

## **Article 1:**

### **Application of molecular marker for rice breeding with low amylose content in the backcross population of OM6976/JASMINE 85//OM6976**

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#### **Abstract**

The strategy of selecting quality rice cultivars is closely related to low amylose content. The breeding method using the molecular markers is a modern method that has been successful in many previous researches on rice. In this study, 71 high yielding rice varieties were evaluated for amylose content, yield and yield components, and the best individuals were selected for the backcrossing. OM6976, the high yielding variety was selected as a recipient (mother) and Jasmine 85, the low amylose variety was chosen as donor (father). Progeny plants have been continuously backcrossed and selected through generations combined with the use of molecular markers to the BC4 generation. 41 molecular markers were used to evaluate the genetic diversity of parental varieties in which a molecular marker (Wx) marked the gene for amylose content and four markers (RM420, RM162, RM256 and RM257) related to yield and yield components for results of polymorphism. In the BC4F3 generation, 10 lines had low amylose content of 17.5-20.6%. Of these, the four best lines including D75, D131, D142 and D150 had low amylose content and high yield.

**Keywords:** Rice, amylose, backcrossing, marker, yield, progeny

## **Article 2:**

### **Testing of drought-tolerant rice varieties in Lak district, Dak Lak province**

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## **Abstract**

Experiments of testing were carried out in three different locations with difficult watering in Lak district, DakLak province during 2 seasons (summer-autumn and winter-spring seasons) of 2015 and 2016. The tested rice varieties included drought tolerant varieties (CH207, CH208, CH19, LCH37, DH39), short duration P6DB and OM4900, CXT30 varieties and popular rice variety IR64 as control one. The result showed that all tested rice varieties were adaptable to local condition and had the yield higher than that of the control. Drought-tolerant rice variety LCH37 and short duration variety P6DB showed the highest yield (P6DB reached 59.0 - 72.5 quintal ha<sup>-1</sup> in summer-autumn season, 52.3 - 58.7 quintal ha<sup>-1</sup> in winter-spring season, increasing by 15.2 - 24.4% compared with control while LCH37 reached 54.7 - 68.3 quintal ha<sup>-1</sup> in summer-autumn season, 51.8 - 57.5 quintal ha<sup>-1</sup> in winter-spring season, 11.7 - 17.8% in comparison with control).

**Keywords:** Rice, testing, drought tolerant rice variety, adaptable, Lak district, DakLak province

## **Article 3:**

### **Drought resistant ability of local rice varieties maintaining at the National Crop Genebank**

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## **Abstract**

The study aimed to determine the drought tolerance and restoration ability of 100 local rice varieties collected in the North Central Vietnam by artificial drought method at different growth stages. The results showed that the different varieties responded differently to drought conditions at each growth stage. 100 rice varieties were grouped by the drought tolerance level and restoration ability at the growth stages. Four good drought tolerant varieties (Score 1) were identified at all stages including Tu thoi Thanh Hoa (Acc. No 12), Tam do Thanh Hoa (Acc. No 299), Nep Loc Thanh Hoa (Acc. No 325) and Mua trang Thanh Hoa (Acc. No 585). Except for Tam do Thanh Hoa variety (Acc. No 299), the other three varieties had higher yield or equivalent to CH5 control variety (4.18 tons / ha) under artificial drought conditions.

**Keywords:** Rice, local rice, artificial drought, drought tolerance, evaluation, restoration

**Article 4:**

**Study on growth, development ability and yield of soybean varieties on upland farm in Hoang Su Phi district, Ha Giang province**

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**Abstracts**

Hoang Su Phi is an upland district of Ha Giang province and soybean cultivation is mainly on the upland farm in the mountain. People mostly use low productivity local variety, so application of new variety for high yield is necessary. Research on 8 soybean varieties including DT22, DT31, DT51, DT2012, DT30, DT26, DT2008 and DT 84 showed that the growth duration of the varieties was belonged to early and medium maturity group. The real yield varied from 14.74 to 24.85 quintals/ha (summer autumn season in 2015) and 13.91 – 24.07 quintals/ha (spring season in 2016). Three soybean varieties such as DT2008, DT22, DT26 gave high yield in both crop seasons. The results of the demonstration plots of 3 elite varieties showed that the average yield reached from 20.63 to 23.59 quintals/ha, among which, DT2008 variety had the highest average yield (23.59 quintals/ha), DT22 variety is preferred by farmers and selected.

