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"AN EXPERIMENTAL STUDY OF EFFECT OF AMALKIRASAYAN AND AMALKISWARAS WITH HELP OF ELECTRON MICROSCOPY".

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Declaration

The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, *Pramod Anand Tiwari* the author of the research paper entitled "AN EXPERIMENTAL STUDY OF EFFECT OF AMALKIRASAYAN AND AMALKISWARAS WITH HELP OF ELECTRON MICROSCOPY". declare that , I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal , This research paper is my original work and no part of it or it's similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Introduction

Ayurveda the science of life with its holistic approach has lead in the field of preventing aging also. Acharyas have considered Jara(means aging) as Vyadhi (disease). They had multichannel approach to achieve this goal. All the AyurvedicAcharyasof various samhitas have contributed on the subject of Rasayana (therapeutics to prevent aging – *YadJaraVyadhiNashnam Tad Rasayanam – Charak).*

Aims & objective

Various drugs termed as Rasayanas have been listed in various Samhitas. Explanation for their mode of action in preventing the aging is deficient. No attempt has yet been made to fulfill lacunae of this literature. The present study has been taken up with this aims and object.

The study certainly paves the path of future prove in this field thus the present research work can be termed as pilot study and in the light of its efficacy of AmalkiRasayanain preventing the aging can be explain.

From huge list of Rasayanas stated in various Samhitas, AmalkiRasayanawas picked up because most of the Acharyas has described it, due to its lesser number of components and due to its efficacy

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presented by most of the Acharyas, and the effect of AmalkiSwarasonly was compared with AmalkiRasayana.

Materials & methods

The material of the present study comprised of AmalkiRasayanaand AmalkiSwaras, administered to the young Swiss Albino mice (MusMusculus).

AmalkiRasayana; Fine powder of Amalki (4 Sera) was soaked with just enough amount of the juice of Amalki itself, and then this wet powder was dried in shade. The resultant powder was again soaked with Amalki Rasa as described above, was dried, and this similar process was repeated for twenty one times. This Amalki powder was mixed with honey (Madhu) (4 Sera), Ghrit (4 Sera). Pippali(Piper Longum) (½ sera) and Khand (Sugar) (1 sera).

This whole mixture was put in a tightly closed earthen pot (Ghara) and the pot was buried in soil containing ash, for the full monsoon season (VarshaRitu). After this period the pot was dug out, the powder retrieved and now this AmalkiRasayanawas ready for use.

AmalkiSwaras; It is a decoction of *Amalki* prepared as follows: Ten gm. dry, cut pieces of *Amalki* fruit are soaked in 40 ml of water at room temperature. Next morning, after shaking, the fluid is filtered and this fluid is called *AmalkiSwaras*. AmalkiSwarasis used fresh, and has to be prepared daily, because it cannot be stored as it losesits properties on storage

Experimental Animals; Healthy and young 35 male and 35 female albino mice weighing 30-40 gm. each, obtained from the animal colony of Central Drug Research Institute, Lucknow were used. The animals were acclimatized in seven different cages for ten days after being transferred from their colonies, they were housed in plastic cages and maintained on 12 hours dark and 12 hours light cycle in hygienic and sanitary conditions. Mice were fed on standard pellet diet (8 gm/mice/day) of Agron limited and tap water ad-libitum.

Experiment No. 1; A set of seven SWISS Albino mice weighing about 35-40 gm.weretaken and divided in two groups.

Group– A – 2Animals - Served as control.

Group – B – 5 Animals- Served as experimental animals.

The animals of control group were given diet as mentioned above and the experimental group animals were also given AmalkiRasayanaat a dose of 250 mg/mice/day, along with the diet and tap water. All the animals were watched for one month for any apparent behavioral or physical change which were kept on diet.

Experiment No. II; Studies using AmalkiRasayana– A set of 25 Animals comprising of five control and 20 experimental animals were used. All experimental animals were given AmalkiRasayanaat a dose of 250 mg/mice/day and were sacrificed after periodical intervals of 4 weeks each, in 5 different batches as shown in the table below.

