



The 2nd International Symposium on Sustainable Agriculture (ISSA2026) and
The 3rd National Conference on Technology and Agricultural Innovation (NCTAI2026)

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Optimization of Green Extraction of *Centella asiatica* and *Bacopa monnieri* Using Coconut Milk as a Natural Bio-Solvent

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Abstract

This study developed an in-situ Green Cold Lipid Extraction framework using coconut milk as natural solvents to eliminate chemical residues and thermal degradation in processing *Centella asiatica* and *Bacopa monnieri*. Fresh biomass significantly outperformed dried samples, achieving higher total yields (% Yield) of 17.50% - 21.25%, with cultivated *C. asiatica* reaching the maximum (20.25% - 21.25%). Dried biomass caused emulsion separation failure at high loads, optimizing at a 1:0.3 ratio (12.50% yield). Total Phenolic Content (TPC) peaked at a 1:0.5 ratio (58.55 - 59.05 mg GAE/g). Fresh *B. monnieri* exhibited the highest DPPH radical scavenging of 28.60% at a 1:0.5 ratio, whereas fresh *C. asiatica* suffered an "Antioxidant Paradox" at the same ratio, dropping to 10.23%. GC-MS profiling confirmed high encapsulation of lipid permeation enhancers across the blood-brain barrier (BBB), notably Rac-glycerol-1,3-dilaurate (19.71%) in *B. monnieri* and Ethyl laurate (12.70%) in *C. asiatica*. Furthermore, a dense neuro-anti-inflammatory cluster of pyrones and lactones constituted over 27% of fresh *C. asiatica*, led by 2H-Pyran-2-one, tetrahydro-6-methyl- (8.09%). This green framework offers superior functional value over conventional ethanol extraction, delivering a 100% chemical-free, ready-to-use product ideal for neuroprotective softgel formulations.

Keywords : Green Lipid Extraction, *Centella asiatica*, *Bacopa monnieri*, Antioxidant Paradox, GC-MS





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Efficacy of Turmeric Extracts in Different Lipid-Carrier Delivery Systems on Growth Performance, Digestive Physiology, and Liver Health of Mahseer (*Tor douronensis*)

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Abstract

This study evaluated the efficacy of dietary supplementation with *Curcuma longa* (turmeric) extract encapsulated in different lipid-based carriers on the growth performance, digestive physiology, and hepatic histopathology of Semah mahseer (*Tor douronensis*) over an 20-week trial. In vitro assays showed that turmeric extract in a coconut oil (CO) had higher total phenolic content and % inhibition than the coconut cream residue. In vivo, fish were assigned to 5 key groups: basal diet control (T1), 5% coconut oil (T2), 5% turmeric extract in CO (T3), 5% turmeric extract in coconut cream residue (T4), and 3% turmeric extract in CO with 2% fish oil (T5). All groups exhibited a 100% survival rate. Dietary lipids caused no significant differences ($P > 0.05$) in viscerosomatic index, intraperitoneal fat, muscle protein synthesis, or proximate composition. Notably, the T2 and T3 groups achieved the significantly highest specific growth rate (SGR) and the best feed conversion ratio ($FCR = 1.07$) ($P < 0.05$), strongly correlating with peak trypsin and lipase activities. Conversely, the fish oil blend (T5) showed the poorest efficiency with the highest FCR (1.45). Hepatic histopathology revealed that while T2 induced microvesicular steatosis, the co-supplementation of turmeric in T3 significantly attenuated lipid accumulation and maintained hepatocyte integrity. On the contrary, T4 caused severe macrovesicular steatosis, and T5 triggered extensive hepatocyte degeneration via lipid peroxidation. In conclusion, dietary supplementation of 5% turmeric extract in a coconut oil (Diet 3) is the most effective formulation to enhance growth, stimulate digestive enzymes, and safeguard hepatic health in Semah mahseer.

Keywords : *Curcuma longa*, Coconut oil, Digestive enzymes, Liver histopathology, *Tor douronensis*





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Product Development of Crispy Sea Bass Chip

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Abstract

This research aimed to develop a crispy baked sea bass sheet product from farmed Asian sea bass (**Lates calcarifer**) and to evaluate its physical, chemical, and sensory qualities. Three formulations were developed: the standard formulation (PKT-1), formulation 1 (PKT-2), and formulation 2 (PKT-3). The resulting products were analyzed for physical properties, including color values in the CIE Lab* system, and chemical properties, including moisture content. Consumer acceptance was evaluated by 30 panelists using a 9-point hedonic scale.

The results showed slight differences in color among the three formulations. The L* values of PKT-1, PKT-2, and PKT-3 were 60.44 ± 1.99 , 60.46 ± 3.22 , and 56.63 ± 1.84 , respectively. The a* and b* values ranged from 2.67–4.06 and 21.93–26.21, respectively, indicating a yellowish-brown color characteristic of baked crispy products. Regarding moisture content, the standard formulation exhibited the highest moisture level, followed by PKT-3 and PKT-2, respectively.

