radiata L.), FEBS Letters, Volume 556, Issues 1-3, 2 January 2004, Pages 127-136, ISSN 0014-5793, DOI: 10.1016/S0014-5793(03)01388-7.
(http://www.sciencedirect.com/science/article/B6T36-4B5B6XB-4/2/3619bc2746f88b7345a852ca13bfdb51)
Abstract:
Phosphoinositide-specific phospholipase C (PI-PLC) catalyzes the hydrolysis of phosphatidylinositol 4,5-bisphosphate to generate inositol 1,4,5-trisphosphate and diacylglycerol, both of which act as secondary messengers in animal cells. In this report, we identified in Vigna radiata L. (mung bean) three distinct partial cDNAs (pVr-PLC1, pVr-PLC2, and pVr-PLC3), which encode forms of putative PI-PLC. All three Vr-PLC genes were transcriptionally active and displayed unique patterns of expression. The Vr-PLC1 and Vr-PLC2 transcripts were constitutively expressed to varying degrees in every tissue of mung bean plants examined. In contrast, the Vr-PLC3 mRNA level was very low under normal growth conditions and was rapidly induced in an abscisic acid-independent manner under environmental stress conditions (drought and high salinity). An isolated genomic clone, about 8.2 kb in length, showed that Vr-PLC1 and Vr-PLC3 are in tandem array in the mung bean genome. The predicted primary sequence of Vr-PLC3 (Mr=67.4 kDa) is reminiscent of the [delta]-isoform of animal enzymes which contain core sequences found in typical PI-PLCs, such as the catalytic domain comprising X and Y motifs, a lipid-binding C2 domain, and the less conserved EF-hand domain. Results of in vivo targeting experiment using a green fluorescent protein (GFP) showed that the GFP-Vr-PLC3 fusion protein was localized primarily to the plasma membrane of the Arabidopsis protoplast. The C2 domain was essential for Vr-PLC3 to be targeted to the plasma membrane. The possible biological functions of stress-responsive Vr-PLC3 in mung bean plants are discussed.
Keywords: Abiotic stress; Calcium; Differential gene expression; Inositol 1,4,5-trisphosphate; Phospholipase C; Plasma membrane; Vigna radiata

Prathibha Devi, P. Radha, L. Sitamahalakshmi, D. Syamala, S. Manoj Kumar, Plant regeneration via somatic embryogenesis in mung bean [Vigna radiata (L.) Wilczek], Scientia Horticulturae, Volume 99, Issue 1, 2 January 2004, Pages 1-8, ISSN 0304-4238, DOI: 10.1016/S0304-4238(03)00079-7.
(http://www.sciencedirect.com/science/article/B6TC3-49BSCDS-2/2/3a31f1c7d62a9b28d7084644b73d7f22)
Abstract:
Somatic embryogenesis was induced from mature cotyledons, hypocotyl, nodal segment, and leaf explants of two Indian cultivars of Vigna radiata (L.) Wilczek on Murashige and Skoog's medium supplemented with several combinations of growth regulators. The greatest response was obtained with the combination 1.809 [mu]M 2,4-dichlorophenoxyacetic acid (2,4-D) with 3.555 [mu]M benzyl adenine (BA). Better response was obtained when cultures were incubated under 24/0 h light/dark (L/D) cycle as compared to the 16/8 h L/D cycle. A high rate of germination of the somatic embryos and plant conversion (development into a full fledged plantlet) was obtained on

Murashige and Skoog's medium (MS) with 3.94 [mu]M indole-3-butyric acid (IBA) medium. Though all the cultures derived from different explants were morphologically similar, a higher percentage of regeneration was observed in the cultures initiated from leaf explants. The regenerated plantlets with well developed roots and shoots were transferred successfully to the glasshouse with a maximum survival rate of 92%. The suitability of this system for clonal propagation was assessed by the preparation of synthetic seeds. The synthetic seeds were found to have optimum germination potential and ability for subsequent plant conversion over a storage period extending to 4 weeks on MS+3.94 [mu]M IBA medium.
Keywords: Somatic embryos; Synthetic seeds; Plant conversion; Mung bean