**Keywords:** Soybean, variety, Hoang Su Phi, yield, elite

**Article 5:**

**Effects of inorganic fertilizer (N, P) and organic fertilizers on coffee *Coffea canephora* yield in basalt soil, Lam Dong province**

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## **Abstract**

The study on the effect of N and P fertilizers and organic fertilizer on Robusta coffee yield was conducted in basaltic red soil in Di Linh plateau of Lam Dong province from 2012 to 2015. The experiment was conducted with four nitrogen doses (250, 320, 390 and 460 kg N/ha), three phosphorus doses (100, 150, 200 kg P<sub>2</sub>O<sub>5</sub>/ha) and two levels of organic fertilizer (0 and 10 manure tons/ha) and was designed in a Split-Split-Plot with treatments, three replications. The experiment was conducted in the garden of an intensive high-yielding 15 years-old Robusta coffee (with an average yield of 4.7 tons/ha). Coffee yield was monitored in year 2, 3 and 4 of the experiment. The results showed that N fertilizer and organic fertilizer affected the yield significantly at 95%. The fertilizer application was 10 tons of manure - 320 kg N - 100 P<sub>2</sub>O<sub>5</sub> kg - 350 kg K<sub>2</sub>O (ha/year) gave the highest yield.

**Keywords:** Mineral fertilizer N, P; compost; robusta coffee yield

## **Article 6:**

### **Effects of polysulphate fertilizer on coffee production on basaltic soil in Lam Dong province**

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## **Abstract**

Lam Dong province has 158,944 hectare of coffee. This crop has a high demand for nutrient, including macro, meso and micro elements. Polysulphate (Poly) is introduced as a new 4-in-1 fertilizer which contains 48.0% SO<sub>3</sub>, 14.0% K<sub>2</sub>O, 6.0% MgO and 17.0% CaO. To assess the effect of Poly fertilizer on coffee growth and productivity, a field experiment with 5 treatments of Poly doses (0, 200, 400, 600 and 800 kg ha<sup>-1</sup>) and 3 replications on basaltic soil in Loc Thang commune, Bao Lam district, Lam Dong province during 2015 - 2016. The results showed that application of Poly increased the development of branch, reduced the rate of dropped fruit and improved the productivity by 0.17 - 0.37 t ha<sup>-1</sup>, corresponding 4.7 - 10.2% compared to the control treatment. The treatment which had the highest coffee yield (3.95 t ha<sup>-1</sup>) and economical effectiveness (benefit of 75.0 millions VND ha<sup>-1</sup>) was with 400 kg Poly ha<sup>-1</sup>.

**Keywords:** Coffee, basaltic soil, productivity, Poly

## **Article 7:**

### **Effect of microbial organic fertilizer types on growth and development of Shan tea variety in Thuan Chau, Son La**

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#### **Abstract**

Planting area of Shan tea in Thuan Chau district, Son La province has been decreasing due to inappropriate cultivation practices and therefore the yield and quality have been decreasing in recent years. However, there has not been any study on the procedures of Shan tea production toward protecting soil while increasing tea productivity and quality in Thuan Chau district, Son La province. To solve this situation, the authors studied the effect of microbial organic fertilizer types on growth and development of Shan tea variety in this area. The results showed that supplementing with microbial organic fertilizer, the number of litter picking reached from 6.7 - 8 litters per year, the average time interval between 2 litter picking ranged from 28.7 - 36 days, the density of buds reached 506.22 - 536.44 buds/m<sup>2</sup>, the weight of buds was recorded at 0.42 - 0.51 g/bud and the yield was of 2.73 - 3.13 tons/ha. On the other hand, applying microbial organic fertilizer could improve the soil as increasing porosity and humus content in the soil; NTT treatment had porosity from 67.26 - 67.63% and it was the best fertilizer treatment.

