ADVANCES IN SCIENTIFIC RESEARCH OF PERSEA AMERICAN MILL (AVOCADO): A META ANALYSIS

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Abstract

This research objective was to obtain a general opinion about the recent trends advances in Persea americana Mill. Scientific researches. In addition, it's aimed to investigate the trends in recent advances of Persea americana Mill. researches conducted and published in recognized and prestigious journals. Instead of carrying out a traditional literature review, we conducted a meta-analysis. This allowed us to compare estimates from different studies standardized for the country analyzed, the method applied, control variables used, or sample selected. We focused on two factors: the recent trends on scientific research of Persea americana mill. First, data evealed that there were many biological effects exhibited using avocado extract, among the many, the most conducted study is on the effectiveness of avocado extract as hypoglycemic/diabetes and an on anti-inflammatory/osteoarthritis.. Second, data indicates a significant positive result as hypoglycemic and anti-inflammatory.

Keywords: persea american mill, meta-analysis, research trends, estimates

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Introduction

Science and technology are crucial for development. Properly harnessed, they can boost growth and reduce poverty. But they are not sufficient in themselves. Science and technology must be combined with several other factors that, grouped together, determine the innovation process and can thus be described as an 'innovation system'. Many developing countries recognize the importance of investing in science to build their economies, but face a number of challenges to do this.
A sound infrastructure of research institutions and laboratories is crucial to building a strong science base.

Harnessing science, technology and innovation for development is a challenge. This topic gateway brings together news and features articles about Persea americana Mill. of the Lauraceae family is commonly known as the avocado tree. This edible fruit is also called the alligator pear, el aguacate in Spanish, and e li in Chinese ("Persea americana (Mill),"). The English name avocado is derived from the Spanish aguacate, which in turn comes from the Nahuatl, or Aztec, name ahuacatl (Popenoe, Zentmyer, & Schieber, 1997). The plant originates from the tropical and subtropical climate regions of Central and South America, where indigenous people first cultivated it. For thousands of years, the fruit, leaves, and seeds of the avocado tree have been used as a food source and for medicinal purposes. The uses of P. americana range from emollients for the skin to treatments for hypertension. The main chemical constituents that lend to the activity of avocado are aliphatic acetogenins, flavonoids, terpenoid glycosides, and furan-ring derivatives (Yasir, Das, & Kharya, 2010). Today, the flesh of the fruit is cultivated and consumed worldwide and is generally recognized as safe as a food source (Morton, 1987).

Meta-analysis can be described as analysis of analyses in the literature studies. Meta analysis is a method analysis of analyses that combines the results of multiple studies which are made in a specific case and independent from each other. In so doing the statistical analysis findings obtained from studies are compared and combined. Meta-analysis summarizes the results of various studies in the fields of science and provides to reach common judgments by combining the conclusions (Çağatay 1994; Abramson 1994; Akgöz et al, 2004).

Therefore, meta-analysis is the method of combining the results of different studies. Meta-analysis makes analysis of analyses of different studies which give statistical results in a similar way and in the same area in education. In other words, meta-analysis combines the results of studies that provide quantitative results and makes analysis statistical result that are reached in these studies.

Problem of the Study

Is there a statistical meaningful difference between advances in Persea Americana Mill. scientific researches? And analyze trends on advances in Persea americana Mill. scientific researches in the frequency of publication. This question

composes the problem sentence of the research.

Purpose

The purpose of this study is to obtain a general opinion about the recent trends advances in Persea americana Mill. scientific researches with meta-analysis method. In addition, it's aimed to investigate the trends in recent advances of Persea americana Mill. researches conducted and published in recognized and prestigious journals.

Importance of Study

This study is important to determine recent trends in Persea americana Mill. researches conducted. Also, doing meta-analysis of related researches and to be example of literature studies as being an analysis of analyses is important.

Limit of Study

In general, this study is limited to its own characteristics of meta-analysis method which is a method of scientific research. The studies which are carried out the trends and advances in Persea americana Mill. Scientific research conducted constitutes the boundaries of this research.

