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BIOTEKNOLOGI BAHAN ALAM
IBT 452

By : Seprianto, S.Pi, M.Si

Universitas Esa Unggul

Pertemuan ke 14

TUGAS TERSTRUKTUR

PRESENTASI DAN REVIEW JURNAL TENTANG SENYAWA BAHAN ALAM

Produksi & Kualitas Fisik Telur *Cortunix cortunix japonica* Berdiet Pakan Mengandung Piperin Sebagai Aditif Pakan Fitogenik

- Nathaniel Nainggolan
- 20160308004

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Egg Production and Physical Quality in *Cortunix cortunix japonica* Fed Diet Containing Piperine as Phytogenic Feed Additive

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ABSTRACT

The objective of this study was to determine the effect of piperine as a phytogenic feed additive on quail performances and egg quality. The experiment used a completely randomized design with five treatments and four replications and used ten quails with one week of age in each replication. The piperine was added to the diets at concentrations of 0 (T0), 15 (T1), 30 (T2), 45 (T3), and 60 mg/kg body weight (T4) for 8 consecutive weeks. The results showed that addition of 60 mg/kg body weight (T4) of piperine significantly (P<0.05) reduced feed consumption, egg production, egg mass, income over feed cost (IOFC), and increased water consumption as compared to the other treatments. The addition of 15-60 mg piperine/kg body weight significantly (P<0.05) reduced eggshell weight and increased egg yolk color score. The conclusion of this experiment was that the addition of piperine at 15-45 mg/kg body weight could be used as phytogenic feed additive to improve performance, IOFC, haugh unit, and yolk color.

Key words: egg, feed additive, phytogenic, piperine, quail

Dalam Presentasi Ini Akan Dibahas….

- Latar Belakang Penelitian
- Tujuan Penelitian
- Metode Penelitian
- Hasil Penelitian
- Kesimpulan Hasil Penelitian
- Opini Terhadap Penelitian

Opini

- Isi dari penelitian ini sudah sesuai dengan judul tertulis dan tujuan yang ingin dicapai oleh para peneliti.
- Penelitian ini memiliki kemiripan dengan penelitian yang dilakukan oleh *Federal Rural University of Rio de Janeiro* dimana mereka memakai ayam broiler sebagai hewan percobaan mereka dalam membuat bahan aditif pakan fitogenik berbasis piperin. Tetapi dalam penelitian ini, para peneliti menemukan batas toksisitas piperin yang dapat diterima oleh ayam (120-180mg piperin/Kg BB).
- Penelitian ini perlu dicoba dengan memakai ekstrak murni piperin untuk melihat efeknya jika dibandingkan dengan memakai merica hitam utuh sebagai bahan aditif pakan fitogenik.

The Impact of Microbial Biotransformation of Catechin in Enhancing the Allelopathic Effects of *Rhododendron formosanum*

- Anita Nauli Pulungan
- 20160308002

OPEN ACCESS Freely available online
PLOS ONE

The Impact of Microbial Biotransformation of Catechin in Enhancing the Allelopathic Effects of *Rhododendron formosanum*

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Abstract

Rhododendron formosanum is distributed widely in the central mountains in Taiwan and the major allelopathic compound in the leaves has been identified as (-)-catechin, which is also a major allelochemical of an invasive spotted knapweed in North America. Soil microorganisms play key roles in ecosystems and influence various important processes, including allelopathy. However, no microorganism has been identified as an allelochemical mediator. This study focused on the role of microorganisms in the allelopathic effects of *R. formosanum*. The microorganism population in the rhizosphere of *R. formosanum* was investigated and genetic analysis revealed that the predominant genera of microorganisms in the rhizosphere of *R. formosanum* were *Pseudomonas*, *Herbaspirillum*, and *Burkholderia*. The dominant genera *Pseudomonas* utilized (-)-catechin as the carbon source and catalyzed the conversion of (-)-catechin into protocatechuic acid *in vitro*. The concentrations of allelochemicals in the soil were quantified by liquid chromatography-electrospray ionization/tandem mass spectrometry. The concentration of (-)-catechin in the soil increased significantly during the extreme rainfall in the summer season and suppressed total bacterial populations. Protocatechuic acid accumulation was observed while total bacterial populations increased abundantly in both laboratory and field studies. Allelopathic interactions were tested by evaluating the effects of different allelochemicals on the seed germination, radicle growth, and photosynthesis system II of lettuce. Protocatechuic acid exhibited higher phytotoxicity than (-)-catechin did and the effect of (-)-catechin on the inhibition of seed germination was enhanced by combining it with protocatechuic acid at a low concentration. This study revealed the significance of the allelopathic interactions between *R. formosanum* and microorganisms in the rhizosphere. These findings demonstrate that knowledge regarding the precise biotransformation process of (-)-catechin by microorganisms in the environment is necessary to increase our understanding of allelopathy.

