BAB V
KESIMPULAN DAN SARAN

A. Kesimpulan

Berdasarkan hasil review di atas dapat simpulkan sebagai berikut :

Pertama, tanaman pepaya memiliki aktivitas sebagai nefroprotektif

Kedua, tanaman pepaya mengandung senyawa kimia yaitu Alkaloid, flavonoid, saponin, tanin, glikosida, steroid, vitamin C dan polifenol.

Ketiga, metode uji nefroprotektif yang dilakukan dalam review artikel tersebut adalah dengan pemberian gentamisin, parasetamol, CCL_4 ,Pb asetat, cisplatin, Aloxan, streptozotocin, KBrO3

B. Saran

Pertama, perlu menggali informasi lebih lanjut tentang aktivitas nefroprotektif pada tanaman pepaya.

Kedua, perlu menggali informasi lebih lanjut kandungan senyawa kimia dari berbagai bagia tanaman pepaya (*Carica papaya,* L) sebagai pengobatan tradisional.

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LAMPIRAN

Lampiran 1. Nephroprotective Evaluation of Ethanol Extract of The Seeds of Papaya and Pumpkin Fruit in Cisplatin Induced Nephrotoxicity

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Nephroprotective Evaluation of Ethanolic Extract of the Seeds of Papaya and Pumpkin Fruit in Cisplatin-induced Nephrotoxicity

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Abstract:
The present study is focused on the Nephroprotective evaluation of ethanolic extract of the papaya seed, PaSE (Biological name- *Carica papaya*, family – Caricaceae) and pumpkin seed, PuSE (Biological name - *Curcubita pepo*, family – Curcurbitaceae). Cisplatin (10mg/kg, i.p.) used for the nephrotoxicity, which is the dose limiting side effect of the Cisplatin (Cis-diamine dichloro platinum-II). The ethanolic extract of PaSE & PuSE exhibited protection against cisplatin-induced nephrotoxicity, which were proved by the gross behavioural studies, histopathological, renal function and biochemical studies. Antioxidant studies like nitric oxide scavenging activity, lipid peroxidation in kidney also supporting the nephroprotective activity of these seeds. This nephroprotective study also compared with chloroform extract of the dried Zinger roots, ZE (*Zingiber officinale Rosc*, Family- Zingiberaceae) and methimazole (MZL) which is already evaluated. Histopathological investigation of the kidney like glomerular congestion, blood vessel congestion, intestinal edema, inflammatory cells, necrosis, tubular casts were also observed for control, test and reference groups.

Keywords: nephrotoxicity, cisplatin, seeds of *Carica papaya*, seeds of *Curcubita pepo*, roots of *Zingiber officinale* Rosc.

Introduction:

Nephrotoxicity is a poisonous effect of some substances, both toxic chemicals and medication (nephrotoxins are chemicals displaying nephrotoxicity) on the kidneys. Nephrotoxicity caused by cisplatin probably due to apoptosis, inflammatory mechanism and generation of reactive oxygen species (Dirk TH et.al.,1985,) [1,2]. Hence a systematic pharmacological evaluation of nephroprotective effect of the ethanolic extract of PaSE & PuSE carried against experimentally induced renal damage. The chloroform extract of the roots of the *Zingiber officinale* Rosc (T.A. Ajith et.al., 2007) [3] and the drug methimazole (A.M. Osman et. al., 2000) [4] is already proved for its nephroprotective activity. This study were purposed the evaluation of

MZL and chloroform extract of *Zingiber officinale* Rosc roots activity.

Our objectives of this study is to find out the natural herbal remedies in such cases where nephroprotectivity can be achieved, which is caused by use of some regularly usable nephrotoxic drugs like ACE inhibitors, angiotensin receptor blockers (arbs), NSAIDS, sulfonamides, amphotericin B, quinolones etc. Studies of renal function & other parameters, lipid peroxidation in kidney, antioxidant profile and histopathological studies in mice treated with ethanolic extract of PaSE & PuSE showed nephroprotective activity significantly (Table 1, 2 & 3).