LITERATURE REVIEW

Persea Americana Mill. Botanical Description

The genus Persea contains 8 species, which are all trees or shrubs ("Persea americana Mill, avocado,"). A polymorphic tree native to Central America, Persea americana has a variety of subspecies, which include the commercial varieties of avocado. The varieties of P. americana are americana, drymifolia, floccosa, guatemalensis, nubigena, steyermarkii, tolimanensis, and zentmyerii. Three of these varieties (the West Indian, Mexican, and Guatemalan avocado) have been domesticated and are used commercially for their fruits, which all slightly differ in size, shape, and color. The necessary climate and soil type for each subspecies varies. For example, the Mexican variety is the hardiest and can survive in the coldest weather (25°F). The Guatemalan variety originated in the subtropical highlands of Central America and while not as hardy as the Mexican variety, it is tougher than the West Indian race, which only grows in tropical or near tropical climates like southern Florida and Puerto Rico.

Although the avocado tree needs a particularly humid and non-windy climate, it can grow in an assortment of different soil types. Some soil types include red clay, volcanic soil, sand, limestone, and slightly alkaline soils. The pH level preferred by P. americana is between 6 and 7, however avocados in southern Florida can grow on land with pH levels between 7.2 and 8.3. Good drainage is also essential for tree growth. The trees can grow up to 30 meters tall with leaves up to 20 centimeters long

and 24 centimeters wide. The trees are almost evergreens, only losing their leaves briefly during dry seasons. The leaves are glossy and dark green on top with a paler bottom surface. They vary from oval to oblong and rounded to obtuse in shape. The flowers of P. americana are small in comparison; only reaching from a few millimeters to a couple of centimeters long. They are small, yellow or pale green in color, and do not have petals.

Traditional Uses

Food Uses

Avocados have been used as a food source in the Americas, particularly in Central America, for approximately 10,000 years. The three types of edible avocados consumed by the indigenous people are Persea americana var. drymifolia, P. americana var. americana, and P. americana var. guatemalensis (Williams, 1977). These three subspecies were selected and cultivated by indigenous populations of Mexico, the Pacific coast of Central America, and Guatemala respectively (Whiley et al., 2002). In addition, avocados were intentionally taken from their centers of origin to other places throughout Central and South America for cultivation purposes even before Europeans landed in the Americas. Evidence for the cultivation of avocado trees was discovered in excavations in Peru which revealed avocado remains dating back to 4000BC (Whiley et al., 2002). The Aztec people in Central America used avocado, or ahuacatl, in the dish ahuacamulli, now known as guacamole. The term "mulli" means sauce or soft dish in the Nhuatl language. So the Aztec compound word for guacamole is a description of the dish, which is made by mashing up the avocado fruit into a soft paste and adding other ingredients. Ahuacachiaualloti, meaning avocado oil, was also used by Aztec people thousands of years ago (Popenoe et al., 1997). Indigenous American peoples also eat avocados whole with salt and tortillas. Today, avocados are served with salads, in sandwiches, and are added to hot dishes just before serving. The avocado becomes very bitter when cooked due to a significant amount of tannins in the flesh, so the fruit is normally served cold. In Brazil, New Zealand, Hawaii, and Java the avocado is treated more like a fruit than a vegetable in the Americas. The fruits are used in milkshakes, ice creams, and fruit salads sweetend with sugar (Morton, 1987).

Ethnomedicinal Uses

P. americana has been, and continues to be, used for a variety of ailments as a traditional medicine. The leaves of P. americana are used in traditional medicine to treat hypertension in Trinidad and Tobago (Lans, 2006). In Togo, a decoction of P. americana leaves and Theobroma cacao leaves are taken orally as an antihypertensive agent. In addition, a combination of Lippia multiflora leaves, Stachytarpheta angustifolia leaves, Allium sativum bulbs and P. americana fruit are made into a powder and taken orally for the treatment of hypertension (Karou et al., 2011). In the Philippines, the seeds or a decoction of P. americana are used to relieve toothaches by applying them to tooth decay (Lewis & Elvin-Lewis, 2003). In the Dominican Republic, the seeds are fried and mashed along with several other plants to treat lice (Lewis &

Elvin-Lewis, 2003). Avocado are also used to treat snakebites through neutralizing the hemorrhagic effect of snake venom (Lewis & Elvin-Lewis, 2003).

