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Preface

We would like to present, with great pleasure, the inaugural volume-9, Issue-7, July 2023, of a scholarly journal, *International Journal of Engineering Research & Science*. This journal is part of the AD Publications series *in the field of Engineering, Mathematics, Physics, Chemistry and science Research Development*, and is devoted to the gamut of Engineering and Science issues, from theoretical aspects to application-dependent studies and the validation of emerging technologies.

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Each article in this issue provides an example of a concrete industrial application or a case study of the presented methodology to amplify the impact of the contribution. We are very thankful to everybody within that community who supported the idea of creating a new Research with IJOER. We are certain that this issue will be followed by many others, reporting new developments in the Engineering and Science field. This issue would not have been possible without the great support of the Reviewer, Editorial Board members and also with our Advisory Board Members, and we would like to express our sincere thanks to all of them. We would also like to express our gratitude to the editorial staff of AD Publications, who supported us at every stage of the project. It is our hope that this fine collection of articles will be a valuable resource for *IJOER* readers and will stimulate further research into the vibrant area of Engineering and Science Research.



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

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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 is incl. 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-wallet 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 Walled 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 basalis 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.

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CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest.

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Semiconductor Cobalt Ferrite Extracted from Various Leaves, Plays as Transposon Bullet, are Frequently Utilized in Magnetic-Based Drug Delivery: A Green Synthesis Methods of Spinel Ferrite

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Abstract— Green Synthesis methods of cobalt ferrite (CoF) and spinel ferrite from many leaves and fruit peels is not only a next-generation (NG) raw material of pharma manufacture, but also better well-being, and in all parts quality of life. B20/G20 negotiation transaction is a now market share of pharma economic besides for diagnosis/ energy/ capacitor/ battery nickel ferrite based on semiconductor. SWCNT, DWCNT, and MWCNT is a capacitors, and semiconductors (supercapacitors and superconductors) are bioelectric power matter. Knowing our potential and harm in taking care of our wet-warm land nanosafety, nano security, and nano defense of one- earth, is the aim of this study.

Method: Review article digging from Science Direct, EBSCOhost, and Google Scholar search engine with keywords: Semiconductor cobalt ferrite extracted from many leaves.

Result: Different semiconductor frequencies/wavelengths of cobalt ferrite, nickel ferrite, Ag ferrite, and many other spinel ferrites with green synthesis methods.

Discussion: Nano-carrier/ nano-vector cobalt ferrite Nano Particles (CoFNPs) as semiconductor depends on size, structure, pH, etc.

Conclusion: The pathophysiology of natural nano-vector in tropical rainforest areas has to be taken care of in one-earth Industry 4.0 with Society 5.0. The value of these nanoparticles should be protected by law especially are associated with RNAi, sepsis, LGBTQIA et al. nowadays iceberg laden of health problems.

Keywords— Cobalt ferrite, Doping, Mantids, Magnetic nanoparticles, *Synzygium polyanthum*.

I. INTRODUCTION

1.1 Problem

Green Synthesis methods of cobalt ferrite (CoF) and spinel ferrite from many leaves and fruit peels are not only a next-generation raw material of pharma manufacture but also improve well-being and overall quality of life. B20/G20 negotiation is a now market share or pharma economic besides for detection/diagnosis/ energy/ capacitor/ battery nickel ferrite, based on the semiconductor.^{1,2,3,4} Biosensors have proved extremely large useful in vital areas, such as in healthcare, environmental monitoring, security, pharmaceuticals, food security, and forensics.² SWCNT, DWCNT, and MWCNT are capacitors, and semiconductors (supercapacitors and superconductors), which are bioelectric power matter.^{3,4} In the last few decades, nanosized spinel ferrites with the structure M Ferrite, where M is a divalent metal cation of Cu, Co, Ni, Zn, Mn, Mg, etc., have received broad attention, and the studies are about their magnetic and electrical properties. The semiconductor Excitation/ Emission (Ex/Em) of this nanocrystal biopolymer with profound chemical and thermal stabilities is the focus of this study.

1.2 Aims

Knowing our potential and harm in taking care of our wet-warm land nano-safety, -security and -defense one-earth, which is prone to be in high prevalence nowadays. Sepsis,⁴ Hypospadias and Congenital Adrenal Hyperplasia (CAH),⁵ LGBTQ,⁶ Bipolar,⁷ the role of non-viral vectors,⁸ and the bioelectric transfection and transposon bullet-High Relative Humidity,⁹ become the laden health problem in the tropical rainforest area. We hope that this review study provides useful information to help translate this novel therapy or diagnostic agent be fast to the right clinical application market share.

II. METHOD AND RESULT

2.1 Method

Review article digging from Science Direct, EBSCOhost, and Google Scholar search engine with keywords of semiconductor cobalt ferrite extracted from various leaves (semiconductor AND cobalt ferrite AND leaves).

