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Evaluation of Pharmacological and Clinical Prophylactic Efficacy of Scrofoloso-12 Group of Electrohomoeopathy Medicine in Eye Disorder

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ABSTRACT

Eye disorder is the most common issue in today's era. Hundreds of various eye disorders and eyesight issues exist. Some diseases are incurable, while many others can be treated. The modern system of medicine works incredibly with advanced techniques and formulations relevant to eye disorder but has certain limitations. Electrohomoeopathy is a new system of medicine founded by Dr. Count Cesare Mattei where the plant is the main source of preparation of medicine. In Electrohomoeopathy we study individual and combination plants show the synergistic effect when specific essence is rationally mixed together to form an effective group against the eye disorder. Spagyric medicine is an old form of natural medicine that has been tested, researched, and practiced for decades. In this article, we are going to discuss the pharmacological activity and the effectiveness of the Scrofoloso-12 group of Electrohomoeopathy medicine with the help of the animal model. Subsequently, we are going to evaluate and correlate the efficacy of Scrofoloso-12 group use in various eye disorders during clinical practice. Hence, the present study focuses on the scientific investigation of the effectiveness of the S12 group against Atropine induced corneal, light reflux, and mydriatic effect of rabbit models.

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Introduction

Prevalence of Eye disorder

As per the various authentic data near or distant, vision impairment affects at least 2.2 billion individuals worldwide while nearly half of these cases of vision impairment may have been avoided or managed. These people include those with moderate or severe distance vision impairment or blindness due to cataract (94 million), untreated refractive error (88.4 million), glaucoma (7.7 million), corneal opacities (4.2 million), diabetic retinopathy (3.9 million), and trachoma (2 million), as well as those with near vision impairment due to uncorrected presbyopia (826 million) [1]. In the United States, approximately 12 million individuals aged 40 and over have a visual impairment, with 1 million being blind, 3 million having vision impairment after treatment, and 8 million having vision impairment owing to uncorrected refractive error [2]. Near vision loss affects more than 137 million individuals in India, with 79 million people suffering from impairment. According to the National Blindness and Visual Impairment Survey, 2015-2019, cataracts (71%) and refractive error (13.4%) were the most common causes of visual impairment in people over 50 Low and middle-income countries are very much affected due to eye disorders [3].

Plants based medicine and eye disorder

Due to light absorption and the high metabolism rate of their tissue cells, the eyes are subjected to oxidative stress. Many major eye disorders, such as ocular inflammation, neovascularization, age-related macular degeneration, glaucoma, and cataracts, are exacerbated by oxidative stress [4]. As ophthalmic ailments, herbal compounds such as lutein, zeaxanthin, omega-3 fatty acids, vitamin C, and vitamin E have been tested. Even though there have been numerous good outcomes for prophylactic or even therapeutic usage for ocular illnesses, the efficiency of these treatments is still debatable [5]. Scrofoloso-12 group of Electrohomoeopathy medicine has the unique rational combination of 8 plants Atropa belladonna, Cochlearia officinalis, Euphrasia Officinalis, Hydrastis Canadensis, Matricaria Chamomilla, Nasturtium officinale, Scrophularia nodosa, and Smilax Medica (Sarsaparilla). As per the Electrohomoeopathy Scrofoloso group-12 is the specific remedy for various eye disorders and is very much effective in chronic disease.

Rational combination of Plants used in S-12 groups

The functions of the neurological system can be influenced by a rational combination of Scrofoloso-12 and its active ingredients. Salivation, sweating, pupil size, urination, digestive activities, and other physiological functions are all controlled by the neurological system. It offers a lot of potential for eye problems such as conjunctivitis, keratitis, and eye traumas, wounds and eye sight.