**Keywords:** Microbial organic fertilizer, Shan tea, growth, development

## **Article 8:**

### **Characterization of actinomyces strain with bioactivity against *Erwinia carotovora* causing the soft rot disease on some crops**

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## **Abstract**

In this study experiments were performed to screen and identify the actinomycetes strains that were capable of antagonism to *Erwinia carotovora* causing the soft rot disease on plants. Using the agar diffusion plate method, 05 strains that were capable of antagonism to *Erwinia carotovora* were obtained. The strain number L2.5 had strongest activity with a diameter of 23 mm clear zone of bacteria. The L2.5 strain was capable to produce the straight spore chains after 03 days of culture, non-induced the soluble pigments on ISP-6 medium, growing well at temperatures between 30 - 35 °C and neutral pH, and adapting to low salt concentration medium. It could be used some carbon and nitrogen sources including sucrose, fructose, cellulose, raffinose, meat extract, peptone and KNO<sub>3</sub>. Results of 16S rRNA sequence analysis showed that strain L2.5 had a similarity of 99% comparing to *Streptomyces psammoticus* KP1404. Based on morphology, culture, physiological, biochemical characteristics and molecular biological analyzes we have identified the strain L2.5 belonging to *Streptomyces psammoticus* species.

**Keywords:** Actinomycetes, *Erwinia carotovora*, *Streptomyces* sp., soft rot

## **Article 9:**

### **Effects of cultural and nutritional conditions on growth of new isolated GL30 *Streptomyces* strain**

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## **Abstract**

The purpose of the present study was to survey the effects of some cultural conditions, including temperature, pH, different resources of C and N, the culture medium / flask's volume ratio, cultural status (static and shaking) on growth and antibacterial metabolite production of *Streptomyces* GL30 strain, isolated from different soil samples. Strain GL30 exhibited antagonistic ability to three pathogens: *Bacillus cereus* ATCC-11778, *Escherichia coli* VTCC-B-482 and *Staphylococcus aureus* VTCC-B-658. Antibacterial activity of *Streptomyces* GL30 strain was evaluated based on the diameter of inhibition zone of pathogenic microorganisms. The results showed that the antibacterial activity of GL30 strain reached highest after 4 days of growth under shaking conditions, the temperature of 30 °C, pH 6-8 and culture media/ flask's

volume was 20%. Cornstarch of 2%, peptone 2% was the best carbon and nitrogen source for growth and antibacterial production of strains GL30. The results also showed that strain GL30 was a potential soil microorganism with antimicrobial activity and may be used for biotechnological purposes

**Keywords:** Cultural conditions, nutrient conditions, antimicrobial activity, *Streptomyces*

### **Article 10:**

#### **Effect of drying and extraction temperature on the change of bioactive compound and sensory properties of spent *Cordyceps militaris* substrate**

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### **Abstract**

*Cordyceps militaris* has an effect for enhancing health, anti-cancer, anti-inflammatory due to some bioactive compounds including adenosine and cordycepin. These compounds vary depending on many factors such as culture media, heat treatment method etc. Apart from the fruiting body being the main parts to be harvested, the spent of *Cordyceps militaris* substrate is now only dried, used in raw form. This research aims to find the effect of drying and extraction temperatures on the change of bioactive substances and sensory properties. The two types of spent *Cordyceps militaris* were grown on semi-synthetic media (MT1) with the adenosine of 0.34 mg/g; cordycepin of 2.34 mg/g and on the natural media (MT2), with these two active compounds at 0.36 mg/g; 2.71 mg/g, respectively. The results showed that the obtained bioactive compound was highest with a good sensory point at the drying temperature of 70°C. The extraction conditions indicated the best bioactive substances content and the best sensory points were at 90°C in 15 min and 90°C in 20 min for MT1; 95°C in 10 min for MT2.