2.2 Result

Different Semiconductor frequency/wavelength of cobalt ferrite, nickel ferrite, Ag ferrite, and many other spinel ferrites, with green synthesis methods are found as follow:

2.2.1 The different sizes, shapes, and crystallinity by various techniques.¹⁰

The frequency/wavelength of the semiconductor could be modified by doping, it is the principle of successful transfection in a wet-warm climate area, or laboratory incubator. The transfection is naturally taken place in the tropical rainforests, but in particularly made in the pharma manufacture for cancer and viral therapy. This review is to reveal the effort in prestige Next Generation (NG) medicine with the raw material extracted potentially from *Moringa oleifera* (*kelor*) and *Syzygium polyanthum* (*salam*) as cobalt ferrite is a non-viral nano-carrier or nano-vector RNAi transfection.

Among these spinel ferrite materials, cobalt ferrite is a typical superparamagnetic ferrite (small nanometer-size). In bigger sizes, cobalt ferrites have a high coercivity, moderate saturation magnetization, excellent chemical and mechanical stabilities, electrically insulating behavior, good magnetostrictive possession, and ferrimagnetic with a high Curie temperature. At normal room temperature, if this physical-mechanical occurs (in small nanoparticles), it is describing superparamagnetic cobalt ferrite (CoFe_2O_4).

2.2.2 Interference: cobalt ferrite as semiconductor

Tamboli offers comprehensive knowledge on how to choose suitable natural resources for the green synthesis of nano cobalt ferrite and the benefits of this approach distinct to conventional methods.¹¹

Magnetic NPs, one of them, cobalt ferrite is the most of great importance and studied superparamagnetic NPs. Green synthesis NPs are environmentally benign synthetic methods, that became necessary to reduce environmental and occupational hazards. The reviewed recent advances in synthesizing cobalt ferrites nanoparticles and their composites using several scientific search engines are very useful.

2.2.3 Comparison

The different efforts to make different frequencies/wave-length from green synthesis methods of CoF, NiF, AgF (SpinelF), etc. Bioactive components of plant extracts with reducing, capping, and stabilizing ability, and mechanistic route used for cobalt ferrite NPs synthesis. A review on plant extract-based route for the synthesis of cobalt NPs: photocatalytic, electrochemical sensing and antibacterial applications.¹² The run-up of cobalt NPs could be in several routes incl. chemical wet processing, thermal reduction, micro-emulsion techniques, and biosynthesis extraction of natural plants. It is research done now in green and sustainable chemistry.¹² Effect of cobalt ferrite (CoFe_2O_4) NPs on the growth and development of *Lycopersicon lycopersicum* (tomato plants) has been notify.¹³

Formation mechanism and lattice parameter research for copper-substituted cobalt ferrites from *Zingiber officinale* and *Elettaria cardamon* seed extracts using biogenic route is a materials.¹⁴ The extracted seed has a copper content of CoFNPs was analyzed by XRD, SEM, EDX, UV-Vis., PL, FE-SEM, FTIR and photocatalytic activity.¹⁴

III. DISCUSSION

Different effort in the making of different frequency/wave-length from green synthesis methods of CoF, NiF, AgF etc. (spinel ferrite) has been denounced. Nano-carrier/ nano-vector cobalt ferrite nano particles (CoFNPs) as semiconductor depends on size, structure, pH, etc. These NPs, especially CoFNPs as semiconductor, doped, transported RNAi, SWCNT, fast delivery is as follows:

3.1 Semiconductor, Capacitor, Dielectric

Ecofriendly green and sustainable chemistry benign synthetic methods became necessary to lessen environmental and occupational health hazards.¹¹ Green synthesis methods are now widely broadly applied in the synthesis of nanomaterials in science and technology utilizations. Synthesizing of CoFNPs and their composites using various search engines has been reviewed.¹¹

Mechano-synthesis, characterization, and magnetic properties of nanoparticles of cobalt ferrite, CoFe_2O_4 .¹⁶ This chemical material has a magnetic escalate with the decreasing particle size. Longer-term milling induces particle growth characterized by sharpening of the Bragg peaks and a rise of the blocking temperature, while prolonged milling results in some cobalt metal.¹⁶

Caldeira reports the correlation of synthesis parameters to the structural and magnetic properties of spinel cobalt ferrites (CoFe_2O_4) associated with an experimental and statistical study.¹⁷ It is improving cobalt ferrite for trading process on global market share.

