

Psidium Guavajava Tea Trice per Day for Preeclampsia: A Mystery of SPIONs act as Thin Film Repeller of Albuminuria

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Received: 01 July 2023/ Revised: 09 July 2023/ Accepted: 18 July 2023/ Published: 31-07-2023

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Abstract— Translational medicine in tropical rainforest wet-warm climate countries has a mystery of Superparamagnetic iron oxide nanoparticles (SPIONs) extracted from guava (*Psidium Guavajava*) leaves. It is broadly used as an herb and spice which's a condition sine qua none for e.g. the famous Indonesian street culinary "gudeg" and "telur pindang", to make the dark chocolate color.

Method: References with keywords guava leaves or and SPIONs.

Result: Guava leaves powder or extract, mantids, 'belalang' (insect, grasshopper, locust), guava leaves SPIONs, ferrite nanoparticles are found widely in the search engine using Google Scholar library, Science Direct, EBSCO-host, etc. as antibacterial agents.

Discussion: Lp(a)-albuminuria, thin layer film SPIONs, Supercapacitor thin film, DWcNT as anion Repeller, and thin film DWcNT is used to support the aims. Preeclampsia in PIMA Indian, Bangladeshi, and Brazilian peoples with high CODHy and CKD1 subjects' prevalence is found. The prevalence is high in low- and medium- nSES in both developing and developed countries. Among the preparation principle of Zn ferrite, the uses of biosynthesis are a promising preparation method that uses plant materials instead of chemical materials to achieve large-scale preparation for nanomedicine application due to their unique physical, chemical, magnetic, and biocompatibility properties. SPIONs act as nanocarriers / nano-vector in New Generation (NG) drug delivery, photocatalytic degradation, MRI agent, also thin films of DWcNT.

Conclusion: Enough Protein nutrition with Guava leaves tea thrice a day, acts as a thin film repeller of albuminuria, and will help the healing of preeclampsia. Both, thin film and albumin act as n-type capacitors and anions.

Keywords— Ferrite nanoparticles, Guava leaves, Hypertension, Lp(a), Preeclampsia.

I. INTRODUCTION

1.1 Background

Ferromagnetic cobalt ferrite (CoF) magnetic NPs are suitable for transfection in NG drug delivery, and for induction of hyperthermia, also as a contrast agent in MRI, and biological application.¹ Cobalt ferrite synthesized by co-precipitation method, agarose gel, and deionized water were used during the test, be superparamagnetic with an average stable small size of 10.45 nm.¹ Smaller than 7 nm could not positively affect the higher r_2 relaxivity.¹ Ferromagnetic is stuff that could be pulled strongly by magnet: cobalt, iron, steel, nickel. Diamagnetic materials are those that some people generally think of as nonmagnetic, they include water, wood, most organic compounds such as petroleum and some plastics, and many metals incl. copper, mercury, gold, zinc, and bismuth. Paramagnetic materials are those that have weak pull by magnets, e.g.: aluminum, copper, platinum. Moreover, superparamagnetic is a form of magnetism that appear in small ferromagnetic or ferromagnetic nanoparticles, where due the small size, a flip direction under the influence of different temperatures, pH, and longer time of the process, have higher magnetic characteristics.^{1,2} A Single-domain magnetic iron oxide particles with hydrodynamic diameters ranging from 1->100 nm are called Superparamagnetic Iron Oxide Nanoparticles (SPIONs).²

SPIONs are now the most extensively used functional nanomaterials as antibacterial agents and for other biomedical applications due to their unique physical, chemical, magnetic, and biocompatibility properties incl. membrane basal. Cobalt

ferrite, nickel ferrites, and spinel ferrites are suitable candidates for a thin film of membrane basal in nephrons glomerular in leaking of albumin, the pathophysiology mechanism based of preeclampsia.^{3,4,5,6} A green synthesis nanoparticles in guava leaves though function as antioxidants and biological stuff.^{3,4} Ferrite extracted from guava leaves is known as SPIONs, made by green synthesis is more beneficial than ferrites, which are conventional chemical synthesis.⁴

1.2 Problem

Thin layer Guava leaves and pregnant women are not a contraindication, how about preeclampsia?³ An ultrathin film comprised of a graphene membrane and carbon nanotube has been developed in vein support.³

1.3 Aims

Describe Guava leaves powder for helping not to lose albumin in preeclampsia.