Materials and Methods:

Drugs and Chemicals: cisplatin and methimazole were obtained as gift sample

Lampiran 2. Dose Dependent Chemopreventive Effect of Methanol Extract of *Carica papaya* Seed on Potassium Bromate Induced Nephrotoxicity in Rats

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Dose-Dependent Chemopreventive Effect of Methanol Extract of *Carica papaya* Seed on Potassium Bromate- Induced Nephrotoxicity in Rats

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Authors' contributions

This work was carried out in collaboration among all authors. Author MAK designed the study, performed the statistical analyses, wrote the protocol and wrote the first draft of the manuscript. Authors AMW and AJA managed the analyses of the study. Authors AIY, NA and ALN managed the literature searches. All the authors read and approved the final manuscript.

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ABSTRACT

Lampiran 3. Evidence of of the nephroprotective effect of *Carica papaya* L. leaves streptozotocin induced diabetic rats

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Evidence of the nephroprotective effect of *Carica papaya* L. leaves in streptozotocin-induced diabetic rats

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Protection against diabetic nephropathy (DN) is one of the main targets in diabetes treatment and present study evaluates the nephroprotective effect of *Carica papaya* L. in streptozotocin (STZ) induced diabetic rats. DN rats were treated with 1.5 and 2.5 gm/dl *C. papaya* leaf extract for 6 weeks to determine its nephroprotective effect with different parameters. Pimagedine (1 ml/mg) served as a reference drug. Compared to diabetic control group, *C. papaya* (1.5 and 2.5 gm/dl) treatment significantly decreased some important parameters including plasma glucose, HbA1-c, urinary AER and albumin/creatinine ratio. Improvement in GFR was also significant by *C. papaya*. However, the decrease in blood urea nitrogen (BUN), plasma creatinine, blood pressure (B.P), total cholesterol and serum albumin levels were significant only in diabetic group treated with 2.5 gm/dl of *C. papaya* leaf extract. Serum triglyceride and urine volume decreased with both low and high doses of *C. papaya*. Histological examination revealed marked improvement in glomerular morphology after *C. papaya* treatment. The study concludes that *C. papaya* leaf extract may exert ameliorative effect on DN.

Keywords: *Carica papaya* L., Diabetic rats, Nephropathy
IPC Int. Cl.[8]: A61K 36/00, A01D 16/02, A01D 13/37, A01D 13/00, A01D 20/00

Since time immemorial, plant-based therapies have been in use by diverse cultures of the world to treat various ailments. The significance of plants in the treatment of diabetes has long been published and until now more than 270 plant species have been identified as having hypoglycemic activity however, the information regarding their usefulness in the prevention of diabetic complications is limited. Among them lies *C. papaya* L. (*Caricaceae*), popularly known as *pawpaw* or papaya or *papita*[1,2]. The edible portion of the plant is its pleasant fruit which is easily digested and is a source of high nutritional value. It is grown in almost all tropical and many subtropical regions of the world and due to the medicinal properties of different parts of the plant, it is used as therapeutic remedy in the form of infusions[3]. There are reports that *C. papaya* leaves are useful in subsiding the signs and symptoms of dysentery, worming and asthma[4,5]. In addition, the leaf extracts of *C. papaya* have long been used for the extract possesses vasodilating and antioxidant effects, indicating its usefulness in the prevention and/or delaying of cardiovascular diseases[4]. In Mexican folk medicine, the plant is used to treat inflammation and diabetes[7,8]. It also relieves diabetes associated oxidative stress[9]. The evidence of hypoglycemic and antioxidant properties of *C. papaya* in diabetes mellitus diverted our attention to evaluate the usefulness of the aqueous extract of *C. papaya* leaves in diabetic nephropathy in streptozotocin-induced diabetic rats. Diabetic nephropathy is characterized by hyperfiltration by glomerulus and albuminuria along with the expansion of the glomerular mesangium which is related to the loss of renal function[10]. It is the major cause of morbidity and mortality and despite treatment with drugs like anti-hypertensives or angiotensin converting enzyme inhibitors (ACEI), nephrotic complications among diabetics are still on the rise in many regions of the world[11,12]. Persistent hyperglycemia and overproduction of reactive oxygen