The sensory evaluation revealed that the overall acceptability scores ranged from moderate liking to high liking. Among the formulations, PKT-3 received the highest overall preference score based on appearance, color, aroma, and texture. The findings demonstrated that the development of crispy baked sea bass sheets was successful, with PKT-3 showing the greatest potential for consumer acceptance. This product could be further developed as a value-added processed product from Asian sea bass and serve as a novel fish-based snack alternative.

Keywords : Asian sea bass (*Lates calcarifer*), crispy baked snack, seafood products





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Object Detection of Feed Maize Kernels Using a Deep Learning Model

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Abstract

Maize is a major raw material used in animal feed formulation. Quality control at the raw material receiving stage is the first step in ensuring the selection of high-quality feed ingredients, thereby supporting efficient production and sustainable resource utilization. Conventional grading relies on manual random inspection, in which personnel classify individual kernels to determine the percentage of acceptable kernels. Implementing deep learning using Detectron2 to automate this process reduces inspection time, improves accuracy, and standardizes raw material assessment before production. This research aims to apply deep learning to classify feed maize kernels for efficient grading decisions, promoting sustainability through optimized agricultural supply chains. A dataset consisting of four categories was compiled: good kernels, damaged kernels, broken kernels, and corn cobs, with 300 images per category. Mask R-CNN was utilized for instance segmentation within the Detectron2 framework, configured with a learning rate of 0.00025, a batch size of 2, and 500 training epochs. Results showed that Detectron2 achieved an average classification accuracy of 81.85 percent. Furthermore, testing on unseen images yielded a confidence score of up to 97 percent, enabling reliable raw material quality evaluation. This study highlights the significance of integrating digital imaging with deep learning as a vital approach to enhancing quality assessment efficiency. In the long term, this technology supports sustainable agricultural industries by reducing post-harvest losses and ensuring high-quality, resource-efficient feed production for the future.

Keywords : Animal science, Classification, Deep learning, Digital images, Feed maize





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Evaluation of Cassava Varieties for high yield and starch content : Regional trial (2020 Hybrids)

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Abstract

This study aimed to evaluate new hybrid cassava lines with high starch yield potential. Ten cassava lines/varieties were tested during May to June 2024 using a randomized complete block design with three replications across six locations. Combined analysis of variance revealed that lines CMR63-09-68,

CMR63-19-01, CMR63-35-29, and CMR63-35-32 produced starch yields of 1,575, 1,415, 1,359, and 1,427 kg/rai, respectively, exceeding DOA Rayong 11 by 9–26%. Lines CMR63-09-68, CMR63-19-01, CMR63-31-16, CMR63-35-29, and CMR63-35-32 produced fresh root yields of 5,173–5,987 kg/rai, which were 7–24% higher than DOA Rayong 11. Lines CMR63-09-68 and CMR63-19-01 had starch contents of 26.3% and 25.0%, respectively, comparable to DOA Rayong 11. GGE biplot analysis indicated significant genotypic and genotype × environment interaction effects on starch yield and fresh root yields. Line CMR63-09-68 exhibited high yield potential and stability across environments, whereas CMR63-19-01 showed specific adaptation, particularly at Nakhon Ratchasima. Considering starch yield, fresh root yield, starch content, and adaptability, three hybrid lines, CMR63-19-01, CMR63-35-29, and CMR63-35-32, were selected for further evaluation in on-farm trials. Although CMR63-09-68 demonstrated superior performance, its excessive branching habit may limit its suitability for farmer-managed production systems.

Keywords : starch yield, harvest index, stability





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Greenhouse Gas Emissions in Rainfed Area in Northeastern and Upland Area in Southern Thailand

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Abstract

This research aimed to study the amount of greenhouse gas emissions from rainfed rice in northeastern and upland rice in southern Thailand. This information will serve as a basis for developing appropriate rice cultivation technologies to minimize the greenhouse gas emissions. Rainfed rice plots were established in Ubon Ratchathani, Surin, and Khon Kaen provinces using the Khao Dawk Mali 105 rice variety, while upland rice plots were established in Phatthalung province using the Niao Dam Mor 37 rice variety, during the 2023-2024 rainy season. Dry seed drilling method are applied, also based on soil analysis of fertilizer was applied. The closed-chamber method was used for flux measurements of methane (CH₄) and nitrous oxide (N₂O). The results showed that under rainfed conditions, the methane emission ranged from 21.8-32.5 g CH₄/m², the highest CH₄ emission was in Khon Kaen province (32. g CH₄/m²). The nitrous oxide emissions ranged from 0.33-0.68 g N₂O/m², the highest emission was in Ubon Ratchathani (0.68 g N₂O/m²). In addition, the seasonal accumulated greenhouse gas emissions from the rain-fed rice season ranged from .11-1.46 t CO₂e/rai. In upland conditions, the methane emission was 0.7 g CH₄/m², nitrous oxide emission was 1.41 g N₂O/m², and the seasonal accumulated greenhouse gas emissions was 0. t CO₂e/rai. The average yield of Khao Dawk Mali 105 across the three provinces ranges from 309-589 kg/rai, while Niao Dam Mor 37 gave 139 kg/rai.