Atropa belladonna

The poisonous perennial herbaceous plant Atropa belladonna, popularly known as belladonna or deadly nightshade, belongs to the nightshade family Solanaceae. It's a European, North African, and Western Asian native [6]. Belladonna was used as a mydriatic, sedative, and bronchial spasm reliever in asthma and whooping cough, as well as a cold and hay fever cure. Parkinson's disease, colic, inflammatory bowel disease, motion sickness, and pain relief are all conditions for which it is prescribed. Major Chemical constituents in Atropa belladonna include atropine, hyoscine (scopolamine), and hyoscyamine, which have anticholinergic properties [7]. The mechanism of action included the active components of belladonna acting as competitive antagonists at muscarinic receptors and blocking the binding of acetylcholine to the central nervous system and parasympathetic postganglionic muscarinic receptors. Belladonna has chemicals that act on the nervous system which regulate body functions like salivation, sweating, pupil size, urination, digestive functions, and others. Belladonna can also cause increased heart rate and blood pressure. Hyoscine present in belladonna has anticholinergic action exerts a smooth muscle relaxing and spasmolytic effect. Hyoscyamine is an antagonist of muscarinic acetylcholine receptors. It blocks the action of acetylcholine at parasympathetic sites in sweat glands, salivary glands, stomach secretions, heart muscle, the sinoatrial node, smooth muscle in the gastrointestinal tract, and the central nervous system.

Euphrasia Officinalis

Euphrasia often known as eyebright, is a genus of herbaceous flowering plants in the family Orobanchaceae (previously Scrophulariaceae) that has a worldwide range. They feed on grasses and other plants and are semi-parasitic. The plant's popular name refers to its usage in the treatment of eye infections. Flowers are usually terminally borne, zygomorphic, and have a lower petal that resembles a lip. Purple, blue-white, and violet are the most common flower colors. Yellow lines on the lower petal of some species serve as guidance for pollinating insects [8]. It used to treat bad memory and vertigo. Used for redness, swelling, and visual disturbances caused by blepharitis, conjunctivitis, eyestrain, and to relieve inflammation caused by colds, coughs, sinus infections, sore throats, and hay fever. Major chemical constituents included N-hexadecanoic acid followed by thymol, myristic acid, linalool, and anethole. Eyebright contains iridoid glycosides including aucubin, flavonoids, including quercetin, apigenin, and tannins. The most studied constituent of eyebright is aucubin and its aglycone, aucubigenin. Eyebright contains aucubin which acts as an anti-inflammatory via an inflammatory pathway [9]. Eyebright contains iriod glycosides that might act through inhibition of thromboxane-synthase enzyme helpful in inflammation. Eyebright contains Aucubigenin, the aglycone of aucubin has been shown antibacterial effects against S. aureus, P. mirabilis, and B. subtilis, antifungal activity against C. Albicans and P. italicum 6, 7, as well as anti-hepatitis B virus. Eyebright is often used as an ingredient in eyewashes, eye drops, or compresses applied to the eyes.

Cochlearia officinalis, often known as common scurvygrass, scurvy-grass, or spoonwort, is a flowering plant in the Cochlearia genus of the Brassicaceae family. The herb was transported onboard ships in dried bundles or distilled extracts, and it was given its common name once it was discovered to cure scurvy. The bitter flavor was frequently concealed with herbs and spices, but this did not stop scurvygrass beverages and sandwiches from becoming a popular trend in the United Kingdom until the mid-nineteenth century when citrus fruits became more widely available. Medicinal use included as an antiscorbutic, aperient, disinfectant, diuretic, stimulant, and preventative for scurvy [10]. Components of Major Chemicals included calystegines, nortropane alkaloids derived from pseudotropine, flavonoids, phenolic acids, and vitamin C while tropane alkaloids included hyoscyamine and scopolamine [11]. Tropane alkaloids present in Cochlearia officinalis enhance competitive antagonism at muscarinic acetylcholine receptors, preventing the binding of acetylcholine. Cochlearia officinalis seems to diminish the hyperactivity of Acetylcholine while an increasing amount of Acetylcholine in the nervous system may cause headaches, weakness, and mental changes. Few studies suggest that ascorbic acid present in Cochlearia officinalis quickly accumulates in microvascular endothelial cells, scavenges reactive oxygen species, and acts through tetrahydrobiopterin to stimulate nitric oxide production by endothelial nitric oxide synthase helpful in various diseases.