Citation: Wang C-M, Li T-C, Jhan Y-L, Weng J-H, Chou C-H (2013) The Impact of Microbial Biotransformation of Catechin in Enhancing the Allelopathic Effects of *Rhododendron formosanum* . PLoS ONE 8(12): e85162. doi:10.1371/journal.pone.0085162

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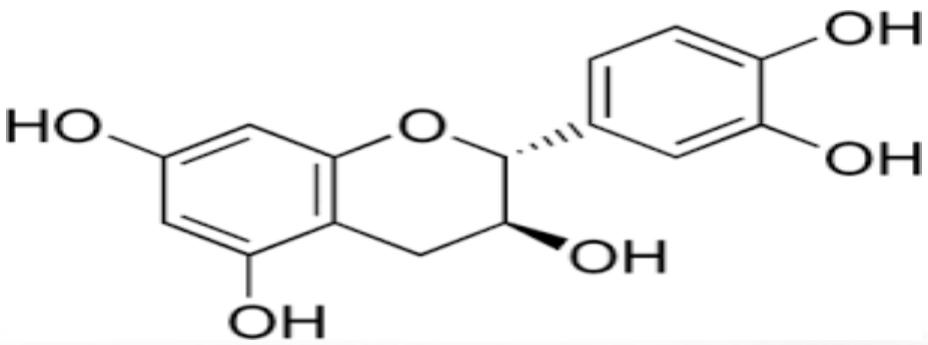
Introduction

The concept of plant-soil interactions has become widely recognized as a major driving force of community composition and ecosystem functioning in the past decade. The term ‘plantsoil feedback’ has been coined to name the multiple interactions between plants and soil organisms and has been adopted by many ecologists.

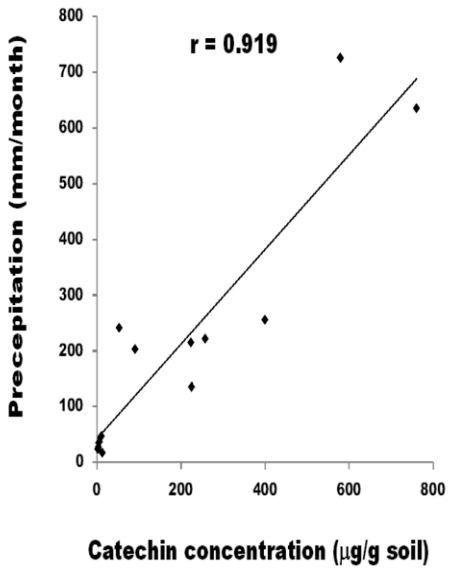


Materials and Methods

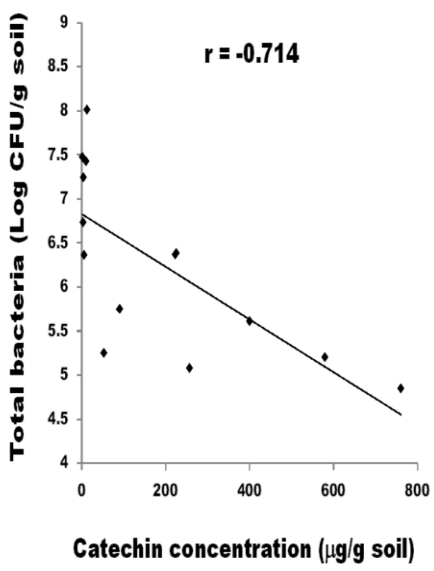
1. Sample collection
2. Microbial community analysis in the rhizosphere of *R hododendron formosanum*
3. Enrichment and isolation of catechin-degrading microorganisms
4. Identification and characterization of catechindegrading microorganisms
5. Biotransformation of catechin
6. Quantification of allelochemicals