Keywords : rice, greenhouse gas, rainfed area, upland area





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Effect of Optimal Physiological Maturity on the Quality and Germination of Betel Nut Seeds

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Abstract

The study on the effect of physiological maturity stages on the quality and germination of betel nut seeds (*Areca catechu* L.) aimed to determine the appropriate harvesting stage for producing high-quality seeds. The experiment was conducted using a Completely Randomized Design (CRD) with four treatments, consisting of betel nut fruits at 240, 250, 260, and 270 days after anthesis. Germination percentage, seedling vigor, seed viability, and physiological fruit characteristics, including color, size, weight, and moisture content, were evaluated. The results showed that fruit age significantly affected seed quality. Fruits at 270 days after anthesis exhibited the highest performance, with a maximum germination rate of 73.9% and the highest seedling vigor. This is attributed to the seeds reaching full physiological maturity with maximum accumulation of reserve food substances. In contrast, fruits at 240 days showed the lowest germination rate at 18.3%, indicating incomplete seed development. Seed viability tests revealed that most non-germinated seeds had lost viability or deteriorated. Physiological characteristics showed continuous fruit development with age. The highest fruit weight (61.0–64.5 g/fruit) was observed at 240–250 days, representing the near-maturity stage. Meanwhile, fruits at 260–270 days exhibited a color transition from green to yellow and deep orange, indicating full maturity. Therefore, betel nut fruits at 270 days after anthesis are considered the most suitable harvest stage for producing high-quality seeds.

Keywords : betel nut, physiological maturity, germination





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Ethanol Sugarcane Promising Clone KK13-203

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Abstract

Thailand's annual energy demand is 131,000 tons, equivalent to 55% of crude oil, which is imported. The Ministry of Energy therefore has a policy to promote and enhance the potential for energy production from renewable energy sources. Given the problem of low agricultural commodity prices, energy sugarcane is a viable option. However, Thailand currently lacks energy sugarcane varieties. The Department of Agriculture has been developing energy sugarcane varieties since 2005. The KK13-203 clone is a hybrid resulting from a cross between the high-yielding and high-sugar 98-2-604 female variety and the high-yielding and disease-resistant DOA UT4 male variety. This hybrid was developed in 2013 at the Khon Kaen Field Crops Research Center. Yield evaluation was conducted between 2018 and 2025, with standard yield trials carried out at the Khon Kaen Field Crops Research Center and the Nakhon Ratchasima Agricultural Research and Development Center. Ethanol production potential was studied at Agricultural Production Factors Research and Development Division, and the Central Laboratory, Faculty of Technology, Khon Kaen University. The findings indicated that the KK13-203 clone is a promising clone with higher yield, juice yield, bagasse yield and ethanol production potential than the LK92-11, DOA UT2, DOA KK3, and DOA KK4 varieties. It yields 16.06 tons per rai and juice yield 5,123 liters per rai, 16-46% and 33-64% higher than the four standard varieties, respectively. It also yields 2.75 tons of bagasse per rai, 5-24% higher than LK92-11, DOA UT2, and DOA KK3, and 478 liters of ethanol per rai, 12-46% higher than the four control varieties. Sugarcane clone KK13-203 is considered a promising new energy sugarcane variety for future renewable energy production.

Keywords : Bio-Energy Sugarcane, Ethanol, Alternative Energy Plant





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Biomass Energy from Sang Mon Bamboo: A Promising Alternative for Enhancing Energy Security in the Lower Southern Region

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Abstract

Currently, the demand for renewable biomass energy in Thailand shows a continuous growth trend; however, the availability of primary raw materials remains highly volatile due to seasonal fluctuations. This research aims to develop production technologies for Sang Mon bamboo (*Bambusa nutans*) and Tong Sri Prachin bamboo as alternative energy crops and for commercial industries. The study covers the Northern, Eastern, and Lower Southern regions of Thailand, conducted between October 2025 and March 2026.

The results indicated that ten high-potential bamboo varieties for biomass production were selected and collected in the Northern region. For the Lower Southern region (Songkhla Province), which faces severe soil acidity (pH 4.62) and low organic matter (1.29%), the application of a basal hole preparation technology using 5 kg of manure combined with 500 g of rock phosphate effectively enhanced the growth rate of *Bambusa nutans* during its establishment phase.

In terms of propagation, the Temporary Immersion Bioreactor (TIB) system, utilizing a semi-solid MS medium supplemented with 2 mg/L of the cytokinin Benzyladenine (BA), successfully induced shoot proliferation up to 85.98% within 6 days, yielding an average of 3.9 shoots per explant. Furthermore, tests were conducted on forming biomass pellets from 1-year-old *Bambusa nutans*. This body of knowledge serves as a crucial mechanism in driving the Bio-Circular-Green (BCG) economic model and establishing sustainable biomass energy security at the community level.