Guava Leaf Powder is beneficial for diabetes, diarrhea treatment, and consuming guava leaf tea can help lower hypertension as well.⁶

II. MATERIAL AND METHODS

The method is using references articles, with using Bayesian analysis and Bayesian network. A thin film of double-walled carbon nanotubes (DWCNT) has been intended to be applied in this field.⁵

Guava leaves powder, extracted, and make tea, already exist in the online market.^{3,4,5,6,7} One teaspoonful for a cup to 5 minutes to brew.⁸ Green synthesis of SPIONs using guava leaves extract is used for anti-microbial and for degradation of organic dyes.⁸ And also for hypercholesterolemia treatment through pectin way in cover coated the digestive tract.⁹ Meanwhile mantids, guava *belalang* (Ind: insect, grasshopper, locust) has been recorded,^{10,11} A grasshopper that looks like a guava leaf is reported as the cause of RNAi – transposon transfection in wet and warm climate, a similar mechanism to *salam* (*Syzygium polyanthum*) mantids.¹³

Guava leaves SPIONs, ferrites, has been reported as green synthesis nanoparticles, which is evaluated as the current developments in environmental technology and innovation.⁴ and associated with the wet and warm climate condition, as a camouflage of the grasshopper or RNAi transfection.^{10,13} Transposon transfection through over Genus and Familia of RNA and DNA has thought of as perching by biologic, chemistry or physics vectors,^{14,15} which the physics vectors are in the form of nanoparticles,⁴ Nano ferrite Nanoparticles (NPs).⁴ Palladium (Pd) NPs were tested for the inactivation of drug-resistant *Pseudomonas aeruginosa*, *Bacillus subtilis*, and *Staphylococcus aureus*. Extracted from different plant parts (leaves, fruits, roots) are widely used in Pd NPs synthesis.⁴ The size of PdNPs synthesized by plants extract was smaller than those prepared using other synthetic agents.⁴

Pd NPs that were synthesized by black tea leaves extract was successfully used as a catalyst.⁴ *Psidium guajava* L. fruits was applied in a four-stage synthesis of Cu NPs. The Cu NPs can be easily oxidized to copper oxide and PEG 6000 was frequently used as a capping agent to stabilize the metal colloid.⁴ This metal colloid is commonly used in medical diagnostics and as a catalyst and biosensor.⁴

III. RESULT AND DISCUSSION

The digging non-vector transfection, nano-carriers, and nanoparticles, in drugs delivery: *Binahong* (*Anredera cordifolia*) has already be a nano-carriers nowadays and next-generation Pharma.¹⁴ The CoF nanoparticles synthesis from *binahong*, *salam*, *kelor*, etc. leaves extraction, also are nowadays nano-carriers. These vectors could also occur in nature.¹⁴

Different parts of the same plant have different effects in Ag NPs synthesis, one of the SPIONs Spinel ferrites. The absorption peak of the callus extract and AgNO₃ after mixed culture was in higher level than that of the leaf extract. Thus, the callus extract as a reducing agent produced more Ag NPs than the leaf extract. The Ag NPs green synthesis involves mixing of silver nitrate solution with reducing substances extracted from plants.⁴ This has the same procedure of the SPIONs vector, Au NPs.⁴

3.1 Superparamagnetic Iron Oxide Nanoparticles (SPIONs)

The hallmark of transposon transfection in epidemiology is dependent on wet and warm climate conditions, like in tropical rainforest areas, where it has been reported that it is like a large laboratory incubator or like a steam bath. While a hot and dry climate is like a desert, dry and hot condition is like a sauna. High relative humidity and hot climate give a high capacitance poor conductance and efficient electrostatic fields.¹⁵ DNA/RNA transfer among different species and genus is known as

transfection. How transposon could cling to other types of vectors (biological and chemical) or plasmid, and various vector viruses, has been reported in studying mammalian genes.