Other Uses

Different parts of P. americana are utilized for nonfood and non-medicinal purposes. For example, the bark of P. americana is used to set the color of dyes in Guatemala. Wood from avocado trees is used in construction. During the time of the Spanish conquistadores, documents were written with the red-brown ink expelled from avocado seeds (Morton, 1987). In cosmetics, avocado oil is used an emollient and sunscreen (Swisher, 1988).

Chemistry and Pharmacology

The main chemical components that have been identified in Persea americana include alkanols (or aliphatic acetogenins), flavonoids, terpenoid glycosides, furan-ring derivatives and a coumarin. These chemical groups all contain different functionality, which enable diverse biological activity (Yasir et al., 2010). There are over six hundred biological activities known for the compounds identified in P. americana (Duke, 2012). Most of the known compounds in avocados have multiple activities ranging from antibacterial and antiviral to hypotensive and antidiabetic effects (Duke, 2012). Persin, is an alkanol constituent of avocado leaves that has been studied rather extensively. Persin was first studied due to its observed toxic effects on animals, especially among lactating mammals (Oelrichs et al., 1995). Later research found that persin has in vitro activity against breast cancer, as later described (Butt et al., 2006). Other major components of P. americana fruit are lipids. With up to 864,000 ppm in the fruit, fat makes up a significant portion of avocado chemistry (Duke, 2012). The main form of glycolipids and phospholipids in P. americana are oleic and linolenic acids. There is a different composition of the lipids in the fruit and in the seed; the most significant difference being a higher oleic acid content in the fruit compared to the seed (Pacetti, Boselli, Lucci, & Frega, 2007). While many of the chemicals in P. americana are well understood and defined in terms of their biological activity, there are even more compounds with unknown activity and more studies are needed to elucidate a fuller picture of the avocado's chemical and biological effects within the human body.

Biological Activity

There is extensive biological activity among the constituents of Persea americana. Several studies have examined the effects of various extracts of different parts of P. americana, both in vivo and in vitro. These studies can be classified into several categories based on the type of activity found, including analgesic, anti-inflammatory, anticonvulsant, anticancer, antioxidant, and hypotensive activity, among others.

Analgesic and anti-inflammatory

Adeyemi et. al found in an in vivo study with mice, that an aqueous extraction of dried avocado leaves, which were processed through boiling, filtration, and drying, had significant analgesic and anti-inflammatory effects. For example, a 1600mg/kg dose of the extract inhibited acetic acid-induced pain (evaluated based on the writhes of the mice) equivalent to a 100mg/kg dose of acetylsalicylic acid. An 800mg/kg dose inhibited pain response to heat equivalent to a 2mg/kg does of morphine. Swelling and inflammation induced by carrageenan, a compound extracted from seaweed, was also inhibited by a previously administered dose of the extract (Adeyemi, Okpo, & Ogunti, 2002). In another study, polyhydroxylated fatty alcohols from avocados were found to suppress inflammatory response (Rosenblat et al., 2011).

Anticonvulsant

P. americana aqueous leaf extracts were tested on mice for the extract's ability to delay and reduce seizures induced by pentylenetetrazole, picrotoxin and bicuculline. In each type of induced seizure, the aqueous leaf extracts yielded positive results indicating that the extract has some effect on GAGAergic action and/or neurotransmission involved with seizures (Ojewole & Amabeoku, 2006).