Okra extract assisted green synthesis of CoFe_2O_4 NPs and their optical, magnetic, and antimicrobial properties.¹⁸ Synthesis of cobalt ferrite NPs using Okra plant gel as a reducing agent rich the production. Route based on “localized” microwave heating to synthesize NPs present high purity single phase CoFNPs are declared.¹⁸

3.2 Doping Cobalt, Zn, Ni, Mg

Green synthesis and Characterization of ZnO- CoFe_2O_4 semiconductor composites set up by using a hydrothermal method and *rambutan* peel extract. The photocatalytic performance of composites under solar light for reduction of Direct Red 81 in the *batik* garments production with degradation percentage reaching 99.6% after 2 hours approached.¹⁹ Synthesis of cobalt ferrite precursors, then could be doped with Zn, and Ni in this report.¹⁹

Magnesium ferrite and cobalt doped magnesium ferrite ($\text{Co}_{0.8}\text{Mg}_{0.2}\text{Fe}_2\text{O}_4$) spinel NPs in biomedical applications using the low-temperature combustion synthesis present relatively high antibacterial effect on *Escherichia coli* and *Staphylococcus aureus* propose its potentials in the treatment of infections common accompanied with these microorganisms.²⁰

The Structural and Optical Properties of zinc ferrite Nanoparticles synthesized via a green route.²¹ The crystallite size calculated from the Debye-Scherrer equation showed an increase from 14 nm-20 nm with the increase in calcination temperature.²¹

3.3 RNAi type in Cancer and viral therapy

3.3.1 Transposon bullet supercapacitor^{8,9}

The different types of RNAi molecules are miRNA, si RNA, and short hairpin RNA (shRNA). RNAi molecules submit into cells initiate the degradation of complementary mRNA molecules via the cells' internal machinery. Nano-based delivery of RNAi in cancer therapy, RNA molecules block gene expression. RNAi is one method of regulating target genes. Two main approaches for the delivery of RNAi molecules have been developed: viral and non-viral vectors. The use of nanoparticles for RNAi molecules delivery is traited to unique benefits provided by nanoparticles in comparing to other carriers, such as viral vectors, non-viral chemical vectors, and mechanical non-viral vectors as electroporation, ultrasound, gene gun, cobalt ferrite NPs, etc.^{8,9} By automating the PCR system to sense the extracted viral RNA could also be done.¹

Cobalt ferrite is utilized as an efficient catalyst for reaction under mild and green conditions. This green catalyst was separated easily by an external magnet. The recycled catalyst was reused several times without significant loss of catalytic properties.²²

Aluminum (Al) and PEG Effect on Structural and Physicochemical Properties of CoFe_2O_4 . Al doped CoFNPs led to a decrease in crystallite size, lattice parameter, elastic constants, and magnitude of moduli. This $\text{CoFe}_{2-x}\text{Al}_x\text{O}_4$ have been synthesized by the sol-gel method.²²

Green synthesis of cobalt ferrite NPs using plant extracts were synthesized through the self-combustion method using aqueous plant extract.²³ A large number of plant extracts are used especially to get noble metal NPs, such as Ag, Au, Pt, and Pd.

Constitutes from plant extract, leaves, etc., are eco-friendly environment and cost-effective route,²³

Cobalt ferrite (CoFe_2O_4) NPs synthesis exploit *binahong* (*Anredera cordifolia* (Ten) Steenis) leaves extract and the application as an anti-bacterial has also been reported.²⁴

3.3.2 Drug / Gen Delivery System based on NP semiconductor-supercapacitor

The SWCNT, DWCNT, and MWCNT are capacitors, and semiconductors (supercapacitors and superconductors) are bioelectric power matter.^{4,9,25} Advances and frontiers in Single-Walled Carbon Nanotube (SWCNT) electronics has been notify.²⁵

Carbon nanocarriers pass siRNA to not breakage plant cells for efficient gene knockdown. This study establishes that nanotubes could bring through an extraordinarily great number of plant biotechnology applications that rely on RNA delivery to not decay cells.²⁶ This study establishes that nanotubes could enable a countless or extremely large number of plant biotechnology applications that rely on RNA delivery to not damage cells. Carbon nanocarriers present siRNA to intact plant cells for efficient gene knockdown. In addition, when bound to SWNTs, biomolecules are shielded from being degraded in the mammalian systems, display a sign of higher rank biostability contrasted to free biomolecules. Moreover, SWNTs have strong near-infrared (nIR) fluorescence inside the biological tissue transparency window, and to the greater distance side of the chlorophyll autofluorescence range, and thus make feasible tracking of cargo-NP complexes as far down in plant tissues.²⁶

DNA-Carbon Nanotube binding mode establish the efficiency of CNT-mediated DNA delivery to intact plants. To the RNA, and genome engineering machinery to plant cells. It will give works to genetically modified plants for global food security, sustainable energy production, synthetic biology applications, and climate change capacity to recover quickly from troubles.²⁷

Having great power vectors for human vaccine dispatched targeting cancer, and infectious diseases using polymeric NPs.²⁸ Based on non-viral vectors, Au NPs (nanoshells/ nanocages) are next nanocarriers enclose polymeric NPs, lipid-based carriers (liposomes/micelles), dendrimers, CnTs.^{4,28} Bolhassani portray polymeric vectors chiefly poly (lactic-co-glycolic acid) (PLGA), chitosan, and polyethyleneimine (PEI) as vaccine transmission system-associated DNA/RNA transfection.²⁸