Lampiran 4. Potensi Jus Buah Papaya (*Carica papaya* L.) Mencegah Nefrotoksisitas pada Tikus Wistar yang Terpapat Pb Asetat

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Potensi Jus Buah Pepaya (*Carica Papaya* L.) Mencegah Nefrotoksisitas pada Tikus Wistar yang Terpapar Pb Asetat

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Abstract

Lead is a heavy metal with hazardous toxicity causing dysfunction, especially the kidneys as excretion organs. Pb pollution in Indonesia is mostly derived from transportation emissions such as Tetraetillead, which can change into trietillead, a free radical that can reduce endogenous enzyme activity, one of which is SOD pollution. (Superoxide dismutase) which is in various organs, especially the kidneys. A decrease in SOD activity in the kidneys indicates oxidative stress because the enzyme is unable against superoxide anions and causes renal glomerular damage. Kidney damage can increase serum creatinine levels. Papaya juice contains flavonoids, vitamins C, E, and beta-carotene can prevent nephrotoxicity of Pb. The study aimed to obtain the best dose of papaya juice on the SOD activity of Wistar rats kidney tissue and serum creatinine level that exposed by lead acetate. The experiment was conducted experimentally with Completely Randomized Design, which was divided into 6 treatments, P1, P2, P3, of papaya juice, Lead ace with dose: 3.6; 7.2; 14.4 g / 200g of weight and exposed to Pb acetate 50 mg/kg weight. Treatment P4 (rats were given vitamin E 400 IU/kg weight and exposure to Pb acetate 50 mg/kg weight), P5 (rat exposed Pb acetate 50 mg/kg weight), P6 (normal mice) for 28 days. The results showed that papaya juice was the best dose of 14.4 g / 200g weight because the SOD activity of renal tissue was increased, and serum creatinine level decreased significantly. The conclusion is papaya juice can be used to prevent Pb acetate nephrotoxicity.

Keywords: *Carica papaya* L., Lead acetate, SOD, Creatinin

Abstrak

Timbal merupakan logam berat dengan tokksisitas sangat berbahaya karena menimbulkan disfungsi terutama ginjal sebagai organ ekskresi. Pencemaran Pb di Indonesia sebagian besar berasal dari emisi transportasi antara lain *Tetraetillead yang dapat berubah bentuk* menjadi *trietillead, suatu radikal bebas* yang dapat menurunkan aktivitas enzim endogen salah satunya adalah SOD (*Superoxidedismutase)* yang ada di berbagai organ terutama ginjal. Penurunan aktivitas SOD dalam ginjal menandakan stres oksidatif, karena enzim tersebut tidak mampu melawan anion superoksida dan mengakibatkan kerusakan glomerulus ginjal. Kerusakan ginjal dapat meningkattan kadar kreatinin serum. Jus pepaya mengandung flavonoid, vitamin C, E dan betakaroten dapat mencegah nefrotoksisitas Pb. Tujuan penelitian adalah menentukan dosis terbaik jus pepaya terhadap aktivitas SOD jaringan ginjal dan kadar kreatinin serum tikus wistar yang dipapar Pb asetat. Penelitian dilakukan secara eksperimental dengan RAL (Rancangan Acak Lengkap) yang dibagi dalam 6 perlakuan, yaitu P1, P2, P3 merupakan pemberian jus pepaya dengan dosis: 3,6; 7,2; 14,4 g/200g BB dan dipapar Pb asetat 50 mg/kg BB. Perlakuan P4 (tikus yang diberi vitamin E 400 IU / kg BB dan dipapar Pb asetat 50 mg/kg BB), P5 (tikus yang dipapar Pb asetat 50 mg/kg BB), P6 (tikus normal). Perlakuan dilakukan selama 28 hari. Hasil penelitian bahwa jus pepaya dosis 14,4 g/200g BB terbaik karena aktivitas SOD jaringan ginjal meningkat dan kadar kreatinin serum menurun secara signifikan. Kesimpulan jus