Anticancer

Extracts of avocado have been found to inhibit cancer growth and have some chemo-protective effects. In one study, a chloroform soluble extract of the avocado fruit flesh was found to have activity inhibiting oral cancer cell growth. The mechanism of action of two aliphatic acetogenin compounds isolated from this extract was found to involve the blocking of phosphorylation of protein kinases and growth factor receptors in the EGFR/RAS/RAF/MED/ERK1/2 cancer pathway. The two compounds work together to produce this anticancer effect (D'Ambrosio, Han, Pan, Kinghorn, & Ding, 2011). Another study investigated the cartenoid content of avocado fruit and found that an acetone extract of the fruit inhibited prostate cancer cell growth in vitro. The main carotenoid in the extract was lutein, at 70%, but alone it did not have the anticancer effects that the extract possessed. A mechanism of action involving the monounsaturated fat content of avocado and the relationship with absorption of the phytochemicals into the bloodstream was proposed but has yet to be verified (Lu et al., 2005).

Another chemo-protective effect was discovered with avocado fruit extracted using methanol. This effect works with regard to the anticancer drug cyclophosphamide, which may have genotoxic effects on healthy cells (Paul, Kulkarni, & Ganesh, 2011). A study on the effects of persin found that both in vivo and in vitro the compound is cytotoxic for mammary epithelium for mice and human breast cancer cells, respectively. Applications of persin to human breast cancer cells in vitro result in a halt of the cell cycle, preventing further division, and apoptosis due to interference with microtubules (Butt et al., 2006).

Antioxidant

P. americana contains many chemical compounds that have antioxidant capabilities. Wang et al. investigated the antioxidant capacity of avocado along with its phenolic content and proyanidins. The seeds had the highest antioxidant capacity and proyanidins and phenolic content while the fruit flesh had the lowest antioxidant capacity (Wang, Bostic, & Gu, 2010). Another study found that the catechins, proyanidins and hydroxycinnamic acids in the peels and seeds were present in larger amounts and were more antioxidant in vitro compared to those constituents in the pulp (Rodrı guez-Carpena, Morcuende, Andrade, Kylli, & Estévez, 2011). An in vivo study on rats found that a methanol extract of avocado probably has an antioxidant effect on intracellular defense mechanisms used to cope with increased oxidant stress. This mechanism supports the finding that the extract could protect against oxidative stress and paracetamol toxicity by increasing the activity of the particular defense enzymes during hepatic damage (Yasir et al., 2010).

Antiulcer

An in vivo study of albino rats, it was found that the rats treated with an aqueous leaf extract of P. americana experienced a significant and does- dependant antiulcer effect when ulcers were induced (Yasir et al., 2010).

Antiviral

An infusion and an ethanol extraction of P. americana were compared regarding their inhibitory effects on viral replication. The infusion had activity against the three viruses AD3, HSV-1, and ADV whereas the ethanol extract was only active against HSV-1 and ADV (Yasir et al., 2010).

Hypoglycemic

In one study, areduction in blood glucose level was found to occur when aqueous leaf extract of avocado was administered to normal rats (Yasir et al., 2010).
Hypotensive

Dose-dependent hypotensive activity was discovered for intravenous doses of P. americana aqueous and methanol leaf extracts in normotensive rats. Doses used ranged from 6.25mg/kg to 50mg/kg with those above 12.5mg/kg having hypotensive activity when compared to the control group (Adeboye, Fajonyomi, Makinde, & Taiwo, 1999).

Vasorelaxant

There are several different mechanisms of action proposed for the vasorelaxant effects of aqueous P. americana extracts. In an in vivo study examining the aortas of rats, it was found that the vasorelaxation response occurs due to the administration of the extract and is concentration related (Yasir et al., 2010).

Clinical Studies

Although there has been extensive research into the biological activity of Persea americana, few clinical studies have been done examining the avocado's effects in humans. There have been four clinical studies investigating the use of the non-soap-forming, or unsaponifiable, extract of P. americana combined with the unsaponifiable extract from soybeans, known as avocado/soybean unsaponifiables (ASUs), to treat osteoarthritis. These studies focused on osteoarthritis of the hip and/or knee. In two of the studies, 300mg of the extracts taken each day for three months resulted in lower use of non-steroidal anti-inflammatory drugs for pain and inflammation. There was no significant difference found between 300 and 600mg/day doses. In a 6-month study, a two month delayed onset of effects was observed and effects continued for two months past the end of treatment. No long-term effects on the prevention of joint narrowing were observed. The fourth study investigated effects of ASUs on hip osteoarthritis with two years of treatment. With a 300mg/day treatment, no statistically significant difference was found between the ASUs and placebo concerning levels of pain and NSAID usage after one year. Despite these negative results, ASUs may have symptom-relieving effects for the most severe hip osteoarthritis. All of these findings require further study for confirmation, whether positive or negative, concerning ASUs ability to modify osteoarthritis symptoms (Ameye & Chee, 2006).