Lp(a), a fat which coated the basal membrane in glomerulus,¹⁶ Basal membranes thought to be anionic Repeller of anionic albumin.¹⁶ Lp(a) is higher in subject underweight (BMI<18.5) first degree relative Diabetic patients.¹⁶ The effect of Lp(a) on the progression of diabetic nephropathy is correlated with microalbuminuria.¹⁶

What is the mechanism of metal colloid which is commonly used in medical diagnostics and as a catalyst and biosensors?⁴ It is the SPIONs characteristic.¹⁷ SPIONs Cu-ZnF NPs coated with PEG layer are widely used for biomedical applications. It is a temperature-sensitive contrast agent. The NPs coated with a PEG layer are synthesized using a one-step thermal decomposition method in a polymer matrix.¹⁷ These NPs are stable in water and biocompatible. The grown NPs exhibit superparamagnetic properties.¹⁷ In the presence of a strong temperature gradient, there is a strong correlation between the temperature and the image intensity. Thin layer film, SPIONs for wastewater treatments aqueous supercapacitors electrodes low-cost sustainable energy storage are recorded.¹⁷ SPIONs embedded into agarose gel give a significant mode of water proton relaxation times T1, T2, and T2* determine by NMR measurement. Cooper-Zn ferrite NPs coated with a PEG layer are synthesized using a one-step thermal decomposition method in a polymer matrix.¹⁷ Although the magnetic and photochemical properties have been widely investigated, the electrochemistry of SPIONs as electrodes in supercapacitors in different electrolytes have been given attention in e.g. cyclic voltammograms.¹⁸ When the size of the crystallites is increasing, and induces the superparamagnetic – ferromagnetic transition (<30 nm) the NPs are no longer dispersible in solution. It is not colloidal anymore.¹⁸ Significant different properties of ferrite nanostructures to be such as surface area, electrical conductivity, crystal cation distribution, and other electronic and magnetic properties exist. If the surface area increases; the electrical conductivity may decrease.¹⁸ Thus, SPIONs for aqueous supercapacitors link for sustainable energy storage.¹⁸

3.2 Thin Layer Film of SPIONs

Supercapacitor thin film, CnT vein support.³ Ferrite Thin Films has been reported to offer an attractive platform for enabling integrated insulating spintronics.¹⁹ An ultralow damping in <20nm thick spinel-structure magnesium-aluminium ferrite, which magnesium arises from Fe⁺⁺⁺ ion with zero orbital angular momentum.¹⁹ Emori et al finding, offer an attractive thin-film platform for enabling integrated insulating spintronics.

The n-type superconductor monolayer ZnFe₂O₄ is better than five layers and 9 layers. Both monolayer and multilayer films TiO_n porous film and ZnFe₂O₄ had capacitive properties.²⁰ The water treatment of organic dyes as a major source of industrial wastewater pollution used photocatalytic degradation CoF and dope to degradation efficiency. Prepared Moringa oleifera under visible light.²¹ SPIONs has received cutting edge applications in the biomedical, bioengineering, and nanomedicines via targeted drug delivery for cancer therapy, tissue repair synergy, magnetic fluid hyperthermia applications, contrast agents in magnetic resonance imaging (MRI), and antimicrobial/antibacterial agent.²² Psidium guajava and Moringa oleifera leaves are both wonderful plants owing the presence of biological stuff which serve both as a capping agent and an effective metal reducing agent.²²

Photocatalytic Degradation of Organic pollutants for water treatment is using zinc ferrite, prepared and modification methods, such as elemental doping with biosynthesis using biological materials, not chemical material.²⁰ Zinc ferrite is stable and manifest outstanding feature of paramagnetic properties in conventional methods and working conditions at room temperature 20°C.²⁰ Zinc ferrite also has high porosity, and a narrow band gap (1.9 eV), making it a good candidate as a photocatalyst.²⁰ Zn F has also a photoelectric fuel cell, organic dye degradation, heavy metal recovery, antibiotic degradation, antibiotic-resistant chemotherapy, etc., and has good reusability.²⁰ Extracted from industrial waste with low cost, it is conducive to a massive production.²⁰

Aqueous supercapacitor thin film spinel ferrite,¹⁸ linking abundant resources and low-cost processes for sustainable energy have been reported.^{18,19,21,22} Biosynthesis of SPIONs via a composite of Psidium guajava-Moringa oleifera and their antibacterial and photocatalytic has been reported.²²