Results

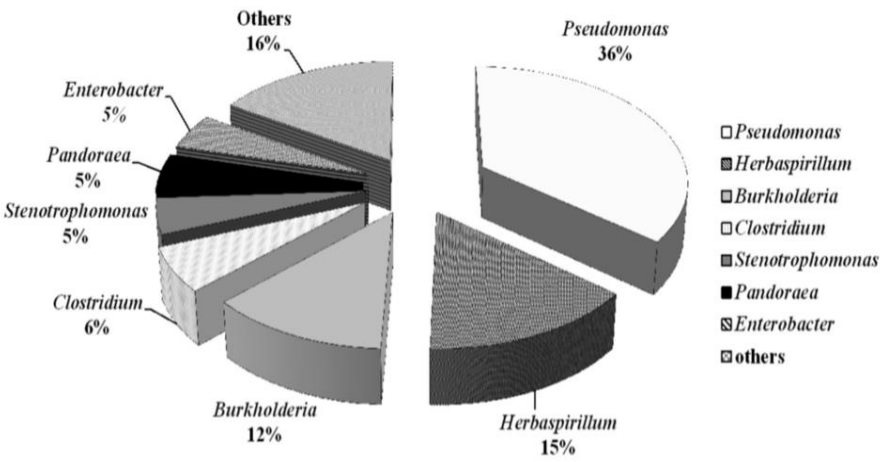
(A)


r = 0.919
Precepitation (mm/month)
Catechin concentration (µg/g soil)

(B)


r = -0.714
Total bacteria (Log CFU/g soil)
Catechin concentration (µg/g soil)

(A)


Bacterial flora of Rhododendron formosanum
Others 16%
Enterobacter 5%
Pandoraea 5%
Stenotrophomonas 5%
Clostridium 6%
Burkholderia 12%
Pseudomonas 36%
Herbaspirillum 15%
Pseudomonas
Herbaspirillum
Burkholderia
Clostridium
Stenotrophomonas
Pandoraea
Enterobacter
others

- The Antioxidant Activities, Phenolic Total and Cytotoxicity of Extract and Fractions of *Aloe Vera* Linn)

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20160308006

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The Antioxidant Activities, Phenolic Total and Cytotoxicity of Extract and Fractions of *Aloe Vera* Linn)

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ABSTRACT

Aloe vera is known containing compounds which have potencies as antioxidants, such as group of anthraquinones (especially emodin and aloin), flavonoids, tannins, saponins, and sterols. In this research, comparison of total phenolics content, antioxidant activity and cytotoxicity of the methanolic extract and its fractions had been conducted. The *Aloe vera* extract was fractionated using a solvent gradient system to obtain fractions of *n*-hexane, dichloromethane, ethyl acetate and water. The analysis of total phenolic and activity were performed on extracts or fractions that showed a positive result to the phenolic test. Total phenolic content was determined by the *Folin - Ciocalteu* method, determination of antioxidant activity was by DPPH radical reduction and determination of cytotoxicity was by BSLT (*Brine Shrimp Lethality Test*). The results showed that the yield of methanol extract, fractions *n*-hexane, fraction of dichloromethane, ethyl acetate and water fraction were 0.580% ; 0.006% ; 0.093% ; 0.0092% and 0.410% respectively. Methanolic extract, ethyl acetate fraction and the water fraction showed positive result on phenolic test. Total phenolic compounds from water fractions was (16. mg gallic acid equivalent/g extract or fraction) which had greater level than E_{met} and F_{ea} (12.47 and 0.89). Fraction of water had the highest antioxidant activity (IC_{50} 433 mg/L) compared to E_{met} (IC_{50} 519.23 mg/L) and F_{ea} (IC_{50} 1311.36 mg/L). All of three samples had cytotoxic potency, water fraction (F_{air}) was the most active sample (LC_{50} 5.209 ppm) compared to E_{met} (LC_{50} 18.383 ppm) and F_{ea} (LC_{50} 56.486 ppm). Overall it can be proposed that the water fraction is the most active fraction compared to the other fractions or extracts.

Keywords: *Aloe vera, fractionation, total phenolics, free radical reduction, BSLT (Brine Shrimp Lethality Test)*

ABSTRAK

- *Aloe vera* telah diketahui mengandung senyawa-senyawa yang berpotensi sebagai antioksidan, seperti senyawa golongan antrakuinon (khususnya emodin dan aloin), flavonoid, tannin, saponin, dan sterol. Dalam penelitian ini dikaji perbandingan kadar fenolat total, aktivitas antioksidan dan sitotoksisitasnya pada ekstrak metanolat dan fraksi-fraksinya.