Reports in HepG2 cells, alter miRNA expression cap by Ag ferrite NPs (6 miRNAs) followed by AuF NPs (4 miRNAs) and SPIONs (2 miRNAs) bring about the highest changes of changes.²⁹ Earliest study of SPIONs-miRNA methylation epigenetic promote laden problem – market share.²⁹

3.3.3 Imaging agent based on NPs semiconductor Ex/Em

The different Excitation/Emission (Ex/Em) NPs semiconductor are reported as follow:

Superparamagnetism is different from standard transition since it occurs at a lower level of the Curie temperature of the material, and is used as an imaging agent semiconductor. One-step preparation of highly stable cooper-zinc ferrite NPs in water suitable for MRI thermometry has been reported.³⁰ This Poly (ethylene glycol) (PEG) coated Cu-Zn ferrite NPs, in the presence of a strong temperature gradient shows a sharp correlation between the temperature and the image intensity, so this CuZn ferrite NPs can be used as a contrast agent for MRI thermometry, as force and brightness.³⁰

Magnetic possession in cobalt ferrite NPs by wet chemical route have been reported,³¹ with the synthesis and magnetic properties of cobalt ferrite (CoFe_2O_4) NPs set up by wet chemical route.³¹ Semiconductor CoF extracted from many leaves, from fruit peels as transposon bullet.^{8,9} Green synthesis methods of CoFe_2O_4 and silver AgNPs exposure give effect on miRNA and global DNA methylation endothelial cells.³² Green synthesis of metallic NPs using some selected medicinal plants from

Southern Africa and their biological applications is reported.³³ This is used as an antimicrobial, anticancer, drug delivery, contrast agent, and bioimaging agent, which is transformed the field of medicine into nano-medicine.³³

Green synthesis of biocompatible superparamagnetic iron oxide-gold composite NPs for MRI diagnostic, hyperthermia, and photothermal therapeutic applications.³⁴ This Materials Chemistry and Physics are vast used for biomedical applications.³⁴ Gold ferrite NPs using aqueous leaf extract of a medicinal plant as NIR absorbing were used has been reported.³⁴ Superparamagnetic cobalt ferrite as T2 contrast agent in MRI has been reported in the engineering and technology society.³⁵

In addition, as an MRI agent, nickel ferrite and cobalt ferrite are good for gene silencing, expression, virus editing, and cancer treatment. It is as follows:

3.3.4 Nanoparticles Semiconductor SPIONs- Editing and Silencing

Since Editing CRISPR/Cas technology grow to be an extremely necessary tool for genome change made, the functional unit of the CRISPR/Cas system after a long time has to be present in the nucleus of target cells, using non-viral delivery using Au, Si NPs.³⁶

NiF, and CoF are also used in silencing, increasing expression, and direct editing CRISPR/Cas9 of virus infection therapy. Non-viral delivery of the CRISPR/Cas system: DNA versus RNA versus ribonucleoproteins (RNPs) has been reported.³⁶ The use of Au, Silica, and Zn SPIONs has been reported.³⁶ This can be achieved by delivery of different biomolecular Cas9 and gRNA formats: plasmid DNA (pDNA), RNA, or Cas9 RNPs.³⁶

Before the use of SPIONs, a novel non-viral vector-mediated gene delivery into mammalian cells by cationic lipid-nanoceria hybrids, a study of the cellular uptake mechanism.³⁷

Green synthesis of biocompatible superparamagnetic iron oxide-gold composite NPs for magnetic resonance imaging, hyperthermia, and photothermal therapeutic applications.³⁸ Au ferrite using aqueous leaf extract has a high relaxivities ratio, indicating the potential of gold ferrite nanoparticles for a contrast agent. MRI of chicken tissue and poultry heart has confirmed this contrast enhancement performance.³⁸

Cobalt ferrite is new applications in lithium-ion batteries, magnetic photocatalysis, and hyperthermia treatment.^{23,34,38} Caused by its chemical, thermal, and color stability, cobalt ferrite NPs are widely used in the ceramics industry.²³ These Al, Ag, Au, Pt, Pd, Li, complete the doped Co, Zn, Ni, and Mg in industry 4.0 forward to society 5.0 but should be aware to ARMGs using, where green synthesis cost-effective, also covered all energy supply.^{4,23}

Aluminum doped cobalt ferrite as an efficient photocatalyst for the abatement of methylene blue.³⁹ At pH 11, using a 200 W visible light bulb and in 120 min, 93% methylene blue dye was degraded by using 0.1 Al_{0.03}Fe_{0.17}O_{0.4}.³⁹

A physiologically based pharmacokinetic model to foresee the superparamagnetic iron oxide nanoparticles (SPIONs) accumulation in vivo.⁴⁰ Biodiversity of plant biosynthesis has a commitment future. Biodiversity in new fields of application in technology, pharmacy, and economy along with environmental policies has been registered and become the next table of Ex/Em. The development happened not only in Indonesia but also in other biodiversity-rich tropical countries. Indonesia is a global megadiversity hotspot.