Hydrastis Canadensis Goldenseal (Hydrastis Canadensis), commonly known as orange root or yellow puccoon, is a perennial herb native to southeastern Canada and the eastern United States in the Ranunculaceae family. It's easy to spot because of its thick, yellow knotted rootstock. Above ground, the stem is purplish and hairy, while below ground, where it joins to the yellow rhizome, is yellow. Goldenseal reproduces both clonally and sexually via the rhizome, with the clonal division being more common than asexual reproduction. A plant's sexual maturity takes anywhere from 4 to 5 years. Flowering plants produce a single terminal flower with no petals, three sepals, and twelve or more prominent white pistils that bloom for a short time in the spring. Wound healing, stomach, and intestinal problems, peptic ulcers and colitis, skin, eye infections, and malignancies were among the medicinal uses. Gastritis, diarrhea, and hemorrhoids, upper respiratory tract infections, clogged noses, and hay fever additive use of Goldenseal. Goldenseal is a highly known nutritional supplement for gastrointestinal disorders and hemorrhagic diseases. This plant contains a variety of alkaloids, such as berberine, hydrastine, palmatine, canadine, 6-desmethyl-sideroxylene, hydrastinine, as well as flavonoids such as sideroxylin, 8-desmethyl-sideroxylene, and others, neochlorogenic acid, chlorogenic acid. Berberine is the most pharmacologically active of these chemicals, and it is currently being studied for coronary artery disease, asthma, dyslipidemia, and cancer in clinical trials. Berberine may potentially serve as an inhibitor of the -glucosidase enzyme. Berberine has anti-inflammatory, antioxidant, neuroprotective, and cardioprotective properties, as well as lipid-lowering and insulin resistance improvement [12].

Matricaria chamomilla popularly known as chamomile, German chamomile, Hungarian chamomile (kamilla), wild chamomile, blue chamomile, or fragrant mayweed, is an annual plant belonging to the Asteraceae family. Although other species are frequently used as chamomile, the name M. Recutita is commonly assigned to the most prominent source of the herbal product chamomile. The Asteraceae family includes Matricaria chamomilla, which is native to southern and eastern Europe [13]. Even in ancient times, chamomile was used as a sedative to relieve anxiety and induce sleep. In a randomized clinical sampling done to treat anxiety in adults, modern clinical trials have validated this health effect from Chamomile. Anti-allergy, stomach issues, and eye inflammation and irritation were among the other benefits. The following are active constituents discovered in Chamomile, sesquiterpenes, terpenoids, flavonoids, coumarins such as herniarin and umbelliferone, phenylpropanoids such as chlorogenic acid and caffeic acid, flavones such as apigenin and luteolin, flavonols such as quercetin and rutin, and polyacetylenes are among the

other substances found in chamomile. The combination of these compounds is said to offer Chamomile's health advantages, albeit there is little scientific evidence to back up these claims. Eye inflammation and irritation are relieved by using a cold compress containing chamomile extract. Sleep has been reported to be induced by higher dosages of chamomile extract. A clinical trial on mice exposed to an itch-scratch chemical found that mice given German chamomile had fewer symptoms than mice who were not given chamomile [14].

Nasturtium officinale Sometimes known as watercress or yellowcress, is an aquatic flowering plant in the Brassicaceae family. Watercress is a perennial plant native to Europe and Asia that grows quickly. It is one of the oldest leaf vegetables known to have been consumed by humans. The pungent flavors of watercress and many of its relatives, such as garden cress, mustard, radish, and wasabi, are well-known. Watercress stems float in water because they are hollow. The leaves have a pinnately complex structure. Insects, particularly hoverflies like Eristalis flies, frequent the small, white, and green flowers that bloom in bunches. Anabolic and antiscorbutic effects are conferred by the vitamins listed. It contains iron, zinc, copper, manganese, magnesium, iodine, phosphorus, nicotinic acid, and traces of arsenic, vitamins A, B1, B2, C, E, and enzymes, as well as iron, zinc, copper, manganese, magnesium, iodine, phosphorus, nicotinic acid, traces of arsenic, vitamins A, B1, B2, C, E, and enzymes. It is used as a diuretic and draining depurative, fluidizer, and expectorant of the phlegm of the airways in cases of exhaustion, anemia, and vitamin deficiencies, in skin diseases resulting from them, in eczemas and alopecias of the scalp (concentrated juice), and in eczemas and alopecias of the scalp (concentrated juice). Phenolic compounds neutralize ROS; polyphenols such as phenolic and flavonoids found in watercress, such as phenolic acid, ellagic acid, and gallic acid, have antioxidant, anticancer, and antimutagenic properties. Flavonoids such as quercetin and catechin have been shown to have antibacterial, anti-inflammatory, vasodilatory, antiplatelet aggregatory and neuroprotective properties. Glucosinolates work by preventing cancer cells from becoming invasive. Detoxification activity in phases 1 and 2 is regulated. Carotenoids in humans are beneficial antioxidants that can protect one from disease and enhance the immune system. Provitamin A carotenoids can be converted into vitamin A, which is essential for growth, immune system function, and eye health [15].