Ultralow damping in <20nm thick spinel -structure, magnesium aluminum ferrite epitaxial thin films exhibit a Gilbert damping and negligible inhomogeneous linewidth broadening, resulting in narrow half width at half maximum linewidths.¹⁹ Emori et al finds offer an attractive thin-film platform for enabling integrated insulating spintronics. Evaluating visible light for carbon-nitrogen and carbon-oxygen bond formation via nickel catalyst.²¹ The development of general and efficient methods for the

catalytic construction of carbon-heteroatom bonds with Earth-abundant catalysts under moderate conditions is stand still desirable highly. Heteroatom-containing motifs are one of the most privileged scaffolds for pharmaceuticals, agrochemicals, and functional materials.²¹

3.3 Double Wallet Carbon nanoTubes (DWCNTs)

The DWcNT-repeller of anionic albumin was supported by many literatures^{3,5,23,24}

Tropical rainforest as being the Industry 4.0 era rely on Carbon nanotube (CnT) and Carbon nano composites (CnC) Fiber-Ceramic Industry 4.0 which cultivation of fish and plant for collagen and cellulose on producing raw material has been recorded.²⁵ CnT has remarkable to make a high-performance lithium-sulfur batteries layer.²⁵

Biosynthesis of iron oxide nanoparticles via a composite of Psidium guajava-Moringa oleifera and their antibacterial and photocatalytic study has been reported.²²

A CNT / graphene hybrid film (CGF) features a very high electron transparency close to 90%, and demonstrate that the CGF can thus be used as a gate electrode in vacuum electronic devices and as high-performance sample Transmission electron microscopy (TEM).³ The TEM is also used on the structural and magnetic properties of CoNiFe₂O₄ functionalized CNTs nanocomposite.²⁴

Conducting and Transparent substrates (CTS's) have received huge attention from researchers since this material plays an important role as an element part on the fabricating of optoelectronic devices, such as organic LED, organic solar cells, touch panels, etc. Low electrical resistance and high optical transmittance are desirable qualities for materials destined to be applied in this field.⁵ Conducting and transparent substrates introduced from thin films of double-walled carbon nanotubes (DWCNT) at a liquid-liquid interface were clearly shown as an easy, cheap, and reproducible method to prepare thin films. The interfacial thin films were strictly related to the purification treatment earlier applied to the carbon nanotubes. Samples preplanned from DWCNT-Air/HCl and DWCNT-HNO₃/H₂SO₄ (H₂O) performed the best electrical outcome. The sheet resistance and the optical transparency of these two samples can be controlled by expressing the amount of DWCNT and the annealing process, which allows the modulation of the properties of the thin films depending on future applications. The capability to prepare to conduct and transparent films on plastic substrates allows these materials to be used in fields where flexibility is required, so that not able to be done with ITO (Indium-Tine-Oxide). DWcNT for optoelectronic devices.⁵

Transparent, flexible and high conductance thin films of reduced graphene oxide or different types of CNTs have been prepared through the liquid-liquid interfacial method, and deposited over two different substrates, glass or polyethylene terephthalate (PET) which belongs to the group of materials known as thermoplastic polymers.²³ The effect of the amount of carbon nanostructures on the properties of the films on the properties of the films, as well as the effect of the annealing treatment at different temperatures, has been also evaluated in order can be used successfully as electrodes, presenting optimized sheet resistance. Flexible and transparent electrodes presenting high stability have been obtained by the carbon nanostructure films deposited over PET. A modification of the electrodes has been demonstrated, through electro polymerization of aniline, confirming the potential for further application as flexible devices.²³ The liquid-liquid interfacial route for thin film is a changeable, easy done, inexpensive, and capable of being influenced in a way to prepare stable, transparent, and flexible electrodes for electrochemical purpose of the user.²³

Functionalized multi-walled carbon nanotubes (FMWCNT) were decorated with crystalline nickel-substituted cobalt ferrite nanoparticles (CNF) by the two different routes of hydrothermal method to form CNF@FMWCNT nanocomposite,²⁴ whereas visible light for carbon-nitrogen and carbon-oxygen bond formation via nickel catalysis.²¹