Lampiran 5. The protective effects of aqueous extract of *Carica papaya* seeds in paracetamol indiced nephrotoxicity in male wistar rats

The protective effects of aqueous extract of Carica papaya seeds in paracetamol induced nephrotoxicity in male wistar rats

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Abstract

Background: Oxidative stress plays a crucial role in the development of drug induced nephrotoxicity. The study aimed to determine the nephroprotective and ameliorative effects of Carica papaya seed extract in paracetamol-induced nephrotoxicity in rats.

Objectives: To carry out phytochemical screening of Carica papaya, measure serum urea, creatinine and uric acid and describe the histopathological status of the kidneys in the treated and untreated groups.

Methods: Phytochemical screening of the extract was done. Thirty two adult male Wistar rats were divided into four groups (n= 8 in each group). Group A (control) animals received normal saline for seven days, group B (paracetamol group) received normal saline, and paracetamol single dose on the 8th day. Group C received Carica papaya extract (CPE) 500 mg/kg, and paracetamol on the 8th day, while group D, rats were pretreated with CPE 750 mg/kg/day,and paracetamol administration on the 8th day. Samples of kidney tissue were removed for histopathological examination.

Results: Screening of Carica papaya showed presence of nephroprotective pytochemicals. Paracetamol administration resulted in significant elevation of renal function markers. CPE ameliorated the effect of paracetamol by reducing the markers as well as reversing the paracetamol-induced changes in kidney architecture.

Conclusion: Carica papaya contains nephroprotective phytochemicals and may be useful in preventing kidney damage induced by paracetamol.

Keywords: paracetamol,papaya, kidney.

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Introduction

Paracetamol (acetaminophen) is one of the most popular and widely used drugs for the treatment of pain and fever. It occupies a unique position among analgesic drugs. Unlike NSAIDs it is almost unanimously considered to have no anti-inflammatory activity and does not produce gastrointestinal damage[1]. Paracetamol is contained in many preparations, available as both over-the-counter and as prescription-only medications. Because of its wide availability paired with comparably high toxicity, (compared to ibuprofen and aspirin) there is a much higher potential for overdose[2]. Paracetamol is especially dangerous on the liver if taken over long periods[3]. If toxic levels of paracetamol occur in the liver, the natural antioxidant defenses of the body are overwhelmed, and the liver is damaged by the buildup of dangerous free radicals. Although nephrotoxicity is less common than hepatotoxicity in paracetamol overdose, renal tubular damage and acute renal failure can occur even in the absence of liver injury[4], and can even lead to death in humans and experimental animals[5]. Even at normal NSAID dosages, people with compromised kidney function can develop NSAID toxicity[6].

Studies are going on throughout the world for the search of protective molecules that would provide maximum protection to the liver, kidney as well as other organs and practically very little or no side effects would be

Lampiran 6. Nephroprotective activies of the aqueous seed extract of *Carica papaya* Linn. In Carbon Tetrachloride Induced Renal Injured Wistar Rats: A Dose and Time Dependent Study

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Biology and Medicine, Vol. 1 (1): 11-19, 2009.