Fast transfection of mammalian cells using superparamagnetic NPs under a strong magnetic field is reported.⁴¹ This Superparamagnetic NPs used in mammalian cells are well for market share, and function as fast delivery of DNA into mammalian cells. Most complexes of plasmid DNA and polyethyleneimine (PEI)-coated SPIONs were internalized immediately.⁴¹

Superparamagnetic NP delivery of DNA vaccine at room temperature has been reported.⁴² PEI was selected to modify the surface of SPIONs to contribute the delivery of plasmid DNA into mammalian cells caused by the polymer's affecting a large area buffering capacity via the "proton sponge" effect.⁴² These SPIONs also have already been used as diagnostic agent.⁴²

The outcome of this study is not only the raw material for pharma economic (with agarose gel) or doping but also in nature, the being mantids (orchids, leave, sticks) RNAi transposon transfection, are based on semiconductor in high relative humidity countries have to be known by all.



FIGURE 1: Green Synthesis: Moringa Oleifera Leaves (July 19, 2020)/ 3 Years) as Spinel Ferrites SPIONs Sources Based on Semiconductor Ex/Em

IV. LIMITATION

Power hindrance, stigma, label, sensitiveness, and industrial deafness, all become the SPIONs accumulation in vivo.^{5,40} The nature SPION accumulation is not associated with laden diseases in the tropical rainforest areas, which could be a crime of omission by everyone by thinking as a fate. The using of many respective SPIONs of words, takes the importance of Bayesian analysis. Also, all types of miRNAs, DNA, and protein which transported by the SPIONs as a vector. Moreover, different size of SPIONs as a semiconductor has different Ex/Em which could not be considered equal. Domestic name of the same species of plants has also different local mentions, also the mantids and the part of the plants should be separated.

The technology which uses cellulose and collagen done by electrospinning machine in Industry 4.0 without Society 5.0 should stand toward SPION mammalian cells market-share.⁴¹ Superparamagnetic nanoparticles delivery DNA vaccine⁴² and also happens in nature⁴³ by NPs green synthesis. Easy and low cost to make, without doing the counting of metal nanoparticles from green synthesis for miRNA and NG drug delivery, and biological application in this study should be started from now on. Genetically modified organism (GMOs) in plants is now used for market share in global food safety, security, energy production, global synthetic biology applications, climate change, and economic crisis, to recover quickly from these nature or nurture difficulties. Analyze different sizes, shapes, and crystallinity CoF NPs from plants, extracted by various techniques have been recorded.¹⁰

V. CONCLUSION

The pathophysiology of natural nano-vector in tropical rainforest areas has to be taken care of in One-earth industry 4.0 with Society 5.0. The value of these nanoparticles should be protected by law especially those associated with RNAi sepsis, LGBTQIA et al. Different sizes, structures, pH, and Spinel Ferrite NPs methods in various leaves extract, fruit peels, will bear new map from the result of any result associated wave-length Excitation/Emission (Ex/Em) for cancer and viral therapy.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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Kelor, Salam, Pepaya, Binahong Mystery in RNAi Indigenous Vector Transfection: A Mystic Semiconductor?

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Abstract— *Spinel ferrite extracted from leaves is the Next Generation (NG) drug-gene delivery, which is a prestige present by Pharma manufactures in cancer and viral diseases, but not aware of the nature physiology of orchids, leaves, and stick mantids, where the prevalence has been known high in the tropical rainforest countries. RNAi, a novel non-viral vector-mediated gene delivery into mammalian cells could be for silencing, increasing gene production, or editing the gene, also occurred in the laboratory incubator or in our large huge natural incubators such as tropical rainforests at night where relative humidity near 100% and high level of CO₂ more than 5%-10%, loss from leaves. This review is the first that reveal the physiology of natural nonviral vector RNAi based on cellular biophysics semiconductor truths, changing the mystic to a mystery of laden sociology and the health problem in wet and warm areas, high relative humidity condition.*

Method: Review articles done from Science Direct, EBSCO-host, etc. **Keywords:** cobalt ferrite and Moringa, broaden with other diction found in Bayesian network.

Result: Nickel ferrites also known as one of the spinel ferrites (SF), are frequently utilized in magnetic-based drug delivery and contrast agents. Many types of methods of doping give different sizes, morphology, and physical features of magnetic NPs. All samples displayed superparamagnetic (SPM) behavior at room temperature, with no or negligible coercivity and retentivity.

Conclusions: Semiconductor CoFe₂O₄ extracted from many leaves from the tropical rainforest area, act as a nano-carrier of RNAi in wet and warm tropical rainforest countries, are signed by mantids.

Keywords— Cobalt ferrite, Electromagnetic power, Moringa oleifera, Nano-carrier, Superparamagnetic (SPM) nanoparticles.