Scrophularia Nodosa (also known as figwort, forest figwort, and common figwort) is a perennial herbaceous plant native to the Northern Hemisphere's temperate zones, except western North America [16]. It thrives in the cultivated waste ground that is wet. From a horizontal rootstock, it grows upright with thick, sharply square, succulent stems up to 150 cm tall [17]. It has opposing leaves that are oval at the base and lanceolate at the tip, with serrated margins. The flowers grow in rectangular or pyramidal panicles in loose cymes. Individual blooms are globular, with five green sepals enclosing green or purple petals and a seed capsule in the shape of an egg. It can be used to treat hemorrhoids, eczema, and breast tumors. It can also be used to apply topically to malignant glands. It aids in the treatment of asthmatic symptoms. It is used to treat Hodgkin's disease and to relieve liver pain. It is effective in the treatment of vaginal pruritus. Chemical substances such as flavonoids, phenylethanoids, glycoside esters, phenolic acids, C9 iridoid, glycosides, resin glycosides, fatty acid derivatives, triterpenes, triterpenoid glycosides, alkaloids, diterpenoids, and essential oils can all be extracted from the genus Scrophularia. Scrophularia nodosa contains Essential oil that shows Antibacterial (against S. aureus), Free radical scavenging activities, and general toxicity. Iridoids, Scrodentoids A–E, scropoliosides show anti-inflammatory activity that significantly inhibited CoA-induced splenocyte proliferation. Scropolioside-A, koelzioside, harpagoside, 6-O-(3″-O-p-Methoxy-cinnamoyl)-α-L-rhmanopyranosyl catalpol, hepatoprotective and immunostimulant. Scopolioside A, scrophuloside A4, and scrovalentinoside show Wound healing activity. Scorodioside, Buddlejasaponin IV shows Antiviral properties [18].

Smilax medica: Smilax is a genus of roughly 300–350 species that can be found all over the world in the tropics and subtropics. Around 80 are found in China (39 of which are endemic), whereas 20 are found in North America north of Mexico. They are climbing flowering plants, many of which are woody and/or thorny, in the monocotyledon family Smilacaceae, native throughout the tropical and subtropical regions of the world. Smilax used for chronic skin problems, psoriasis, rheumatoid arthritis, Scrofula, gout, and giving general tonic benefits is among the medicinal uses. Use to treat eczema, psoriasis, toe fungus, sores, ulcers, and ringworm, among other skin conditions. Components of chemicals Saponins, sarasapogenin, smilagenin, sitosterol, and stigmasterol are all types of saponins. Smilax has also been proven to inhibit TGF-1-induced cell migration [19]. Sarsaparilla has been discovered to have a new anticancer role in preventing the invasiveness of a subset of cancer cells via inhibiting TGF-1 signaling.

Material and Method

The spagiric essence of Scrofoloso-12

The spagiric essence of Scrofoloso-12 has been prepared according to the Electrohomoeopathy protocol and collected from an Authentic Electrohomoeopathy lab Alchemy Research Lab-Punjab under the supervision of a qualified Pharmacist and investigator. Cross spagyric sample collected from Biomes Lab. Scrofoloso-12 sample has been evaluated for the sterility property under the supervisor of the study coordinator.