Keywords : Biomass energy, *Bambusa nutans*, Temporary Immersion Bioreactor (TIB), BCG economy model, Soil improvement





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Potential Alternative Crop in the Lower Southern Region : *Salacca zalacca*

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Abstract

The initial phase of the research on *Salacca zalacca* (Gaertn.) Voss. (snake fruit) as a potential alternative crop in the lower southern region focused on data collection through literature reviews and field surveys. These surveys examined cultivation methods, farm management practices, and popular varieties grown in the area. The findings indicate that *Salacca zalacca* is widely cultivated in Indonesia, Malaysia, and Thailand. In Thailand, it is mainly grown in the southern region, typically intercropped in rubber plantations and fruit orchards, as it requires relatively low light for growth. It is easy to cultivate and can produce yields within three years. The fruit of *Salacca zalacca* has a scaly skin resembling snake. It can be classified into three main types: Salak Sidempuan: The fruit skin ranges from dark brown, almost black, reddish-brown, to yellowish-brown. The fruits are generally larger than other types, with a sweet and slightly sour taste and a firm texture. Salak Pondoh: Known for its fragrant aroma and sweet taste even when not fully ripe. It has three notable sub-varieties: Pondoh Super, Pondoh Hitam (black pondoh), and Pondoh Gading (ivory or pale yellow skin). Salak Bali: This type has more than 15 varieties with diverse flavors, such as very sweet (Salak Gula Pasir), sweet and slightly sour like grapefruit (Salak Getih), and sour like pineapple (Salak Nanas). The fruit size is similar to a large fig. The flesh is crisp and juicy. Some varieties have a slightly astringent and starchy texture (e.g., Salak Gading), while others like Salak Gondok and Salak Gula Pasir have little to no astringency. The most expensive variety is Salak Gula Pasir, which has a fine, sand-like texture, smaller fruit size, and the sweetest taste among all salak varieties. Field surveys on cultivation patterns, farm management, and popular varieties in the lower southern region found that farmers in Phatthalung, Satun, and Narathiwat provinces commonly intercrop *Salacca zalacca* in rubber plantations. It is usually planted in a single row between rubber tree rows, alternating with the rubber trees. Spacing depends on the rubber planting layout. *Salacca zalacca* is also grown among fruit trees, utilizing empty spaces between them. Two types of *Salacca zalacca* were observed: those with many thorns and those with fewer thorns. However, most *Salacca zalacca* have numerous, long, hard thorns that are brown to black in color.





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Abstract

The most commonly found varieties in Phatthalung and Narathiwat are Salak Pondoh and Salak Bali due to their sweetness, crisp texture, and thick flesh. In Satun, there is greater diversity, including Salak Sidempuan, Salak Pondoh, and Salak Bali. Pollination of *Salacca zalacca* is carried out either manually or naturally. Manual pollination produces higher yields than natural pollination. Pollination typically occurs from November to April, and harvesting takes place about six months after pollination. Water management includes both sprinkler irrigation and reliance on rainfall. Fertilization involves the use of organic fertilizers (manure) and chemical fertilizers such as 15 – 15 - 15 and 13 – 13 - 21. The produce is sold in local markets, through middlemen, and online, with prices ranging from 50 to 200 baht per kilogram. Additionally, progressive farmers propagate *Salacca zalacca* through offshoot cuttings for sale, priced between 1,000 and 3,500 baht per offshoot depending on the variety, providing additional household income. Therefore, *Salacca zalacca* is considered a promising alternative crop for intercropping in rubber plantations and fruit orchards, enhancing land-use efficiency and generating additional income for farmers.

Keywords : *Salacca zalacca*, Salak, Snake fruit,





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Development of an Artificial Intelligence-Based Decision Support System for Fertilizer Management in Economic Field Crops

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Abstract

Fertilizer use in economic field crops in Thailand still faces problems related to inappropriate use of production inputs, resulting in high production costs and low production efficiency. In addition, farmers lack easily accessible decision support tools. This study aimed to collect, analyze, and develop a fertilizer-use database for major economic field crops, namely sugarcane, cassava, maize, and mungbean, and to develop a guideline and prototype of an automated interactive fertilizer recommendation system using artificial intelligence to support farmers' decision-making. The research was conducted in two phases. Phase 1 involved collecting, analyzing, and developing a fertilizer-use database from documents, research findings, and technical information of the Department of Agriculture, with data validated for accuracy and suitability. Phase 2 focused on developing a guideline and prototype of an automated interactive fertilizer recommendation system by applying Retrieval-Augmented Generation (RAG) and Large Language Model (LLM) technologies. Farmers' satisfaction and acceptance of artificial intelligence technology, as well as the impacts of climate conditions on farmers' adaptation, were also surveyed in four study provinces: Suphan

Keywords : artificial intelligence, automated interactive system, fertilizer use, economic field crops, Retrieval-Augmented Generation (RAG)