I. INTRODUCTION

*Binahong*¹ (Anredera cordifolia) heart leaf, *Salam* (Syzygium polyanthum) bay leaf,² *Papaya* (Carica papaya), *Kelor* (Moringa oleifera)^{3,4,5} drumstick tree leaves extraction, is a Next Generation (NG) of nonviral vector-mediated gene delivery into mammalian cells.^{6,7,8} CoFe₂O₄ (cobalt ferrite, CF) nanoparticle⁹ and nickel ferrite (NiFe₂O₄, NiF),¹⁰ is potentially superparamagnetic nanoparticles, act as a semiconductor which has electromagnetic power.

Besides gene delivery into mammalian cells, cobalt NPs also used in silencing, increasing expression of genes, and editing CRISPR/Cas9 of virus infection therapy.¹¹

RNAi, a novel non-viral vector-mediated gene delivery into mammalian cells¹² could be for silencing, increasing gene production, or editing the gene, which could be occurred in a laboratory incubator, or in our large huge natural incubator such as tropical rainforest at night where relative humidity near 100% and high level of CO₂ more than 5-10%, by which CO₂ loss from leaves. That's why living plants could not place in the bedroom at night. This review is the first revealed natural nonviral vector RNAi based on cellular biophysics semiconductor NPs, open the mysticism and mystery of laden sociology and laden health problem in tropical rainforests hidden by stigma, mysticism, and sensitiveness by the family, or even by the village.¹³

This study aims to open the mystery of mystic nanoparticles (NPs) which have nano-economic power, which will complete the macro- and micro-economic global to recover together, recover stronger.

II. METHODS

The search was done in 1st semester of 2023.

This review article digs from Science Direct, EBSCO-host, and other search engines, related references to Cobalt Ferrite and Moringa oleifera. Using keywords: Moringa Oleifera and cobalt ferrite with Bayesian analysis and networks.

III. RESULT

The potentiality of many tropical rainforests leaves powder had been reported to be Next Generation (NG) drugs gene delivery. Next Generation of nonviral vector-mediated gene delivery into mammalian cells has been reported.⁶

Meanwhile, orchid mantids and 'salam' (*Syzygium polyanthum*) bay leaf, has been reported as translational RNAi indigenous as an insect fact in tropical rainforest country area such as Indonesia, Thailand, and many other SEA countries, for a long-long time ago.²

Kelor, salam, binahong, papaya, etc. has been reported associated with cobalt ferrite, nickel ferrite, and spinel ferrites, which have functioned as Super Paramagnetic Iron Oxide Nanoparticles (SPIONs)^{8,14} There are many various types of leaves as source of cobalt ferrites (CoF) and other spinel ferrites:

3.1 Cobalt Ferrites (CoFe₂O₄, CoF)⁹

Green synthesis of CoF nanoparticles (NPs) is an emerging material for environmental and biomedical applications.⁹ Cobalt doping on NiF nanocrystals intensifies the micro-structural and magnetic properties, and both have a correlation. The smaller of the same type have different emissions of the semiconductor crystal.¹⁰ It is like the radio wave of a transmitter, the smaller the semiconductor the higher the frequency, the shorter the lambda (wavelength). Gene delivery by CoF, NiF, and other spinel ferrites functions as semiconductors based.¹⁴ Polymeric Nanoparticles: Potent vectors for vaccine delivery targeting cancer and infectious diseases.¹⁵ Polymers used to form nanoparticles can be both synthetic and natural, using for drug delivery, imaging contrast agent, and detection of apoptosis.¹⁵

3.2 Binahong (*Anredera cordifolia*)

The synthesis of Cobalt Ferrite Nanoparticles using 'binahong' (*Anredera cordifolia*) has been reported as antibacteria.¹ A research has been done on the synthesis of CoFe₂O₄ nanoparticles using 'binahong' (*Anredera cordifolia* (Ten) Steenis) leaf extract. With comparison mol variation of (Co(NO₃)₂.6H₂O : (Fe(NO₃)₃.9H₂O) = 1:1 in 15 mL extract. The nanoparticles were characterized using XRD and SEM and tested for their antibacterial activities.¹ The NP size was 37.52 nm, which suggests is good as an antibacterial.

3.3 Kelor (*Moringa oleifera*/ MO)

The NPs size from the study of Almesiere has been reported as within the size range of 11-17 nm and 16-28 nm in groups with and without extracted MO leaf on green synthesis.³

It is the effect of 'kelor' (*Moringa oleifera*) leaf extract on the structural and magnetic of Zn doped Ca-Mg nano-SFs.³ All samples present superparamagnetic behavior at room temperature, with no or negligible coercivity and retentivity. Abdul Karim et al also confirmed silver ferrites extracted from *Moringa oleifera* using ethanol 96%.⁴ Desoky,⁵ 2022, explore the impact of doping on the structure and low-temperature magnetic features of cobalt nano-spinel ferrite.