Nephroprotective activities of the aqueous seed extract of *Carica papaya* Linn. in carbon tetrachloride induced renal injured Wistar rats: a dose- and time-dependent study

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Abstract

In the present study, the dose related effect of the aqueous seed extract of *Carica papaya* Linn. extract (CP*E*) was evaluated by pre-treating three groups of rats (made up of six male rats per group) with 100 – 400 mg/kg body weight per oral of the extract for 7 days before challenging with 1.5 ml/kg body weight of 20% carbon tetrachloride in olive oil in addition to the untreated control and model control rats. Also, the time-course effect of 400 mg/kg per oral of the extract were determined at 3 hr pre-, 0 hr, 1 hr post-, 3 hr post-, and 6 hr post-CCl_4 induction, respectively, in addition to the untreated control and model control groups. After 72 hours, serum levels of uric acid, urea and creatinine of all study groups were measured using standard procedures. Histological studies of rat kidneys of all study groups were also done. Results showed that intraperitoneal injection of CCl_4 caused a significant ($p<0.001$) elevation in the serum levels of uric acid, urea and creatinine and induced histological features of severe tubulo-interstitial necrosis. However, elevations in the measured biochemical parameters were significantly ($p<0.05$, $p<0.01$ and $p<0.001$) attenuated in rats pre-treated with the graded oral doses of the extract, in dose related fashion. Maximum nephroprotection was offered by the extract at 400 mg/kg/day CP*E* which lasted up to 3 hours post-CCl_4 exposure and these biochemical evidences were corroborated by improvements in the renal histological lesions induced by CCl_4 intoxication. In conclusion, our study showed that CP*E* has nephroprotective effect on CCl_4 renal injured rats, an effect which could be mediated by any of the phytocomponents present in it via either antioxidant and/or free radical scavenging mechanism(s).

Keywords: *Carica papaya* Linn.; Aqueous seed extract; Nephroprotection; Carbon tetrachloride; Wistar rats.

Lampiran 7. Nephroprotective Effect of Aqueous Extract of *Carica papaya* Seed

ORIGINAL ARTICLE

Nephroprotective Effect of Aqueous Extract of Carica Papaya Seeds

Sameer Ahmed[1], Akbar Waheed[2], Attiya Munir[3]

ABSTRACT

Objective: To determine the nephroprotective effect of aqueous extract of *Carica papaya* seeds in Aminoglycoside induced acute nephrotoxicity in rats.

Study Design: Quasi Experimental study.

Place and Duration of Study: The study was conducted from April 2016 to March 2017 at "Department of Pharmacology and Therapeutics" and "Multidisciplinary Laboratory of Islamic International Medical College, Riphah International University", Islamabad in collaboration with National Institute of Health (NIH), Islamabad.

Materials and Methods: Thirty Sprague Dawley rats were divided into 3 groups i.e., A, B and C with 10 rats in each group. Group B and C were given Aminoglycoside; Gentamycin in 80 mg/kg) via intraperitoneal route once daily for 5 consecutive days to induce acute nephrotoxicity. At day 6th, nephrotoxicity was confirmed by measuring serum urea and creatinine. Aqueous extract of *Carica papaya* seeds (1000 mg/kg) was started once daily through oral route in group C for 5 consecutive days. All animals were given standard diet pellets manufactured at NIH.

Results: Mean serum urea and creatinine for Group A (Control Group) at day 0 was 24.70 mg/dL 5.16 and 0.750 mg/dL 0.1958 respectively. Mean serum urea and creatinine for Group B (Disease Control Group) was 78.60 mg/dL 3.921 and 1.920 0.1229 at day 6th. This suggested induction of nephrotoxicity by gentamycin. Mean serum urea and creatinine for Group C (Aqueous Extract Treated Group) at 11th day was 50.60 mg/dL 5.910 and 1.380 mg/dL 0.1932 after 5 days treatment with aqueous extract of *Carica papaya* seeds.

Conclusion: Aqueous extract of *Carica papaya* seeds has significant nephroprotective effects on aminoglycoside induced acute nephrotoxicity in rats.