3.4 Green synthesis NPs and preeclampsia

Ying 2022, reports Green synthesis of nanoparticles (NPs): Current developments and limitations.⁴ So the Thin layer of Guava leaves and pregnant women is not a contraindication, so do preeclampsia.^{3,4,6,7,22}

Hypertension and Diabetes are in high prevalence in pregnancy. The increase in Body Weight is well- known in these cases. Overweight and obese high prevalence are found in the nested population, parallel with preeclampsia (PE). Preeclampsia in PIMA Indians has been studied,^{26,27}

Asian Indian (Bangladeshi), Aborigine Australian, neighborhood low-Socioeconomic Status (SES) in developing and developed countries, have also been included in these preeclampsia cases. The Pima Indians of Arizona have high rates of T2DM which has a strong genetic component and develops at young ages.²⁶ Since 1965, Pima Indians at least 5 years old participated in a study of diabetes and complications. Biennial measurements of obesity, Glucose Tolerance Test during pregnancy. Gestational diabetes conveys a greater risk for later T2D (NIDDM) in both mother and child.²⁷ After the birth of the child, the mother's glucose levels typically return to normal.²⁷ So do hypertension and hypercholesterolemia. But increasing to developed increase severity during the additional number of gravity.²⁸ Pregnant women have become a central target for prevention cause gestational diabetes conveys a greater risk for later NIDDM/ type 2 Diabetes.²⁷ Diagnostic Controversy: Gestational Diabetes and the Meaning of Risk for Pima Indian Women.²⁷

Preeclampsia (PE) is a multi-organ system disorder of pregnancy and is responsible for a significant rate of maternal morbidity and mortality not only in Bangladesh but also worldwide.²⁹ Prevalence of and the associated risk factors among pregnant women in Bangladesh has been reported.²⁹ The overall prevalence of preeclampsia was high (14.4%).²⁹ About 10% of pregnancies were found to have preeclampsia after 20 weeks of gestation without a previous history of hypertension. The prevalence of preeclampsia that is superimposed on chronic hypertension was found to be 5.4%.²⁹ The common mean age found to be affected for preeclampsia was a trend towards increasing severity with younger age population.³⁰ Preeclampsia is responsible for a significant rate of maternal mortality worldwide. In Bangladesh, a large number of obstetric deaths occur every year but the exact reasons are reported by Mou.²⁹ Eclampsia-related conditions are the second leading direct cause of obstetric deaths in Bangladesh.³⁰ Efforts to prevent such death are shifting at the primary care level to screen and initiate treatment for a moment with preeclampsia, severe preeclampsia, and eclampsia.³⁰ Preeclampsia is hypertension that generally occurs after 20 weeks of gestational along with proteinuria.²⁹

In Brazil, chronic hypertension (RR=6.07) and obesity (RR=1.83) were significantly more frequent in the PE than non-PE group in all women with COVID-19 (molecular confirmation and/or radiological findings).³¹ In another study, the vast majority of Brazilian physicians prescribe low-dose aspirin and calcium carbonate to prevent preeclampsia in high-risk pregnant women.³² Quality prenatal care was verified, given that the woman's health mediates the complications and maternal and fetal risks, like gestational hypertensive syndromes.³³ The frequency of preeclampsia is increasing in Brazil and the problem of hypertensive disorders of pregnancy in Brazil has been reporting by Guida et al, 2022.³⁴

In Africa, Ethiopia, preeclampsia is a multi-organ system disorder that occurs after the 20th week of gestation in pregnancy and is characterized by hypertension and proteinuria.^{29,35} The prevalence in Africa is more than 270.000 women die from maternal deaths yearly, and worldwide about 76.000 women and 500.000 babies die yearly due to preeclampsia.³⁵ Up to 77% of women affected with preeclampsia, have a lack of knowledge about preeclampsia, and so cannot be taken preventive action,³⁵ e.g. by drinking guava leaf tea, good protein nutrition, and salt and carbohydrate diet.