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Optimization of Fertilizer Management for Trang Pepper Production

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Abstract

A study on optimal fertilizer management for quality Trang pepper production was conducted at the Trang Agricultural Research and Development Center between 2025 and 2026. A Randomized Complete Block (RCBD) design was used to compare three treatments: the method recommended by the Department of Agriculture, an adaptive method, and a farmer's method. Eight replications were performed, with six plants per replication. Seedlings were planted on June 20, 2025, and are currently 11 months old, a crucial stage for stem development. Data recorded showed that treatment 2 (the adaptive method) exhibited the best stem growth, with the largest average stem diameter (1.15 cm), a statistically significant difference ($P < 0.05$) compared to the other methods. Stem height and canopy width were similar across all methods, with no statistically significant differences. The adaptive method resulted in the greatest stem height (112.05 cm), while the method recommended by the Department of Agriculture resulted in the widest canopy (17.04 cm). Since pepper plants began producing fruit at 2 years of age, the researchers plan to collect yield data subsequently for further comparison and in-depth conclusions regarding the most accurate and best fertilizer management method. Before transferring and expanding the acquired knowledge to farmers' plots, the aim is to sustainably drive the commercial pepper growing group in Trang province.

Keywords : Fertilizer, Phrikthai Trang or Trang pepper, Increase efficiency





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Comparison of Yield Potential of *Parkia speciosa* Hassk. in Trang Province

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Abstract

The research on the Comparison of Yield Potential of *Parkia speciosa* Hassk. aimed to select new varieties capable of producing both in-season and off-season crops. The study was conducted at the Trang Horticultural Research Center from October 2021 to September 2024. The experimental design was randomized complete block design (RCBD) with 4 replications and 5 treatments including 3 varieties (1608, 1506, and Trang 10) compared with the recommended variety (DOA Trang 1) and a local variety. (Data were collected from bitter bean trees aged 7 to 9 years.) The results revealed that the Trang 10 variety exhibited the highest potential, consistently providing stable in-season yields (146.2, 250.2, and 97.0 pods/tree, respectively) and off-season yields (32.2, 44.4, and 253.0 pods/tree, respectively) across all three years. These yields were significantly higher than those of the local variety and surpassed the in-season production of the DOA Trang 1 variety throughout the study period. The total yields of Trang 10 variety were 180.4, 294.6, and 350.0 pods/tree, respectively. In terms of physical characteristics, Trang 10 variety pods had width of 4.42 cm, length of 31.48 cm, pod weight of 86.00 g, 14.20 seeds per pod, and 10-seed weight of 24.96 g. Consequently, Trang 10 variety has been proposed for registration as a recommended variety by the Department of Agriculture.

Keywords : Breeding, Off-season production, *Parkia speciosa* Hassk.





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Fruit development and changes in tannin content of Indian gooseberry fruits grown in the South

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Abstract

This study on fruit development and changes in tannin content in Indian gooseberry (*Phyllanthus emblica**) grown in southern Thailand aimed to characterize fruit development and tannin levels at various stages of maturity. The findings serve as criteria for selecting cultivars and determining the optimal harvest time to ensure raw material quality suitable for pharmaceutical production. The study was conducted at the Trang Horticultural Research Center during 2022–2023, utilizing a total of eight Indian gooseberry cultivars categorized by fruit size (large, medium, and small). Data analysis involved comparing mean values and was carried out in two stages. Step 1 involved studying fruit development by measuring fruit weight, width, length, and flesh thickness every 7 days after flowering, from May to December 2013; Step 2 involved analyzing the tannin content in fruits aged 7–10 months. The study revealed that large- and medium-fruited varieties shared similar growth patterns: fruit weight increased slowly between 3 and 5 months of age, rose rapidly between 6 and 7 months, peaked at 8 months, slowed down at 9 months, and began to abscise at approximately 10 months. In contrast, small-fruited varieties showed relatively little increase in fruit weight throughout the development period. Regarding tannin content in the fruit, it was found that all varieties exhibited an increase in tannin levels as the fruit matured, peaking at eight months of age before gradually declining. The KRI 59-01 variety showed the highest tannin content, followed by KRI 59-05 and Phrae 01—which displayed similar levels—and subsequently by KRI 56-01 and KRI 59-08. In conclusion, the KRI 59-01 variety is suitable for selection for pharmaceutical production. For medicinal use, the fruit should be harvested at 8 months of age, whereas for fresh consumption or processing, harvesting should take place at 7 months; at this stage, the fruit is large, with clear, unblemished skin, and the flesh is firm, crisp, and low in fiber.

Keywords : Indian gooseberry (*Phyllanthus emblica*), fruit development, harvest age, tannin.