Key Words: *Aminoglycoside, Carica papaya, Gentamycin, Nephrotoxicity.*

Lampiran 8. Dose dependent attenuatingEffect of Aqueous Extract of *Carica papaya* Seed on Carbon Tetrachlorid-Induced Renal Toxity in Rats

Advances in Life Sciences 2012, 2(4): 124-127
DOI: 10.5923/j.als.20120204.08

Dose-dependent Attenuating Effects of Aqueous Extract of *Carica papaya* Seed on CarbonTetrachloride-Induced Renal Toxicity in Rats

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Abstract A reasonable population of the world today uses herbal drugs.Carica papaya is one of those fruits that is documented to have the potentials of being used for medicinal purposes.In the present study, theeffects of aqueous extract of Carica papaya seeds on a CCl4-induced renal toxicity was studied. A total of thirty (30) Wistar rats were randomly divided into five groups (n=6). Group 1 (control)was administered with rat chow and water. Group 2,3,4 and 5 received CCl4intraperitoneally (IP) at a dose of 0.8mg/kg and group 3, 4 and 5 received in addition 100mg/kg, 200mg/kg and 300mg/kg extract of Carica papayafor 28 days orally respectively. Samples were collected and assayed for the renal function markers (urea, creatinine and electrolyte). Results obtained showed a dose-dependent statistically-significant decrease in therenal function markers except potassium, which suggests that the extract has a nephro-protective effect. These findings need be further investigated for application in the health care delivery.

Keywords Carbontetrachloride, Nephro-Toxicity, *Carica Papaya*, Renal Function Markers, Free Radical Scavengers

Lampiran 9. Protective Effect of *Carica papaya* L Seed Extract in Gentamicin Induced Hepatotoxity and Nephrotoxity in Rats

Int J Pharm Bio Sci 2012 July; 3(3): (P) 508 - 515

Research Article **Pharmacology**

International Journal of Pharma and Bio Sciences **ISSN 0975-6299**

PROTECTIVE EFFECT OF *CARICA PAPAYA* L. SEED EXTRACT IN GENTAMICIN INDUCED HEPATOTOXICITY AND NEPHROTOXICITY IN RATS

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ABSTRACT

A study was conducted to evaluate the protective effect of aqueous seed extract of *Carica papaya* L. on gentamicin induced hepatotoxicity and nephrotoxicity in Wistar rats. A control group (Group I, n=12) was compared with rats administrated with 40 mg/kg gentamicin, once daily for 14 days (Groups II, III and IV, n=12 each). The effect of aqueous extract of *Carica papaya* L. at a dose level of 200 mg/kg (Group III) and taurine @ 1000 mg/kg body weight (Group IV) was compared with gentamicin treated group (Group II). The activities of serum alanine aminotransferase (ALT), aspartate aminotransferase (AST), blood urea nitrogen (BUN), serum creatinine and uric acid values were significantly increased in rats exposed to gentamicin (Group II). Moreover, administration of gentamicin resulted in damage to liver and kidney structures. Administration of aqueous extract of *Carica papaya* L. before gentamicin exposure prevented severe alterations of biochemical parameters and disruptions of liver and kidney structures. In conclusion, this study obviously demonstrated that pretreatment with aqueous extract of *Carica papaya* L. significantly attenuated the physiological and histopathological alterations induced by gentamicin. Also, the present study identifies new areas of research for development of better therapeutic agents for liver, kidney, and other organs dysfunctions and diseases.