Research investigating the antidiabetic and cholesterol-lowering capabilities of P. americana has found positive results in clinical trials. For example, a study by Lerman-Garber et al found that a diet high in monounsaturated fatty acids from avocados and olive oil for patients with non-insulin-dependent diabetes patients resulted in minor decrease in cholesterol and a 20% decrease in plasma triglycerides (Lerman-Garber, Ichazo-Cerro, Zamora-González, Cardoso-Saldaña, & Posadas-Romero, 1994). Another study comparing an avocado enriched diet high in monounsaturated fatty acids and a high carbohydrate diet also found that the avocado enriched diet was more effective in lowering total cholesterol levels and low-density-lipoprotein (Colquhoun, Moores, Somerset, & Humphries, 1992). These clinical trial results coincide with the hypocholesterolemic activity of some of the chemical constituents in P. americana (Duke, 2012).

Meta-Analysis

A meta-analysis of scholarship is a systematic selection of research items that meet certain criteria to identify frequencies and trends, highlight themes, trace methods and theories, or to identify gaps in coverage or analysis. Meta-analyses in mass communications have focused on specific issues in research like media effects or content analysis. Others focused on the scholarship trends of a particular journal such as Journalism and Mass Communications Quarterly. While others have studied scholarship across publications in a certain discipline. Rarely have meta-analyses been used to study scholarship across disciplines. But in order to study the research intersecting Internet and gender, a multi-disciplinary approach is necessary to find the key points of scholarship and most appropriate methods and analyses that have been

undertaken. This analysis combines the research in the fields of communications, gender, and technology and society publications to produce a body of research that fully represents the breadth and scope of the topic.

Most often a meta-analysis is used for quantitative research purposes, for instance in counting the number of occurrences of particular methods, frequencies over time, or theories invoked. But in the case of Ettema, Whitney and Wackman, a qualitative survey of literature for identification of broad themes within a body of research was undertaken (1987). This study incorporated both quantitative and qualitative aspects of meta-analysis. The focus of much communication research is on mapping trends between qualitative and quantitative methods (Perloff, Schram, Wimmer & Hayes), but Weaver indicated that some studies have shown recent trends in using a combination of qualitative and quantitative methods. This study assesses trends in methods across publications and disciplines.

Because this meta-analysis was focused upon inquiry teaching, research dated between 1965 and 1980 was considered. This period parallels the implementation period for the modern science curriculum projects.

A second limitation was suggested by the work of Munby (1980).He concluded that "on the basis of this analysis there are grounds for viewing research on the affective outcomes of science education with misgiving, simply because there seems little to be said of, the instruments' as to enlist our confidence in their use."Furthermore, if we are attempting to change attitudes with an eye toward teacher practice, a review of research on changing the attitude of student teachers by Morrisey (1980. Is relevant. He claimed that the lack of change in the teaching of elementary school science indicates something more than just 'immediate attitude change must be considered. Therefore, studies involving only affective outcomes were not included in this meta-analysis.

METHODOLOGY

Chosen for this research and conducted in Philippines, published Persea Americana Mill scientific research have been examined. Review of these studies meta-analysis has been done to determine the mean trends in scientific. Shortly, meta-analytical screening method which allows to combine the results of similar studies in research and to calculate common effect sizes has been used (Ergene, 1999; Akgöz et al, 2004; Şahin, 2005).