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Effects of Leaf Pruning on Growth and Yield of Fujisawa Melon Cultivated under a Polyethylene Roof Net House in Phatthalung Province

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Abstract

This study aimed to investigate the effects of leaf pruning on the growth and yield of Fujisawa melon cultivated under a net-house covered with a polyethylene plastic roof in Phatthalung Province, Thailand. The experiment was conducted at the Faculty of Agriculture, Thaksin University, Phatthalung Campus. A completely randomized design (CRD) was employed, consisting of four leaf-retention treatments: 18–19 leaves, 20–21 leaves, 22–23 leaves, and ≥ 25 leaves per plant. Each treatment comprised 10 replications, and four plants were randomly selected from each replication for data collection. The results revealed that retaining 22–23 leaves per plant produced the most favorable growth and yield performance. This treatment resulted in the highest leaf area at 7, 8, and 9 weeks after transplanting, with values of 296.74, 286.97, and 280.72 cm², respectively. At 6 weeks after transplanting, plants with 22–23 leaves exhibited the highest net photosynthetic rate of 5.81 $\mu\text{mol CO}_2 \text{ m}^{-2}\text{s}^{-1}$. However, no significant differences in net photosynthetic rate were observed among treatments at 8 and 9 weeks after transplanting. Furthermore, the 22–23 leaf treatment produced the highest plant dry weight (106.67 g), which was significantly greater than that of the 20–21 leaf treatment. Regarding fruit characteristics at harvest, retaining 22–23 leaves resulted in the largest fruit size, with transverse and longitudinal circumferences of 41.56 and 42.25 cm, respectively. In addition, this treatment yielded the highest fruit weight at harvest, averaging 1.40 kg per fruit.

Keywords : Leaf pruning, Fujisawa melon (*Cucumis melo* L.), net-house cultivation, vegetative growth, yield





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Income Enhancement of Hom Thong Banana Farmers Using Simple and Low-Cost Tissue Culture Technology

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Abstract

This study aimed to investigate the effects of transferring a simple and low-cost tissue culture technology for Hom Thong Banana (*Musa acuminata*) production on reducing production costs, increasing yield, and improving farmers' income. The research employed a Participatory Action Research (PAR) approach conducted at the Rai-or Kankaset Community Enterprise in Thung Nui Subdistrict, Khuan Kalong District, Satun Province. The sample consisted of 10 Hom Thong Banana farmers selected through purposive sampling. The qualitative data were collected through community forums and technology transfer activities on simple and low-cost Hom Thong banana tissue culture propagation, and demonstration plots. The qualitative data were collected using a survey form covering basic personal information, production costs, revenues, and net income before and after project participation. The results revealed that the farmers were predominantly male, with an average age of 57 years. Most had completed lower secondary education and cultivated Hom Thong Banana on an average area of 10.5 rai. Following participation in the project, the average production cost decreased by 3,015.80 THB per rai, primarily due to a reduction in planting material costs of 2,760.00 THB per rai. The average yield increased by 615.00 kilograms per rai, and the average net income increased by 10,396.00 THB per rai. Hypothesis testing indicated that both yield and net income after project participation were significantly higher than those before participation at the 0.05 level. The findings indicate that the simple Hom Thong banana tissue culture technology is an appropriate technology that was associated with reduced production costs, increased yield, and higher farmers' income. Therefore, the Appropriate Technology should be further extended and disseminated to other farmers and agricultural communities, under conditions of adequate skills readiness and support.

Keywords : Hom Thong Banana, Appropriate Technology, Tissue Culture Technology, Agricultural Extension,





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Assessment of Rice-Based Cropping Systems for Greenhouse Gas Mitigation in Irrigated Paddy Fields: A Case Study of Lopburi and Pattani Provinces, Thailand

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Abstract

This study aimed to evaluate the potential of rice-based cropping systems for reducing greenhouse gas (GHG) emissions in irrigated paddy fields in Lopburi and Pattani provinces, Thailand. During 2023–2024, cropping systems were established and methane (CH₄) and nitrous oxide (N₂O) emissions were measured using the closed chamber technique. In 2025, selected cropping systems were further evaluated at the farm level using life cycle assessment (LCA) with the SECTOR tool. Emissions were expressed as carbon dioxide equivalents (CO₂e) and analyzed together with crop yield. The results showed that GHG emissions varied significantly among cropping systems. In Lopburi, the rice–soybean system produced the highest emissions 60,968 kgCO₂e/rai, with N₂O as the dominant component, while the rice–sunn hemp system had the lowest emissions 36,000 kgCO₂e/rai. In Pattani, the rice–mung bean system showed the highest emissions 12,310.8 kgCO₂e/rai, whereas the fallow system had the lowest 4,558.4 kgCO₂e/rai. At the system level, CH₄ emissions from rice fields were the major source (0.637–0.717 tCO₂e/rai), while N₂O emissions ranged from 0.004 to 0.063 tCO₂e /rai. Total emissions were 0.654–0.790 tCO₂e /rai. The rice–mung bean system in Lopburi produced lower yields 132–158 kg/rai, whereas the rice–sweet corn system in Pattani achieved much higher yields 1,546–1,735 kg/rai, indicating greater potential for reducing GHG emissions per unit of production. These findings suggest that appropriate crop selection can reduce GHG emissions while improving productivity and farmers' income.