Animal Groups	After 4 weeks	After 8 weeks	After 12 weeks	After 16 weeks	After 20 weeks
Control (Total Animals 5)	1	1	1	1	1
Treated (Total Animals 20)	4	4	4	4	4

Experiment No. III; Another set of 25 animals, 5 of which served as control and 20 of which served as experimental animals were given *AmalkiSwaras*at rate of 1.25 ml/mice/day along with diet. The

animals were sub grouped and sacrificed at periodical interval at different batches as shown below in table no.II

Animal Groups	After 4 weeks	After 8 weeks	After 12 weeks	After 16 weeks	After 20 weeks
Control (Total Animals 5)	1	1	1	1	1
Treated (Total Animals 20)	4	4	4	4	4

All the animals of control and treated group in both experiment no. II & III were watched for their physiological behavior and any other apparent sign of disease or toxicity, which could develop because of the drug administered.

Histological Study

For this study the chosen organs viz. brain, heart and gonads from all the animals of control and experimental were taken out after the animals were sacrificed decapitation. The organs were immediately put into the ice cold normal saline. A small piece of the tissue was cut out by standard procedures for electron microscopy,and immediately transferred and 3.5% buffered to glutaraldehyde, while the rest of the organ was transferred to formalin.Dehydration was achieved by serial changes in graded concentrations of acetone using 30 percent acetone for 15 minutes, followed by 50, 70 and 90 percent acetone for 30 minutes each. Finally two changes in dry acetone each for 30 minutes were given. After dehydration, tissue pieces were infiltered with various combinations of acetone and Durcupan ACM mixture.Polymerization was achieved by keeping the capsule incubator at 50c for 36-48 hours. The tissue blocks were taken out from beam capsule peeling off capsule. The blocks were finally trimmed on trimmer(reichert). Thin sections were cut on ultramicrotomeCMU (3), with a glass knife and were picked up on microscopic slides and stained with toluidine blue basic fuchsin and were studied under light microscope. Finally a representative area was selected for ultrathin sectioning. The ultrathin sections of silver and gold color were cut on fresh glass knife and were picked up on Athene type of grids coated with fine layer formvar. The sections were stained with uranyl acetate and lead citratefor studying in EM 301 Philips electron microscope.

Observation and result

The present study was done with the aim of proving the efficacy of one of the many Rasayanas. "*AmalkiRasayan*" described in Ayurveda by AcharyaCharak in ChikitsaSthan and BhaishajyaRatnawali. The effect of the Rasayana as mentioned in Ayurveda onhuman body is promotion of memory and intelligence, Preservation of health and youth, enhances luster, complexion andvoice etc. (Ch. Chi. 1/ 7).

Discussion

The quest of man to live longer, and remain healthy so large as he lives, has laid to a frantic search for compounds or substances that may produce the desired results. All the ancient systems of medicine like Unani, Ayurveda, Chinese, Tibetan system and others have a wealth of information on these aspects. Ayurveda, one of the oldest documented (2500 B.C.) systems have laid emphasis on not only the dependence on drugs but as such the Ahar and Viharto achieve best of health and longevity.

*AmalkaRasayana*and *AmalkaiSwaras*used for the present study were chosen because of long known and accepted facts about Amalki-Amla(EmbalicaOfficinalis) and also of the other components of Rasayanalike Madhu (Honey), Ghrit,Pippali(piper longum) Khand (Sugar) etc. Amalkiis one of the richest source of vitamin 'C' which is not destroyed even in dried form of it. It is cheap, easily available as well as tolerated bythe body. The use of Amalki fruit has been recommended in forms by Acharya.

When this Amalki is combined with other substances which have many useful properties, the synergistic effect of this compound all together has been told to be tremendous. Moreover the way these different ingredients are mixed. Processed and matured, the qualities of the resultant compound or substances has been described all together excellent for longevity and health.