Data Collection

The first issue was to identify the journals in which studies of this manner are likely to occur. The decision was made to review journal articles to focus the study and because these journals were identified as the key research publications containing information on the topic about trends in Persea Americana Mill scientific researches. This approach does not represent the entire body of literature on the

topic, excluding books, book chapters, conference papers or proceedings, or other published research, but it does provide a body of knowledge that is reviewed, broadly based, and accessible by scholars in these fields. By using several different online search strategies, journals from the various fields were selected, then full-text searched with the following text string.

Process Order

It has regarded that experimental or quasi-experimental related studies have to be compared to determine the recent trends of Persea Americana Mill scientific researches.

Encoding process

The number of researches, experimental group mean, standard deviation of the experimental group, control group mean, standard deviation of control group, t values and p values of evaluable studies have been coded. In addition, publication date and the authors' names of these studies were also included in the encoding. These encoding processes have also been done for pre-test findings of related studies. However, in a study Sünbül and his friends have done in (2002), although pre-test findings have been given for two different data, pre-test finding has not been given for third data.

Data analysis

Mean Difference Effect meta-analysis has been used in this research to calculate mean trends on scientific research. It is seen necessary that data of different studies are converted to a common effect size.

RESULTS AND DISCUSSIONS

Table 1 highlights the frequency and percentage of articles that met the search criteria for each published recent advances in Persea americana mill (Avocado) and its biological effect. The number of articles published on different journals reached a peak in 108 related to avocado.

Data revealed that out of 108 published articles, 24 or 22.22 percent focused on hypoglycemic/diabetes effect of the avocado there were 14 or 12.96 percent do research on anti-inflammatory/osteoarthritis. There were 9 or 8.33 percent studies of avocado as anti-viral, 8 or 7.41 percent as anti-oxidant, 7 or 6.48 as anti-cancer, 6 or 5.56 as anti-convulsant. Some researchers do studies on the biological effects of Persea americana mill for hypertensive effect which has a frequency of 4 or 3.70 percent.

Data further shows that 35 or 32.41 percent out of 108 studies were conducted not on the biological effect of the avocado hence its all about the

production of the said fruits.

BIOLOGICAL EFFECT OF PERSEA AMERICANA MILL		
	F	%
HYPOGLYCEMIC/DIABETES	24	22.22
ANTI INFLAMATORY/OSTEOARTHRITIS	14	12.96
HYPOTENSIVE/HIGH BLOOD PRESSURE	4	3.70
ANTI CONVULSANT	6	5.56
ANTI CANCER	7	6.48
ANTI OXIDANT	8	7.41
ANTI ULCER	1	0.93
ANTI VIRAL	9	8.33
OTHER STUDIES	35	32.41
TOTAL	108	100.00

Table1. Frequency and percentage distribution of published articles on biological effect of Persea americana mill.

Data implies that Persea americana mill where scientifically studied to to understand its biological effect and most of the published articles about advances in scientific research on Persea americana mill (avocado) focuses on the hypoglycemic/ diabetes effect and anti-inflammatory/osteoarthritis effect.

SCIENTIFIC RESULT OF PERSEA AMERICANA MILL AND IT'S EFFECTIVENESS

Table 2 shows the scientific result of Persea americana mill and its effectiveness. Among the identified possible biological effect of Persea americana mill scientific research conducted, hypoglycemic/diabetes effect and anti-inflammatory/ osteoarthritis effect was being tested most of the researchers to prove its positive effects.

HYPOGLYCEMIC/DIABETES EFFECT

Data revealed that among the identified possible biological effect of Persea americana mill scientific research conducted, 19 or 79.2 percent shows a positive hypoglycemic effect and only 5 or 20.2 percent exhibit a negative effect.

19 researches conducted using a scientific method of extracting the methanolic extract of the avocado and being used to treat the hyperglycemic rat. Data shows that The administration of aqueous and methanolic leaf extracts of P. americana induced reductions in plasma glucose (16% and 11%,respectively), T-CHOL (8% and 5%, respectively), and LDL-CHOL (19% and 20%, respectively) in the treated rats compared to the hypercholesterolemic controls. Also, plasma HDL-CHOL concentrations increased by 85% and 68%, respectively, in the aqueous and methanolic extract-treated rats compared to the hypercholesterolemic controls. However the 5 research conducted showing negative results performs a different method of treatment which indicating a negative result. These results suggest that

aqueous and methanolic leaf extracts of P. americana lower plasma glucose and influence lipid metabolism in hypercholesterolemic rats with consequent lowering of T-CHOL and LDL-CHOL and a restoration of HDL-CHOL levels. This could represent a protective mechanism against the development of diabetes.