Keywords : rice-based system, greenhouse gas emissions, GHG mitigation, life cycle assessment (LCA), cropping system





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Greenhouse gas emission from rice-based cropping systems in Saline Intrusion Area

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Abstract

In Nonthaburi Province, farmers face rice mortality issues due to saltwater intrusion and the lack of salt-tolerant varieties; therefore, this research was to develop suitable rice-based cropping systems in irrigated and saline intrusion area to mitigate greenhouse gas emissions. This research was conducted from 2023-2025 with 2 activities; 1) studying greenhouse gas emissions in rice-based cropping systems, questionnaire was used in this study with 50 farmers in Ban Mai Subdistrict, Bang Yai District, Nonthaburi Province, covering 965 rai. Life Cycle Assessment (LCA) used to evaluate. The study found that methane (CH₄) emissions of 10.78 gCH₄/m²/season, nitrous oxide (N₂O) emissions of 0.01 g N₂O /m²/season, and Global Warming Potential of 0.88 tCO₂e/rai/season, 2) Field experiments of four different treatments were investigated: Rice–Fallow, Rice–Baby Corn, Rice–Baby Corn–Cowpea, and Fallow–Rice–Baby Corn. The closed-chamber method was used for flux measurements of methane (CH₄) and nitrous oxide (N₂O), with samples taken weekly at intervals of 0, 6, 12, 20, and 30 minutes until harvest and analyzed via Gas Chromatography. The results indicated that the baby corn produced the highest methane emissions at 1.66 gCH₄/m²/day, followed by the cowpea emitted at 0.08 gCH₄/m²/day, no nitrous oxide emissions were detected in any of the four treatments.

Keywords : saline intrusion area, cropping systems, Greenhouse gas emissions, Life Cycle Assessment





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**Comparison of Sweet Sorghum Varieties for Bioenergy Potential
in Chainat and Nakhon Sawan Provinces**

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Abstract

This study aimed to compare sweet sorghum varieties/lines under on-farm conditions in Chai Nat and Nakhon Sawan provinces during the 2025 growing season in order to identify high-potential genotypes for use as alternative energy crops. The evaluation focused on fresh stalk yield, juice yield, juice sweetness, and ethanol production potential. The experiment was arranged in a randomized complete block design (RCBD) with four replications and seven treatments (varieties/lines), consisting of CB 5, CB 23, CB 14, and CB 23, with Cowley, Keller, and Wray used as check varieties. The results showed significant differences ($P < 0.05$) among varieties / lines in harvested stalk weight, and juice yield, whereas total soluble solids was not significantly different. At the Nakhon Sawan site, the Cowley variety produced the highest fresh stalk yield, reaching 18,925 kg rai⁻¹. In contrast, Wray exhibited the highest fresh stalk yield in Chainat, with 17,844 kg rai⁻¹. Ethanol production potential, determined using gas chromatography (GC), revealed that Wray had the highest ethanol concentration at 0.103% (v/v).

Keywords : sweet sorghum, promising varieties/lines, yield potential, ethanol production potential





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Effect of Harvesting Age on Yield and Seed Quality of Bambara Groundnut DOA Songkhla 2 in Songkhla Province

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Abstract

This study aimed to determine the effects of harvesting age on yield and seed quality of bambara groundnut (*Vigna subterranea*) cultivar DOA Songkhla 2. The experiment was conducted at the Songkhla Field Crops Research Center, Songkhla Province, Thailand, from May to September 2025. A Randomized Complete Block Design (RCBD) with four replications was employed. Harvesting was carried out at five different ages: 80, 85, 90, 95, and 100 days after planting (DAP). The results showed that harvesting at 95 DAP produced the highest fresh pod yield and dry pod yield, at 526 and 135 kg /rai, respectively. In terms of seed quality, seeds harvested at 85 and 90 DAP exhibited the highest germination percentage, reaching 97%. Harvesting at 85 DAP resulted in the highest germination index (6.36) and the shortest mean germination time (6.66 days).

Keywords : Bambara groundnut, Harvesting Age, Yield, Quality





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Effects of Cytokinin Application Methods and Concentrations on the Growth of Chinese Chive

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Abstract

This study aimed to investigate and compare the effects of cytokinin application methods on the growth of Chinese chive (*Allium tuberosum*). Two application methods were evaluated: soaking planting bulbs in a cytokinin solution for 2 h before planting and weekly drench application of cytokinin throughout the experimental period. These methods were combined with six cytokinin concentrations: 0 ppm (control), 50, 100, 150, 200, and 250 ppm. The experiment was arranged in a Completely Randomized Design (CRD) with four replications. Growth parameters recorded included clump number, plant fresh weight, bulb weight, number of shoots per clump, root length, root diameter, leaf length, and leaf width. The results showed that the method of cytokinin application significantly affected the growth of Chinese chive. Weekly cytokinin drench application produced greater leaf length and plant fresh weight than pre-plant bulb soaking at all cytokinin concentrations, including the control. Average leaf length under the weekly drench treatment was approximately 4–7 cm greater than that of the bulb-soaking treatment. Furthermore, intermediate cytokinin concentrations (100–200 ppm) tended to promote plant growth more effectively than the lower and higher concentrations. These findings indicate that continuous weekly cytokinin drench application is more effective than a single pre-plant bulb soaking treatment in promoting the growth of Chinese chive.