**Keywords:** Spent *Cordyceps militaris* substrate, adenosine, cordycepin

## **Article 11:**

### **Study on the antimicrobial activity of essential oils**

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#### **Abstract**

This article presents research on the antimicrobial properties of five essential oils from *Ocimum gratissimum*, *Cinnamomum loureiri*, *Ocimum basilicum*, *Mentha arvensis*, *Curcuma longa* for *B. subtilis*, *B. cereus*, *S. aureus*, *E. coli*, *S. typhimurium*, *P. putida*, *L. damsella* compared with two antibiotics, gentamycin and streptomycin. Disc diffusion method was established so that all essential oils had antimicrobial ability, in which *Cinnamomum loureiri* showed the highest ability. It was determined that the minimum inhibitory concentration (MIC) and bactericidal time of *Cinnamomum loureiri* oil for *B. cereus* were 0.25% and 10 minutes, respectively, and for *E. coli* were 0.5%, 20 minutes, respectively. Based on the minimum bactericidal concentration/minimum inhibitory concentration ratio (MBC / MIC), *Cinnamomum loureiri* oil was determined as a disinfectant, and *Mentha arvensis* as a bacteriocin for *B. cereus* and *E. coli*. This study showed that some essential oils indicated a comparable effectiveness as an antibiotics.

**Keywords:** Essential oil, antimicrobial, antibacterial ring, minimum inhibitory concentration, minimum bactericidal concentration

## **Article 12:**

### **Enhancement of Validamycin-A productivity of *Streptomyces hygroscopicus* 11405 by protoplast mutagenesis**

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#### **Abstract**

Validamycin A (Val-A) is anti-fungal aminoglycoside antibiotic produced by *Streptomyces hygroscopicus*. The present work aims to enhance the antibiotic productivity of the actinomycete

strain *S. Hygroscopicus* 11405 by protoplasts mutagenesis UV and N-methyl-N'-nitro-N-nitrosoguanidine (MNNG). The obtained results showed that a maximal yield of protoplast was obtained within 60 - 70 min at 37°C after adding lysozyme at a concentration of 1 mg/ml to mycelium in the logarithmic phase of growth (48 hours cultivation) in medium containing 0.4% (w/v) glycine. The suitable conditions for MNNG treatment on the protoplasts was established as MNNG of 0.1 mg/ml and treatment time of 30-40 min. Resulting variants by this method expressed antibiotic activity higher than that by UV treatment. After mutation, 109 resulting variants with 5 types of color were collected, of which type 1 and type 5 were 38.5 - 49.6%. Among the positive variants, the Val-A productivity of the mutant strain *S. hygroscopicus* 11405-115 was highest and enhanced 70% compared to the original one. The maximal Val-A activity of the strain *S. hygroscopicus* 11405-115 reached 6.87 mg/ml after 48 hours of cultivation in shaking flasks.

**Keywords:** Anti-fungal, mutant, protoplast, *Rhizoctonia solani*, *Streptomyces hygroscopicus*, validamycin-A

### **Article 13:**

#### **Biological characterization of HT1 strain of *Streptomyces* with potential antimicrobial activity against *Streptococcus agalactiae* causing disease on tilapia**

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#### **Abstract**

The article presents the biological characteristics and antimicrobial activity of actinomycetes strain HT1 against *Streptococcus agalactiae* causing disease on tilapia. The 'HT1' colonies were observed to be circular, diameter 4 - 6 mm, dried surface with grayish white color, aerial hyphae are long, straight branching with a chain of spherical spore on ISP 4 medium after 21 day of cultivation. The favourable conditions for growth and antimicrobial activity of the strain HT1 were established: temperature of 30°C, pH (6 - 8), shaking speed of 200 rpm, the inoculum size of 3% (v/v), volume of medium in shaking flask of 10% (v/v). Our results also revealed that 'HT1' strain could grow well on the media containing xylose (C resource), peptone and KNO<sub>3</sub> (N resource) with clear zone of inhibition against *S. agalactiae* 23, 24 and 24.67 mm, respectively.