KEYWORDS: *Carica papaya* **L, Gentamicin, Hepatotoxicity, Nephrotoxicity, Wistar rats.**

Lampiran 10. Protective Effect of Ethanol Leaf Extract of *Carica papaya* Linn (Caricaceae) in Alloxan-induced Diabetic Rats

Tropical Journal of Pharmaceutical Research November 2014; 13 (11): 1877-1882
ISSN: 1596-5996 (print); 1596-9827 (electronic)

Available online at http://www.tjpr.org
http://dx.doi.org/10.4314/tjpr.v13i11.15

Original Research Article

Protective Effect of Ethanol Leaf Extract of *Carica papaya* Linn (Caricaceae) in Alloxan-induced Diabetic Rats

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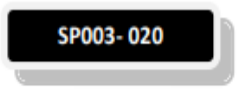
Received: 25 April 2014 *Revised accepted: 2 October 2014*

Abstract

Purpose: *To investigate the ameliorative effect of ethanolic extract of Carica papaya leaves in alloxan - induced diabetic rats.*
Methods: *Rats were randomly divided into five groups of eight animals each. Group A (control) comprised normal healthy animals which were orally administered 1.0 ml of distilled water daily for 21 days while groups B – E consisted of alloxan-induced diabetic rats. Group B comprised diabetic untreated rats, and groups C and D received 1.0 ml of 250 mg/kg and 500 mg/kg body weight of the extract, respectively. Group E received 300 mg/kg of metformin.*
Results: *Administration of the extract to the diabetic rats significantly reduced ($p < 0.05$) glucose level (123.50 mg/dl), total cholesterol (TC), triglyceride (1.24 mg/dl) and low density lipoprotein cholesterol (LDL-C), while significantly increasing ($p < 0.05$) high density lipoprotein cholesterol (HDL-C) and total protein level (66.51 g/dl) compared to the diabetic untreated rats. The extract also significantly decreased ($p < 0.05$) the concentration of serum urea (12.35 mg/dl), creatinine, alanine aminotransferase (ALT) and aspartate aminotransferase (AST) of the diabetic rats.*
Conclusion: *The ethanol leaf extract of Carica papaya ameliorates metabolic disorder caused by diabetes in rats.*

Keywords: *Diabetes, Carica papaya, Glucose, Lipid profile, Alloxan monohydrate*

Lampiran 11. Analisis Daun Pepaya (*Carica papay* L.) di Balai Penelitian Tanaman Aneka Kacang dan Umbi, Kendalpayak, Malang



Analisis Fitokimia Daun Pepaya (*Carica papaya* L.) Di Balai Penelitian Tanaman Aneka Kacang dan Umbi, Kendalpayak, Malang

The Phytochemical Analysis of Papaya Leaf (*Carica papaya* L.) at The Research Center of Various Bean and Tuber Crops Kendalpayak, Malang

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Abstract: Papaya (*Carica papaya* L.) is one of the most cultivated plants in Indonesia. It is the most significant chemical compoundas a medicine or as a model compound to get new active compound. Papaya leaf contains alkaloid, carpaine, caricaksantin, violaksantin, papain, saponin, flavonoid, and tannin compound. The purpose of this study is to know the phytochemical compound which is contained in papaya leaf at The Research Center of Various Bean and Tuber Crops Kendalpayak, Malang. This study is conducted by doing several methods of phytochemical analysis by which includes alkaloid analysis, triterpenoid, steroid, flavonoid, saponin and tannin. Alkaloid analysis is conducted by employing the method of Douglas et al., which has already modified by T.E.H Aplin et al. and H.J Cai e al. While triterpenoid and steroid analysis use the method of L.H. Briggs. Another, flavonoid analysis uses the method of H.J. Cai. The analysis of saponin uses the method of J.J.H Simes et al., whereas the tannin analysis is conducted by employing the method of Miranda S.R. The phytochemical screening results found are the data of phytochemical content from papaya leaf which is performed in the form of table. The results of phytochemical screening show that papaya leaf contains alkaloid, triterpenoid, steroid, flavonoid, saponin and tannin compound.

Lampiran 12. Skrining Fiokimia Ekstrak dan Fraksi ETanol 70% Daging Buah Pepaya (*Carica papaya* L.)