Keywords : Chinese chive, cytokinin, application method, plant growth





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Effectiveness of Plant Growth Stimulants on Shoot Emergence of Torch Ginger

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Abstract

This study aimed to evaluate the effectiveness of plant growth stimulants on shoot emergence and growth of torch ginger (*Etlingera elatior*). Trang 3 cultivar were used as the planting material. Five treatments were evaluated including distilled water (control), auxin at 3 mL L⁻¹, cytokinin at 3 mL L⁻¹, gibberellin at 3 mL L⁻¹, and marine fish amino acid at 3 mL L⁻¹. The suckers were planted in baskets, and each treatment solution was applied once weekly throughout the experiment. The experiment was arranged in a Completely Randomized Design (CRD) with four replications, each consisting of five plants. Data were collected on the number of shoots, shoot weight, shoot length, and shoot diameter. The data were analyzed using analysis of variance (ANOVA), and treatment means were compared using the Least Significant Difference (LSD) test at the 95% confidence level. The results showed that different plant growth stimulants significantly affected shoot emergence and growth of torch ginger. Treatment 3 (cytokinin at 3 mL L⁻¹) produced the best performance for all measured characteristics, with the highest mean number of shoots (0.62 shoots), mean shoot weight (233.05 g), mean shoot length (17.03 cm), and mean shoot diameter (8.05 mm). The second-best treatment was Treatment 5 (marine fish amino acid), which produced an average of 0.50 shoots, a shoot weight of 173.05 g, a shoot length of 5.09 cm, and a shoot diameter of 4.08 mm. In contrast, Treatment 2 (auxin) did not induce any shoot emergence throughout the experimental period. Furthermore, shoot quality assessment based on hardness and stickiness indicated that Treatment 3 exhibited superior shoot quality compared with the other treatments. These findings suggest that cytokinin has considerable potential for promoting shoot emergence and improving shoot quality in torch ginger.

Keywords : *Etlingera elatior*, shoot emergence, cytokinin, plant growth regulators, plant propagation





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**Study on Potential of Local Medicinal Plants (*Melastoma malabathricum*,
Cassumunar ginger) for Health Utilization in Lower Southern Thailand**

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Abstract

The objective of this research was to investigate the morphological diversity, appropriate production technologies, phytochemical contents, and biological activities of three local medicinal plants: Khlongkhlang (*Melastoma malabathricum* L.), local Phlai (*Zingiber montanum*), and Wan Sao Long (*Amomum biflorum*) in Lower Southern Thailand, including Songkhla, Phatthalung, Trang, and Narathiwat provinces. Taxonomical and physiological studies successfully categorized these plants into distinct subtypes. Khlongkhlang was classified into 4 types: purple-flower form, white-flower form (*M. malabathricum* var. *alba* L.), glandular-hairy form, and hairy form. Local Phlai was identified into 3 distinct varieties: yellow, black, and pink Phlai. Wan Sao Long was divided into red-shoot and green-shoot types. Quantitative phytochemical analysis revealed that the fruits of purple-flower Khlongkhlang, along with the stems and roots of the glandular-hairy form, exhibited the highest total phenolic contents of 535.51, 430.10, and 361.16 mg GAE/g extract, respectively. Total flavonoid content was highest in yellow Phlai leaves, yellow Phlai rhizomes, and black Phlai rhizomes at 1.54, 1.14, and 1.08 mg QE/g extract, respectively, which was consistent with Thin-Layer Chromatography (TLC) profiles showing curcumin only in yellow Phlai. For antioxidant activity evaluation via DPPH assay, white-flower, glandular-hairy, and purple-flower Khlongkhlang leaves possessed the strongest radical scavenging capacity with IC₅₀ values of 0.01, 0.02, and 0.07 mg/mL, respectively. Mineral profiling demonstrated that Phlai leaves contained the highest phosphorus and calcium, while its rhizomes were rich in magnesium, iron, and zinc. Wan Sao Long leaves contained the highest manganese content. However, the field trials in 2025 encountered severe tropical monsoons, causing absolute crop failure from prolonged waterlogging and leaf spot fungal diseases in Wan Sao Long. These empirical findings provide a solid baseline for chemical and agricultural optimization, confirming that these indigenous plants possess substantial potential for high-value nutraceutical and pharmaceutical applications.

Keywords : *Melastoma malabathricum*, *Zingiber*, Phytochemicals, Antioxidant Activity,