**Keywords:** Antimicrobial activity, biological characteristics, *Streptococcus agalactiae*, actinomyces, tilapia

#### **Article 14:**

##### **Optimization of autolysis conditions for waste brewer's yeast**

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#### **Abstract**

Treated brewers' yeast is optimized for the autolysis conditions followed the Box-Behnken design. Derringer's desirability function is used for optimization of output factors. The results showed that the autolysis ability of waste beer yeast depended on various factors, but the most important ones were temperature, composting time and pH. The combined factors had very little or insignificant impact on the result, except the interaction between pH and composting time caused reducing the dissolved substances. Under the optimum condition the ratio of yeast:water at 1: 3, stirring speed at 30 rpm, temperature at 52°C, pH at 5.8 and composting time in 22h, the percentage of protein converted to free amino nitrogen, of the protein transformed to dissolved form, and of the dry matter transformed into extract were 41.3; 73.6 and 52.1%, respectively. The desirability value for all three target function was 94.3%.

**Keywords:** Waste beer yeast, optimization, autolysis, mathematical model, experimental design

#### **Article 15:**

##### **Selection of lactic acid bacteria producing acidic tolerant enzyme $\beta$ -galactosidase (pH 2 - 3)**

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## **Abstract**

In this study, 82/265 strains of lactic acid bacteria were determined to produce  $\beta$ -galactosidase by using agar plate supplemented with X-gal. Of which, strains RGH7.1, RGH6.1, RGH8.8 produced extracellular  $\beta$ -galactosidase with the highest enzyme activity, 685.95 U/L, 498.92 U/L and 492.23 U/L, respectively.  $\beta$ -galactosidase of these three strains had high activity at pH 2 and 3 with their relative activity was from 74.32 - 83.16%, 86.49 - 93.24%. In addition, residual enzyme activity was still remained over 50% after 4 hours of incubation at pH 2 and 3. Among them,  $\beta$ -galactosidase from strain RGH7.1 was the best in terms of stability at pH 2 and 3 after 4 hours of incubation; residual enzyme activity was remained 50.01% and 65.14%, respectively. Results of this research indicated that extracellular  $\beta$ -galactosidase of strain RGH7.1 was promising one which could be applied in free lactose milk production and capsules containing of  $\beta$ -galactosidase with stability at with pH 2 and 3 for intolerant lactose people.

**Keywords:** Lactic acid bacteria,  $\beta$ -galactosidase, pH stability

## **Article 16:**

### **Improving production technology of ometar metarhizium anisopliae preparation for brown backed rice plant hopper prevention**

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## **Abstract**

Bioproduct of *Metarhizium anisopliae* shows its great potential in controlling the brown plant hopper. However, the characteristic of the final product is still need to be improved for the better commercialization. A number of pure spores was obtained based on the spore splitting technique by using screen with mesh size of 200  $\mu$ m. The preparation pervious powder included pure spores with more than  $10^{10}$  bt/g and PG1 addition agent, and the powder dose used was low by 500 g/ha. The preparation pervious powder can be directly dissolved inside the sprayer without any addition refinement. The 72.8% preventing effect of the preparation was achieved,

furthermore, the new form of the product offered a great extension in preservation time which made the preparation keeping use within a year.

**Keywords:** *Brown planthopper*, *Metarhizium anisopliae*, spore, PG1 addition agent

### **Article 17:**

#### **Identification and biological characteristics of *Botrytis cinerea* Pers. causing gray mold on dahlia (*Dahlia pinnata* Cav.) in Vietnam**