IV. LIMITATION

The CHAOS Syndrome³⁶ is Coronary heart disease, Hypertension, Atherosclerosis, Obese, Stroke in a family pedigree is not dug. CODHy³⁷ (Consensus in Obesity, Diabetes Mellitus, Hypertension in the population in this study are not especially dug, but the underweight healthy subjects of F1 diabetes patients have a high level of Lp(a) has been reported.¹⁶ This high Lp(a) level is parallel to microalbuminuria, hypertension, and diabetes nephropathy in Asian Indians, Pima Indians, Aboriginal Australian, and unfortunate populations in developed countries.¹⁶ Also in many developing countries.^{16,38} The Pima Indians of Arizona has high rates of T2DM which has a strong genetic component and develops at young ages.²⁶ Since 1965, Pima Indians at least 5 years old participated in a study of diabetes and complications. Biennial measurements of obesity, GTT during pregnancy. AFB1 exposure induced Obesity in low- and medium-neighborhood Socioeconomic Status (nSES).³⁹ This review articles doesn't take low- and middle-nSES in industrial countries which have also been laden on obesity.³⁹

Psidium guajava leave-based magnetic nanocomposite⁴⁰ and is a green synthesis of Iron Oxide Nanoparticles⁸ is used also to remove methylene blue from water,⁴⁰ and other degradation of Organic Dyes and Anti-microbial applications.⁸

TABLE 1
SIZE AND FUNCTION OF SPINEL FERRITES

No.	Size (nm)	Function	NPs	Synthesized by	Reference
1	10.45	SPIONs	CoF	Co-precipitation	¹ Mohammadi, 2020
2	< 7	Loose SPIONs	CoFMNPs	idem	¹ Mohammadi, 2020
3	1- >100	SPIONs	SF	Thermal decomposition and Oxidation	² Wei, 2017
4	<30	No Colloidal	SPIONs	Green synthesis	¹⁸ Malale 2021
5	<20	Thin film	SF	Ultralow damping	¹⁹ Emori 2018
6	-5.5	MRI	Gd-SPIONs	Thermal decomposition	² Wei 2017
7	7.3->8.2 5-20 87.3 6 & 15-18 4.5	Water Treatment	ZnF modification	Hydrothermal, co-precipitation, sol-gel, and other novel methods	²⁰ Zhu 2022
8	1-6	Ca therapy	FeO-NPs	Biosynthesis	²² Madubuonu 2019
9	11.55	SWCnT	SF	2 Hydrothermal	²⁴ Hossain 2021

Debye-Scherrer Equation has A Positive Correlation Between the Crystalline Size of the Nanoparticles and Lambda:

$$D = K\lambda/\beta\cos\theta \quad (1)$$

D: the nanoparticles crystalline size in the direction perpendicular to the lattice planes.

K: the Scherrer constant (0.98)

λ : the wavelength (1.54)

β : full width at half maximum (FWHM)

The smaller the size of the nanoparticles, the smaller the wavelength in nanometer nanoparticles of visible light in in the nature field.⁴² Biosynthesis of FeO-NPs via Psidium guajava and Moringa oleifera aqueous leaves extraction, placed the metabolites reducing agent and capping agents in it, to get different shapes and sizes of NPs. These nanoparticles are based on the extract's intrinsic compositions.²² The antimicrobial and antibacterial potency against drug-resistance drugs was alongside the photocatalytic efficacy and sundry applications such as catalysis, food coatings, cosmetic, NG delivery, and MRI agents. These various applications are due to their diversity of nanometric size, high magnetic permeability, cost-effectiveness, surface modifications, good chemical permeability, facile synthesis, colloidal stability, and dispersion in aqueous media without the use of the nephrotoxic polyethylene glycol.

V. CONCLUSION

Guava leaves 'tea' thrice a day act as a thin layer film repeller of albuminuria in membrane basal is incl. in nephrons glomerular in leaking of albumin. This mechanism will help the healing of preeclampsia which is in high prevalence in Pima Indian, Aborigine Australian, South America, South Asia, unfortunate population in developed countries, and in many developing countries.

ACKNOWLEDGEMENTS

We should thank our Indonesian ancestors, who in the centennial years have guava leaves in traditional heritage culinary such as *gudeg* and *telur pindang*, which are almost variate their menus every day. The authors also thank ORCID and SCOPUS for the nice strong support in <https://orcid.org/0000-0002-2493-0320> and <https://scopus.com/57216361616>

CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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