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SKRINING FITOKIMIA EKSTRAK DAN FRAKSI ETANOL 70% DAGING BUAH PEPAYA (*Carica papaya* L.)

PHYTOCHEMICAL EXTRACTS AND FRACTION 70% ETHANOLIC OF PAPAYA FRUIT FLESH

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ABSTRAK

Pepaya merupakan salah satu tanaman yang banyak dibudidaya oleh petani Indonesia dan menjadi sumber asupan buah-buahan. Buah pepaya dalam bentuk ekstrak dan fraksi sering dimanfaatkan khususnya dalam bidang kosmetika. Kandungan kimia yang terkandung dalam buah pepaya bertanggungjawab dalam memberikan aktivitas kosmetologi. Penelitian ini bertujuan untuk mengetahui kandungan senyawa yang terdapat dalam ekstrak dan fraksi etanol 70% daging buah pepaya. Metode yang digunakan pada penelitian ini adalah metode eksperimental. Penelitian dilakukan dengan membuat ekstrak dan fraksi kemudian hasilnya diuji secara kualitatif kandungan senyawa kimianya. Berdasarkan penelitian ekstrak etanol 70% daging buah pepaya mengandung vitamin C, polifenol, flavonoid dan steroid sedangkan fraksi etanol daging buah pepaya mengandung vitamin C, polifenol dan flavonoid. Hasil tersebut dapat dijadikan dasar untuk penelitian selanjutnya membuat sediaan tabir surya.

Kata kunci: ekstrak, fraksi, pepaya, skrining fitokimia

Lampiran 13. UJi Aktivitas Antibakteri Ekstrak Biji Papaya (*Carica papaya* L.) terhadap Pertumbuhan *E.coli*

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Journal of Current Pharmaceutical Sciences

UJI AKTIVITAS ANTIBAKTERI EKSTRAK BIJI PEPAYA (*Carica papaya* L.) TERHADAP PERTUMBUHAN Escherichia coli

(Test Activity of Antibacterial Pepaya Seeds (*Carica papaya* L.) on Growth of Escherichia coli)

(Submited : 13 Maret 2019, Accepted : 31 Maret 2019)

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ABSTRAK

Tanaman pepaya merupakan tumbuhan perdu yang berbatang tegak dan basah. Hampir semua bagian tanaman pepaya dapat dimanfaatkan sebagai pengobatan tradisional salah satunya adalah biji pepaya. Secara tradisional biji pepaya dimanfaatkan sebagai obat cacing gelang, gangguan pencernaan, diare dan penyakit kulit. Kandungan yang terdapat pada biji pepaya merupakan senyawa metabolit sekunder yang memiliki aktivitas antibakteri. Penelitian ini bertujuan untuk mengetahui aktivitas antibakteri ekstrak biji pepaya terhadap pertumbuhan Escherichia coli dan mengetahui diameter zona hambat dari berbagai konsentrasi ekstrak. Jenis penelitian ini adalah non eksperimental dengan metode sumuran. Pengambilan sampel menggunakan metode purposive sampling. Konsentrasi ekstrak yang digunakan adalah 1,25%, 2,5%, 5%, dan 10%. Kontrol positif yang digunakan adalah Amoxicillin 25 µg/10 ml akuadest dan kontrol negatif etanol 96%. Penentuan zona hambat dengan melihat adanya zona bening disekitar sumuran, kemudian zona bening tersebut diukur diameternya menggunakan jangka sorong. Hasil penelitian menunjukkan bahwa ekstrak biji pepaya memiliki aktivitas antibakteri terhadap pertumbuhan Escherichia coli. Ekstrak biji pepaya dengan konsentrasi 1,25%, 2,5%, 5%, dan 10% dapat menghambat pertumbuhan bakteri dan diperoleh rata-rata hambatan secara berturut-turut sebesar 3,6 mm, 4,44 mm, 5,56 mm, dan 6,65 mm.