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#### **Abstract**

*Botrytis cinerea* is an important pathogen that causes diseases in different crops in Vietnam. In present study, a total of 15 isolates were isolated from dahlia (*Dahlia pinnata* Cav.) in Northern midland mountainous and the Red River delta. The morphological characterization were based on traits such as conidiophore and conidial length; and the results indicated that all isolates belonged to morph species *Botrytis cinerea*. PCR with specific primer pair C729+/C729- amplified DNA fragments of about 730 bp from all isolates. The DNA sequencing and phylogenetic analysis confirmed that *B. cinerea* was the causal agent of gray mold disease on dahlia. Using medium plate culture method, the effect of various culture conditions on mycelium growth, sporulation, sclerotia formation of dahlia *B. cinerea* was detected. Among 4 media, the mycelium cultured on BĐ grew fastest with the production of gray mycelium and dense conolies; however, the highest number of big sclerotia was formed on Czapeck 3 days after incubation. The optimum temperature for mycelium growth and sporulation of dahlia *B. cinerea* was 15°C on PDA medium. The optimum lighting conditions for mycelium growth was fluorescent light with alternating cycles of 12 hours light and 12 hours darkness; and the continuous light was optimum condition for sporulation of the fungus.

**Keywords:** *B. cinerea*, gray mold, biological characteristics, *Dahlia pinnata* Cav.

## **Article 18:**

### **Effect of drying regime (temperature, duration) by heat pump drying technology on quality of refined turmeric powder**

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#### **Abstract**

This research studied effect of drying regime (temperature, duration) by heat pump drying technology on quality of refined turmeric powder. The experiment was carried out with 4 treatments of temperatures as 45°C; 50°C; 55°C; 60°C, in 2; 4; 6; 8; 10 and 12 hours for wet refined turmeric powder with humidity content of 40 ÷ 45%; the dimension of the trays was 540 x 740 x 20 mm, the thickness of the turmeric powder was 0.5 cm. The results showed that the most suitable temperature of drying was 55°C for 10 hours making the best quality of refined turmeric powder with humidity of 8.46%; the curcumin content of 1.02% and the best quality of sensory indicators.

**Keywords:** Turmeric, refined turmeric powder, drying duration, drying temperature, curcumin content, humidity, sensory quality

## **Article 19:**

### **Effect of aminoethoxyvinylglycine combining with hot water treatment on ripen time of postharvest avocado Booth7**

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#### **Abstract**

The study used an inhibitor of ethylene biosynthesis (AVG) in combination with hot water treatment (temperature of 50 °C; in 10 mins) to prolong the shelf life of postharvesting avocado fruits (BOOTH7). The results showed that avocado fruits treated with AVG had lower activity of ACC oxydase, respiratory intensity and ethylene production than that of the control. Among 4 studied concentrations (320 ppm; 370 ppm; 420 ppm; 470 ppm), the AVG treatment

concentration of 420 ppm showed that the peak of respiration and ethylene production appeared more slowly in comparison to the control and the ripen time was 9 days longer than the control. The results also showed that the avocado fruits treated with AVG 420 ppm after 30 days of preservation had the best quality with indicators (AVG 420 ppm, temperature of 50 °C; in 10 mins): Vitamin C content of 7.45 mg%; total lipid content of 14.28%; weight loss of 3.14%; ethylene production rate of 23.29 ( $\mu\text{l C}_2\text{H}_4.\text{kg}^{-1}.\text{h}^{-1}$ ); respiration rate of 38.96 ( $\text{ml CO}_2.\text{kg}^{-1}.\text{h}^{-1}$ ); the content of ACC oxydase of 9.01 ( $\text{nmol C}_2\text{H}_4.\text{g}^{-1}.\text{h}^{-1}$ ).

**Keywords:** Respiration rate, ethylene production rate, ACC oxydase activity, low temperature, hot water treatment, AVG treatment

### **Article 20:**

#### **Establishment of baseline standards for medicinal herb (*Panax stipuleanatus*)**

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### **Abstract**

The baseline standards for medicinal herb (*Panax stipuleanatus*) were established based on: Morphological characterization, microsurgery, powder, moisture, total ash, impurities. The research results showed that *Panax stipuleanatus* was curvy, scattered into several installments, each 3-10 cm long, 0.3-1.0 cm diameter. The outer surface was brown or yellowish-gray, with slim lines, fragments, slight odor, bitter taste, and slightly sweet taste. Vascular surgery consisted of 7 to 10 layers in rectangular shapes, stacked over equally. Soft shell contained many starch granules, occasionally appeared tubes containing the resin and crystalline calcium oxalate which is spherical hemisphere. Libe - the wood packs in a bunch directed to the core; Very few wood circuit. Powder was light brown, tasting slight sweet. Grain starch was round or multi-edged. Moisture content is not more than 13%, ash content is not more than 8%, qualitative pharmaceutical materials must contain oleanolic acid and AO content is not less than 1%. This research contributes to good quality control and enhances the value of *Panax stipuleanatus*.