Aging changes have been described in almost all tissues or body Generalized connective tissue and ground substance; and specialized organs. It is the various organs which have become focus of study. For the present study three organs were chosen; Brain, Heart and Gonads. The reason for choosing brain has been because brain regulates the body functions as a whole and besides the gradually weakening working body, it is the memory of a man which gets affected.

None the less, some of the first changes of aging have been described in brain. Similarly the heart, which supplies blood to all the body, again plays a pivitol role. Gonads— of course, are the basic tools not only of the creativity but also the diminishing or disbalanced gonadal hormonescost the body its vigor and youth.

In the present study light microscopic examination of the mice *brain* from control animals, showed normal morphology. The cerebral cortex, cerebellum, hippocampus, choroid plexus all demonstrated normal appearances of neurons, as well as density of cells. Glial cells and cerebral connective tissue was normal. However, electron microscopic examination demonstrated neurons of different regions with intracytoplamic deposition of electron—dense material-lipofuscin.

A number of changes in the brain of aging human being have been described by different workers (Sturrock 1987, Hang et al 1983). These include Neuronal, glial and vascular changes. Thickening of dura and pia; and small blood vessels has been described in man. Sturrock (1987) has reported that number of neurons ions appreciably reduced from mild to significant degree, while some recent workers have refuted the old claim and have tried to establish that the neurons are not lost due to aging process. The most important single feature, accepted by almost all workers is the deposition of lipofuscin in the neurons of various areas of the brain, which can be demonstrated at light microscopy by special staining and also by Electron microscopy. In the present study, deposition of lipofuscin. In the neurons of control animals after 16—20 weeks of experiment has been recorded by Electron microscopy (fig. 6) and this deposition of lipofuscin was conspicuously, absent in mice treated by *AmalkiRasavan*(fig.6,7) for longer durations of 16—20 weeks. Similarly the treated animals did not show gliosis or loss of neurons or any vascular change. Animals treated with *AmalkiSwaras*showed changes similar to Rasayan treated animals but for the degree of the change

Experimental mice may not show all the changes in the same way as they are produced in human beings, because these animals not only have a short life span but also the aging phase is very short. Moreover the pattern of changes may be different. Bigger mammals known to have a long life span demonstrate a longer old age and the changes looked for, or the effect of Rasayanas in preventing these changes could be more easily studies, but since the life span of those animals is very long, it would have not been possible to carry out the present work in the limited time available for the present study. However future works involving Albino rats in whom aging changes have been well recognized, as well as have a life span of 36 to 48 months, should be used and it is desirable to see the prevention of aging changes by the administration of *AmalkiRasayan*.

Aging changes in *heart* in the control animals of the present study were, only, very early myocardial fibrosis (fig. 11), and coronary vessel thickening. These changes were not seen in animals who were treated with *AmalkiRasayan*. There was no brown pigment deposition, very much characteristic of some aging human heart. The lipofuscin pigment could also not be demonstrated at electron microscopic level. Coronary vasculature showed slight thickening of media and slight loss of elastin in the internal lamina, in control animals. These changes were conspicuously absent in the mice treated with *AmalkiRasayan.*

Sturrock (1987) has described a number of changes in albino rat's vasculature like loss of endothelial uniformity, fragmentation and degeneration of elastin with replacement by and proliferation of collagen.

In human, Atherosclerosis, of the blood vessels right from coronary to aorta are supposed to be associated with aging. (Linzbach 1973). However not all human beings are associated with this and this is where the people think that Atherosclerosis as such is a diseased state or at least associated with a faulty diet and life style. However thickening of blood vessels has been an almost universal feature, detected in most mammals including man. If it is taken as true, then any drug or compound that can halt, minimize or delay; should must be able to reduce other age associated changes.

Progressive *gonadal* fibrosis in females was seen in control female mice of the present study group, which was not altered by giving AmalkiRasayanin mice.