3.4 Salam (*Syzygium polyanthum*)

The mantis form which is similar to 'salam' (*Syzygium polyanthum*) bay leaf has been reported as indigenous RNAi: camouflage in tropical rainforest climate areas.² And Das reported a novel non-viral vector-mediated gene delivery: an investigation of the cellular uptake mechanism.⁶ Fast transfection SPIONs under a strong magnetic field has been reported by Chen in 2009.⁸ Synthesis and magnetic properties of cobalt ferrite (CoFe₂O₄) NPs by wet chemical route has been prepared in 2007.⁷

3.5 Papaya (*Carica papaya*)

Nanotechnologies are utilized in the areas of medicine, agronomy, environments, communication, consumer possessions, chemistry, and energy, as well in industry 4.0 such as photovoltaic solar cell detectors thin films.¹⁶

Biosynthesis of TiO₂ nanoparticles by Caricaceae ('papaya') shell extracts are made for antifungal application.¹⁶ Applied TiO₂ nanostructure of numerous surface morphologies could consist of nano prism, nanotube, nanobuds, quantum dot, nanoparticles, nanofilms, nanosheets, nanoplates, nanomicrospheres, nanopyramids, nano tetra-pods, etc.¹⁶

3.6 *Jambu biji* (Psidium guajava)

Removal of organic dyes from water (water treatment) and anti-microbial-based magnetic nanoparticles have been reported by Adhikari,¹⁷ 2022. Green Synthesis of Iron Oxide Nanoparticles using Psidium guajava L. leaves extract for degradation of organic dyes and anti-microbial applications.¹⁷ Structure, form, and electrical properties of CoF synthesis by solvothermal has been reported.¹⁸ Hydrothermal synthesis of cobalt ferrite NPs have been reported on the structural and magnetic properties.^{19,20}

IV. DISCUSSION

From translational medicine of tropical rainforest leaves associated with the mystery of nano-carrier or nano-vector, a.k.a nanoparticles, the basic cellular biophysics will support the potentiality of spinel ferrite superparamagnetic properties. There are as follows:

4.1 Semiconductor-RNAi and Semiconductor nanocrystal-antibody

Structure analysis, morphological observation and electrical behavior of CoF synthesis by surfactant-free solvothermal.¹⁸

Hydrothermal route synthesis of spherical cobalt ferrite NP: synthesis characterization & optical properties,¹⁹ and hydrothermal process on structural and magnetic properties of CoNi Ferrite are functionalized CNTs nanocomposites.²⁰

A strong temperature relying on magnetic viscosity and coercivity, prone to zero on approach spin glass freezing temperature from below, then support the spin-glass state which results from magnetic dilution driven by diamagnetic Zn²⁺ and Ti⁴⁺ ions leading to magnetic frustration. This is reported in Antiferromagnetic short-range order and cluster spin-glass state in diluted spinel ZnTiCoO₄.²¹

Hybrid materials give a great understanding of the part played of existing organic functions, metal nodes, and the presence of defects in metal-organic frameworks for the adsorption and sensing of phosphate. How a second component increases the adsorption efficiency, and advances the removal and identification of phosphate.²²

Selective and sensitive turn-on fluorescent sensor for identifying the presence of phosphate in aqueous solution.²³

4.2 Low-cost cobalt ferrite nanoparticles

Spinel nano-ferrites for a low-cost process for sustainable energy source based on spinel nano-ferrites for aqueous supercapacitors. A nano-ferrites as supercapacitor electrodes have been reported by Malale.²⁴

There is a correlation between cation distribution and magnetic and dielectric properties of a substituted Fe-rich cobalt ferrite.²⁵

Amazing sensitivity, cheap, high stability, great selectivity, and quick response at low temperature creates these sensors favorable for medical industries. Nano ferrite in biosensors.²⁶

4.3 SPIONs^{8,27}

Chen⁸ 2009 has reported a fast transfection of mammalian cells using Superparamagnetic Iron Oxide Nanoparticles (SPIONs). A fast delivery of DNA into adherent and suspended cells was well-transfected with enhanced green fluorescent protein gene has been reported.⁸ The transfection enhanced with the strength of magnetic field and the number of pulsing. The enhancement in transfection efficiency was about two-fold on average by pulsing in magnetic field on 0.6 Tesla three times.⁸ Later, SPIONs has used to deliver DNA vaccine.²⁷

4.4 Cobalt Ferrite dope

Cobalt Ferrite dope and nano-powder strontium-substituted CoF has been performed.²⁸

MgF dope based on calcination temperature on the spin-spin relaxation time (T₂).²⁹

Lanthanum doping on microstructural, dielectric & magnetic properties of MnO.₄ZnO.₆CdO.₂LaxFe1.8-xO₄ (0.0<x<0.4).^{30,31}

4.5 Cobalt ferrite nanoparticles for sensing/detector

Semiconductor cobalt ferrite nanoparticles for sensing phosphate ions in aqueous media and biological samples have been reported.³²