ANTI INFLAMATORY/OSTEOARTHRITIS EFFECT

Data indicates that P american mill also considered as a treatment for osteoarthritis. Carotenoids in the avocado (beta-carotene, alpha-carotene and lutein, neochrome, neoxanthin, chrysanthemaxanthin, beta-cryptoxanthin, zeaxanthin, and violaxanthin) are known for their anti-inflammatory properties, most of which are concentrated in the dark green skin and the greenish inner pulp

.

Data shows that there were 14 scientific researches being conducted showing a positive results. On the review of all studies, Avocado/soybean unsaponifiables (ASU) have shown some promise for OA. This implies that Persea americana significantly indicates a medical characteristics on OA.

Data further revealed that aside from hypoglycemic/diabetes effect and anti-inflammatory/osteoarthritis effect exhibited by P Americana. 8 researches conducted shows a positive result as anti-oxidant, 6 also shows a positive effect as anti-convulsant, 5 show also a positive result as anti-viral and 2 researches exhibited a positive result as anti-cancer.

Furthermore, there were 4 researches conducted to prove if P americana exhibits hypotensive effect. Data revealed that 1 shows a positive result and there were 3 shows a negative result. Indicating that P americana is not significantly effective on hypotensive.

RESULTS OF PERSEA AMERICANA MILL EFFECTIVENESS				
	POSITIVE		NEGATIVE	
	F	%	F	%
HYPOGLYCEMIC/DIABETES	19	79.2	5	20.8
ANTI INFLAMATORY/OSTEOARTHRITIS	14	100.0	0	0.0
HYPOTENSIVE/HIGH BLOOD PRESSURE	1	25.0	3	75.0
ANTI CONVULSANT	6	100.0	0	0.0
ANTI CANCER	2	28.6	5	71.4
ANTI OXIDANT	8	100.0	0	0.0
ANTI ULCER	0	0.0	1	100.0
ANTI VIRAL	5	55.6	4	44.4

Table2. Scientific result of Persea americana mill and its effectiveness

DISCUSSIONS

Persea americana has been used for thousands of years as both food and

medicine. The beneficial activity of avocado occurs due its composition of bioactive compounds, which affect a myriad of pathways in the human body. Further studies are needed, especially clinical studies, to verify the efficacy of traditional uses of P. americana. The many biological activities found in laboratory studies also need to be investigated with clinical studies to determine the effectiveness of specific activities in humans. Since instances of cancer and diabetes have become more widespread threats to human health worldwide, the avocado's activity in preventing and treating these diseases needs to be further researched. In particular, the development of cancer treatments should be studied since P. americana has shown activity against so many different types of cancer. In addition, the many chemical components with unknown biological effects must be studied for complete understanding of the effects of P. americana in the human body. As a widely consumed food, whose cultivation has spread globally in more recent years, the avocado will continue to remain an important food source that provides nutrition along with flavor (Whiley et al., 2002). With proper investigation and drug development, the avocado has the potential to provide much needed medicines for a wide range of ailments in the future.

CONCLUSION

Persea american mill (Avocado) exhibited a various biological effects. Among those, most of the science researchers focus on the ability of avocado on hypoglycemic effect and anti-inflammatory effect which significantly shows a positive result. This implies that avocado is not only a fruit but also a exhibit a medicinal properties.

RECOMMENDATIONS

Based on the foregoing conclusion, the following recommendations are hereby offered:

1. There is a need to further investigate the efficacy of the other parts of avocado as medicinal fruit through further research;
2. The biological effect or medicinal effect of the avocado extract should be introduced to human being as to indicate its efficacy as medical plant.
3. Further study should be conducted to support this present study.

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