Research Paper

Effect of Aqueous Extract of Green Tea (*Camellia Sinensis L.*) on Obesity and Liver Status in Experimental Rats

- STEVINA PRANATA

Int. J. Pure Appl. Sci. Technol., 22(1) (2014), pp. 53-63

International Journal of Pure and Applied Sciences and Technology

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Research Paper

Effect of Aqueous Extract of Green Tea (*Camellia Sinensi L.*) on Obesity and Liver Status in Experimental Rats

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Abstract: *Obesity is one of the most common disorders encountered in clinical practice. It has been noted as a major public health problem in many countries including Arab countries. It is a major risk factor for many chronic diseases. Green tea is reported to contain thousands of bioactive ingredients which are almost contributed by polyphenols which play a key role in prevention and treatment of many diseases including obesity. Our investigation aimed to study the effect of oral administration of aqueous extracts of green tea (GTE) on obesity and liver status by using experimental rats. Sixteen adult male albino rats (150-160g) was divided into four experimental groups: The first considered as control negative group (C -ve) and fed on normal diet, while other three groups fed on high fat diet for three weeks to induce obesity. Obese rats were divided into three equal groups (n= 4 rats). Second group (obese rats) considered as (C +ve). Third group (obese rat) and fourth group fed on 10% and 20% of green tea extract respectively. At the end the experimental period (28 days), the body weight gain, food intake, feed efficiency ratio, blood sugar, liver enzymes (ALT, AST, ALP), and lipid profile were evaluated. Our results revealed that the consumption of green tea extract produced a significant reduction in body weight in obese rats and enhances liver functions. Conclusion: Green tea could be used as a weight reductions and enhancing liver status for obese.*

Keywords: Obesity, green tea, rats, liver.

Uji Aktivitas Antimikroba dari Saponin pada *Barleria cristata L.*

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Amutha and Doss, IJPSR, 2012; Vol. 3(10): 4040-4044 ISSN: 0975-8232

IJPSR (2012), Vol. 3, Issue 10 (Research Article)

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IDENTIFICATION AND ANTIMICROBIAL ACTIVITY OF SAPONIN FRACTION FROM THE LEAVES OF *BARLERIA CRISTATA* L.

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Keywords:
Barleria cristata L.,
Saponin,
HPTLC,
Antimicrobial activity

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ABSTRACT

A simple HPTLC method was used to determine the saponin profile of *Barleria cristata* L. crude leaf extract. The antimicrobial activity of saponin fraction from the leaves of *Barleria cristata* L. was studied *in-vitro* against four bacterial species and four fungal species by agar disc diffusion method. *Klebsiella Pneumonia*, *Staphylococcus aureus, E. coli, Aspergillus parasites* were the most inhibited microorganism. The present study suggests that the saponin fraction possess significant antimicrobial activity and can be used to develop a potential antimicrobial agent.

Improvement of Biogas Production from Orange Peel Waste by Leaching of Limonene

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- 20160308003

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BioMed Research International
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Research Article

Improvement of Biogas Production from Orange Peel Waste by Leaching of Limonene

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Academic Editor: Ilona Sárvári Horváth

Limonene is present in orange peel wastes and is known as an antimicrobial agent, which impedes biogas production when digesting the peels. In this work, pretreatment of the peels to remove limonene under mild condition was proposed by leaching of limonene using hexane as solvent. The pretreatments were carried out with homogenized or chopped orange peel at 20–40°C with orange peel waste and hexane ratio (w/v) ranging from 1 : 2 to 1 : 12 for 10 to 300 min. The pretreated peels were then digested in batch reactors for 33 days. The highest biogas production was achieved by treating chopped orange peel waste and hexane ratio of 12 : 1 at 20°C for 10 min corresponding to more than threefold increase of biogas production from 0.061 to 0.217 m^3 methane/kg VS. The solvent recovery was 90% using vacuum filtration and needs further separation using evaporation. The hexane residue in the peel had a negative impact on biogas production as shown by 28.6% reduction of methane and lower methane production of pretreated orange peel waste in semicontinuous digestion system compared to that of untreated peel.



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