**Keywords:** *Panax stipuleanatus*, medicinal baseline standards, characterization, microsurgery

## **Article 21:**

### **Establishment of baseline standards for medicinal herb (*Mahonia nepalesis* DC)**

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#### **Abstract**

The baseline standards of this medicinal herb were established based on: Morphological characterization, microscopy, powder, moisture, total ash, impurities. The research results showed that medicinal herb (*Mahonia nepalesis* DC) had cylinder shape, light orange color with the diameter of about 0.5-2 cm, rough bark. Vascular microscopy indicated that the vascular containing 1-2 layers of dense polygons, multi-edged packed together, with fibrous tissue and hard tissue. The libe area was thick and the intestine rooted from libe heading to the end of the pulleys, the libe intestinal flux containing calcium oxalate pronged which are prismatic and crystals shapes. The soft tissue of the intestine occupied most of the body's surface, consisting of thick polygonal cells that partially encode cellulose. Moisture content is not greater than 12%, ash content is not higher than 8%, qualitative medicinal products must contain berberine chlorid and the content of berberine chlorid should not be lower than 0.5%. This research contributes to good quality control and enhances the value of *Mahonia nepalesis* DC.

**Keywords:** *Mahonia nepalesis* DC, medicinal baseline standards, characterization, microscopy

## **Article 22:**

### **Preliminary results of using nano silver in controlling brown rot**

**(*Gluconobacter frateurii*) on longan fruit**

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## **Abstract**

In this study, we have evaluated the inhibition effect of silver nanoparticles on *Gluconobacter frateurii* bacteria and the ability to prevent brown rot on the longan fruit of silver nanoparticles. The results showed that: (i) silver nanoparticles at a concentration of 10 ppm (with a treatment time of 45 minutes) and 7.5 ppm (with a treatment time of 60 minutes and 75 minutes) achieved 100% inhibitory effect on *Gluconobacter frateurii* bacteria; (ii) The concentration of 20 ppm nano silver provided the best disease control for brown rot on the longan fruit. No disease appeared after 48 hours of infection.

**Keywords:** *Gluconobacter frateurii* bacteria, brown rot on the longan fruit, silver nanoparticles

## **Article 23:**

### **Effect of different feed types on sexual maturity of redbtail botia *Botia modesta* Bleeker, 1865)**

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## **Abstract**

The experiment was carried out with 4 treatments (NT) of NT1 feed: small shrimp; NT2: trash fish, NT3: 50% marine trash fish + 50% commercial pellet feed 40% protein and NT4 are 100% commercial pellet feed 40% protein. After 4 months, the results showed that temperature, pH and oxygen in the culture ponds were always within the appropriate range for maturity stage. Maturation coefficient ratios of female ( $2.7 \pm 0.99\%$ ) was highest in NT1 and the difference was significant at  $P < 0.05$  compared with coefficient ratios of female  $1.44 \pm 0.84\%$  in NT4. In treatment NT1, the highest maturity rate was obtained ( $66.67 \pm 19.52\%$ ), and the lowest one was in NT4 ( $44.44 \pm 8.61\%$ ). The fecundity in NT1 and in NT2 were significantly different ( $P < 0.05$ ) compared to NT3 and NT4. The level of Vitellogenin (Vg) in stage IV ovary in treatments NT1, NT2 and NT3 were significantly different ( $P < 0.05$ ) compared with NT4. The protein content in muscle was lowest in April (2.37 - 4.87). The highest protein in liver (6.88 to 10.85 mg protein/g fresh sample) was in April.

**Keywords:** *Redtail Botia*, sexual maturity, different feed types