Highly sensitive detection of phosphate using well-ordered crystalline cobalt oxide nanoparticles supported by multi-walled carbon nanotubes (MWCNT).³³ Single-walled (SWCNT), double-walled (DWCNT), MWCNT has been reported as the remarkable nanotechnology of Industry 4.0 in almost all aspects.³⁴ Rationale and trends of applied nanotechnology have also to be recorded.³⁵ Intrinsically conductive polymer hybrid bilayer films for molecular diagnosis of the Zika virus are published in Colloids and Surfaces B: Biointerfaces.³⁶

4.6 Water treatment

Despite being used for sensing/detectors, cobalt ferrite is used for water treatment.³⁷ Zhu 2022 reports water treatment of organic dyes as a major source of industrial wastewater pollution used photocatalytic degradation. Using cobalt ferrite and dope to degradation efficiency.³⁸ Prepared plant roots, leaves, fruit peels, seeds, and biomass waste, are now widely used in organic dye degradation, heavy metal recovery, photoelectric fuel cell, antibiotic degradation, etc.³⁸ Hassan review provides up-to-date insight research on bioelectrochemical systems (BESs), which improves the removal of the antibiotic in an efficient way. Bioelectrochemical technologies are found promising.³⁹ Antibiotic wastewater from pharmaceutical industries that make antimicrobial resistance is needed for the ecosystem. The degradation rate of antibiotics increased, indicating good photostability. Current knowledge and future perspective in environmental engineering.³⁹

Vamvakadis, 2020, report diverse surface chemistry of cobalt ferrite NPs to optimize Copper(II) removal from aqueous media.⁴⁰ The nano adsorbents were quickly isolated from the solution by magnetic separation and regenerated easily by acidic treatment.⁴⁰

4.7 Advanced Spinel Ferrite Nanocomposites for Electromagnetic Application

Epoxy-based (EP)-Cobalt Ferrite nanocomposites is useful as protective coatings and corrosion-resistant for a variety of application.⁴¹ The cobalt ferrite nanofiller was synthesized through a coprecipitation route by a reaction of $\text{Fe}_2(\text{SO}_4)_3$, Co SO_4 , and triethylene glycol. The obtained cobalt ferrite NPs were thermally treated at 600°C for 5 hours. As prepared, the cobalt ferrite NPs were surface functionalized with 3-(triethoxysilyl) propylamine (APTES).⁴¹ Yadav, 2021, reported spinel ferrite nanocomposites formation and characterization. An advanced spinel ferrite nanocomposites for electromagnetic applications were reported.⁴² Multifunctional magnetic nanoparticle has been reported by Aghanejad 2021, for medical application-based hybrid materials.⁴³

One of the delivery patterns for CRISPR/Cas9 system is non-viral delivery modes, incl. transfection using polymer nanoparticles, once using gold nanoparticles for gene therapy.¹¹



(A) Kelor Leaves Soup with Coconut Water



B) Kelor Leaves Soup with Coconut Milk (Santan)

FIGURE 1: From Kelor Leaves Soup to Source of Green Synthesis Semiconductors Magnetic NPs

V. LIMITATION

Magnetic nanoparticles (NPs), such as Ferromagnetic cobalt ferrite (CoF) are suitable for transfection in NG drug delivery,⁴⁵ Cobalt ferrite synthesized by co-precipitation method, agarose gel, and deionized water were used during the test, superparamagnetic with an average stable small size of 10.45 nm.⁴⁵ Smaller than 7 nm could not positively affect the higher r_2 relaxivity.⁴⁵ Many magnetic NPs recklessly think as diamagnetic (nonmagnetic), not Ferromagnetic is a stuff that could be pulled strongly by magnets: cobalt, iron, steel, and nickel. Diamagnetic materials are those that some people generally think of as nonmagnetic, such as gold, copper, mercury, and bismuth. Paramagnetic materials are those that have weak pull by magnets, e.g.: aluminum, copper, and platinum. But, superparamagnetic is a form of magnetism that appears in small ferromagnetic or ferromagnetic nanoparticles, where due to the small size, flip direction under the influence of different temperatures, pH, and longer time of process, have higher magnetic characteristics.^{45,46} A single-domain magnetic iron oxide particles with hydrodynamic diameters ranging from 1-100 nm are called Superparamagnetic Iron Oxide Nanoparticles (SPIONs).^{45,46} This review does not strictly group the size of NPs in biological applications, especially RNAi vectors, the role of methods, and PH. We are sometimes trapped to dig the NPs for induction of hyperthermia, also as a contrast agent in MRI,⁴⁶ and water treatment in degradation of organic dyes¹⁷.

VI. CONCLUSION

Semiconductor CoFe_2O_4 extracted from many leaves from the tropical rainforest area, act as a nano-carrier transposon bullet in the transfection process in wet and warm tropical rainforest countries, are signed by mantids. Improving the performance of the Nano Ferrite Indigenous Vector in various places, and various parts of plants will develop the knowledge for prospects to further enrichments.

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CONFLICT OF INTEREST

The author declares no conflict of interest.

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