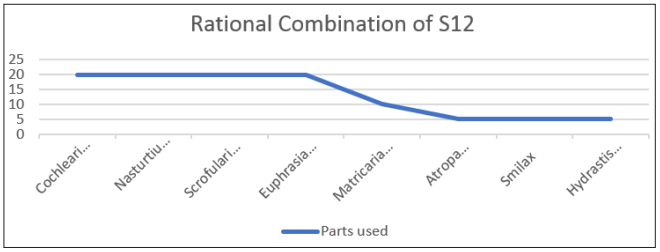


Table 1: Concentration gradients of S12

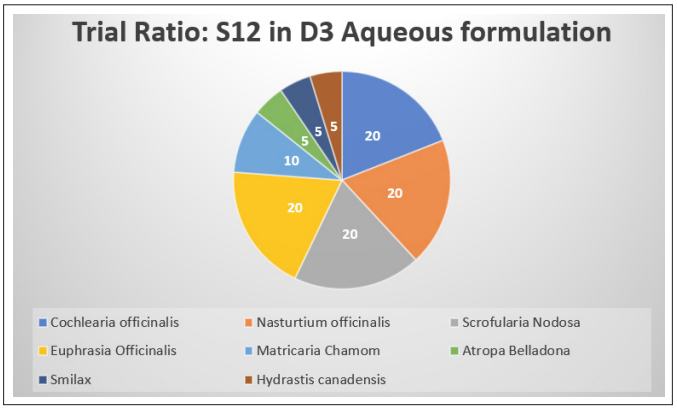


Table 2: Rational mixing during the animal study

Requirements and collection
Standard drug Atropine (1% w/v) was obtained from laboratories, in India. Normal saline was collected in Pharmaceutics Laboratory Acharya B. M Reddy College of Pharmacy.

Experimental Animal - Rabbits (2-5 kgs) were used for the study. Approval from the animal ethical committee was taken before the experimental work. As mentioned in many ancient and modern Pharmacopoeia of Ayurveda, Unani, Homeopathy, and Chinese Pharmacopoeia, several herbal medicines have been used for eye diseases for a long time. Night blindness, cataracts, floaters, and glaucoma can all be treated with them. The efficacy of these cures is based on personal experiences and discrete clinical results, rather than rigorous scientific research such as animal testing and clinical trials. So, during this study, we have selected the prescribed protocol on the Rabbit model.

Procedure
Handle the rabbit with care and place it in the rabbit holder box with the head on the outside. Make a note of the size of both eyes' pupils. Light reflex can be observed by moving the light from side to side and then back to front (to and fro), and corneal reflex can be observed by contacting a side of the cornea with a cotton swab of the tip.' Observed light reflex by putting the light from the side and then to the front and corneal reflex by touching the cornea with a cotton swab of stip. Use pouch method for installation of drops into the eye. Put one drop of saline to the left eye and consider it as the control eye [20]. Instill (mydriatic/miotic) in the right eye and consider it as a test. After adding the drops, press the medial canthus for 10 seconds. Record the following parameters at 1 minute, 5, 10, and 15 minutes after instilling the drug and saline. Parameters to be measured: 1. Diameter of the pupil 2. Light reflex 3. Corneal reflex.

Used pouch method for instillation of drops into the eye. Put one drop of saline to the left eye and instill (mydriatic) in the right eye and considered it as a test. After adding the drops, press the medial canthus for 10 seconds. Recorded the following parameters at 1 minute, 5, 10, and 15 minutes after instilling the drug and saline.

Parameters are measured:
Diameter of the pupil 2. Light reflex 3. Corneal reflex.
Three readings were taken for every parameter and recorded observations in a tabular form. Repeated the same procedure for other rabbits.

Observations

Drug	Light reflex			
	1 min	5 min	10 min	15 min
Saline	Present	Present	Present	Present
Atropine	Delayed	Delayed	Delayed	Delayed
Scrofolos-12 Test sample	Delayed	Delayed	Delayed	Delayed

Table: 3 Effect of S12 Light reflexes on rabbit eyes

Observation: Compared to normal control with saline, test drug with Scrofoloso-12 and atropine shows delayed light reflex during the prescribed period.

Drug	Corneal reflex			
	1 min	5 min	10 min	15 min
Saline	Present	Present	Present	Present
Atropine	Delayed	Delayed	Delayed	Delayed
Scrofolos-12 Test sample	Delayed	Delayed	Delayed	Delayed

Test /Standard/Control

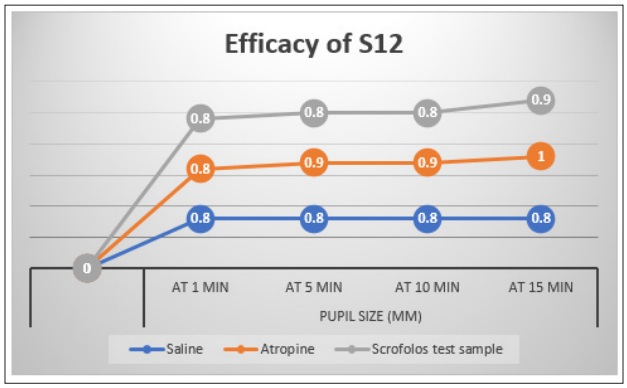
	Delayed Delayed Present	Delayed Delayed Present	Delayed Delayed Present	Delayed Delayed Present

Table: 4 Effect of S12 on Corneal Reflex on Rabbit Eyes

Observation: For the corneal reflex compared to normal control with saline water, test drug with Scrofoloso-12 and atropine shows delayed light reflex during the prescribed period.

Drug	Pupil size (mm)			
	At 1 min	At 5 min	At 10 min	At 15 min
Saline	0.8	0.8	0.8	0.8
Atropine	0.8	0.9	0.9	1.0
Scrofolos-12 Test sample	0.8	0.8	0.8	0.9

Table 5: Effect of S12 on Pupil size on rabbit eyes



Observation: Pupil size monitored at 1 min, 5 min, 10 min, and 15 min. Normal saline, atropine, and test sample Scrofoloso-12 showed the same pupil size initially. While the mydriatic effect was observed with atropine at 5 min null with test sample and saline. At 10 min mydriatic effect was observed in standard groups while test group changes in the pupil size observe control group does not show any changes. At 15 min increase in mydriatic effect was observed in the standard group and test group (S12) while the control group with saline water does not show any effect. Other observations noted during this study were mild irritation, itching, and rubbing of eyes for the test drug which disappeared within a few minutes.

Result: Desire effects of S12 have been shown on the experimental animal diameter of the pupil, Light reflex, and Corneal reflex. The results indicate that Scrofoloso-12 test sample shows mild effectiveness while the standard group with Atropine shows the mydriatic effect as per reference safety information with respect to the drug on the rabbit eye. The effectiveness of S12 was observed during this study on the specific parameter.

Conclusion: Awareness of common eye disorders and treatments might encourage patients to seek timely eye care, hence minimizing the burden of visual impairment. Despite the fact that 90% of vision loss is preventable, the majority of individuals do not have access to or the financial means to pay for eye care. In the present study, the finding suggests that the S-12 group of Electrohomoeopathy remedies possesses good results on experimental animals and can be correlated with clinical practice. For several decades across India, Electrohomoeopathy practitioners use S12 as a primary remedy for all kinds of Eye disorders, and several people get benefited. During clinical practice, S12 shows excellent results in chronic and acute eye disorders due to its rational combination of 8 plants in this group. Moreover, the efficacies of Electrohomoeopathy treatments have been said to vary widely due to non-standardized sources, quality, combinations, and preparation methods. These well-documented ancient cures, on the other hand, are a treasure for natural product discovery. Defined S12 essence and Electrohomoeopathy remedies provide a better choice for future development in order to solve the challenges of variances. Authority and government are very much conscious and encouraging the Herbal and plants system as an alternative due to its efficacy and safety. Scientific system Electrohomoeopathy is still under consideration despite all the evidence and scientific literature which shows its efficacy, safety, easy availability, and acceptability.

Limitation: This study was done for reference and to correlate the efficacy of S12 during clinical practice with the help of an animal model. Ophthalmic preparations like eye drops, eye ointment, or any formulation for direct eye administration are never recommended by Authors. Microbial-free environment and sterilization are major challenges. A large sample size and multi-center study require to correlate the efficacy for further evaluation.

Ethics approval

Approval from the Institutional Animal Ethics Committee (IAEC): IAEC/MLP/2021-22/PHL-21 was taken before the experimental work.

Data Availability

The data is available with the authors for further information and details you can communicate to the corresponding author via email as mentioned in the article.

Conflicts of Interest

The authors declared that there is no conflict of interest regarding the publication of this paper.

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Authors' contributions

All the authors are equally contributed to this article through the study. Correspondence Author is the primary source of communication and should intimate for any reference or further publication.

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