It is a well-known fact that in human beings, ovaries atrophy with age; start shrinking after menopause, and are gradually replaced by fibrosis. This is also associated with gonadal hormonal balance, and this all is directly related to fertility.

Similar changes have been reported in experimental albino rats and other experimental models. This phenomenon is one of the best examples of genetically determined, coded and timed events, specific for any given species; and is hardly altered by general drugs. However, with the modern medical concept of altering the genetic expression even by means of chemicals in vivo does not preclude us from imagining the possibility of such compounds RASAYANA that can achieve the desired results by altering the genetic expression.

In male gonads the age associated changes detected were only a slight diminution of spermatogenesis in control mice, while in *AmalkiRasayan*treated mice, the gonads depicted almost normal maturation of germ cells and spermatogenesis.

At ultra-structural level in *Rasayana* treated animals testes the morphology of sperms was normal.

It appears that experiments of longer duration; might; more effectively evaluate the good effects of *AmalkiRasayan*on testis; especially when the mice chosen would be of higher age group; wherein spermatogenesis starts decreasing.

The experimental animals treated with *AmalkiSwaras*showed only mild benefit over the control group of animals as regards to the aging changes in brain, heart and gonad. However there were untoward effects.

The degree of benefit was definitely much more in animals treated with AmalkiRasayanaand it appears that this difference could have been because of the difference in composition of *AmalkiRasayana*which uses not only Amalki but also Pippali, Ghrit, Madhu and Khand, two of these themselves are known to produce longevity and health in man, even when used individually.

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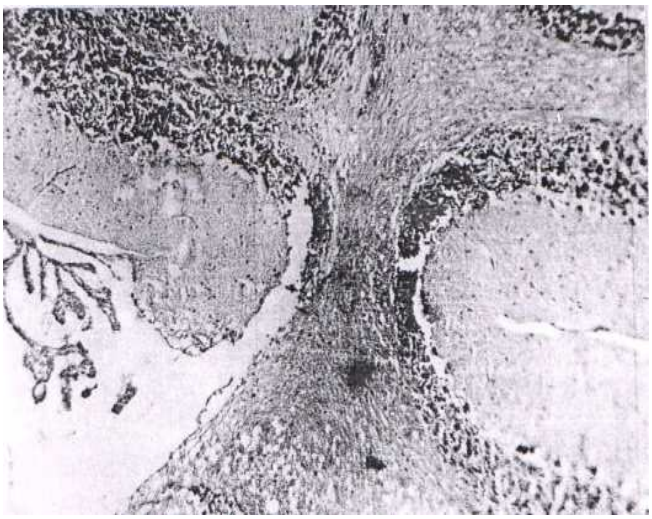

Fig. 1. Photomicrograph from AMALKI RASAYANA treated ventricles of mice brain. Choroid plexus is also seen in picture.

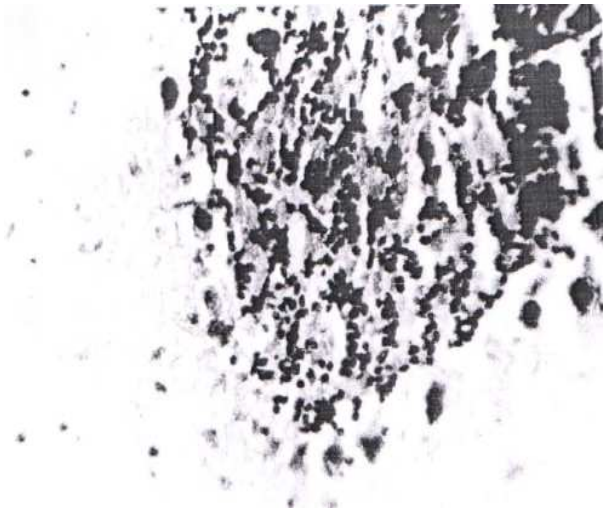

Fig. 2. Photomicrograph from AMALKI RASAYANA treated animals showing cerebral cortex.

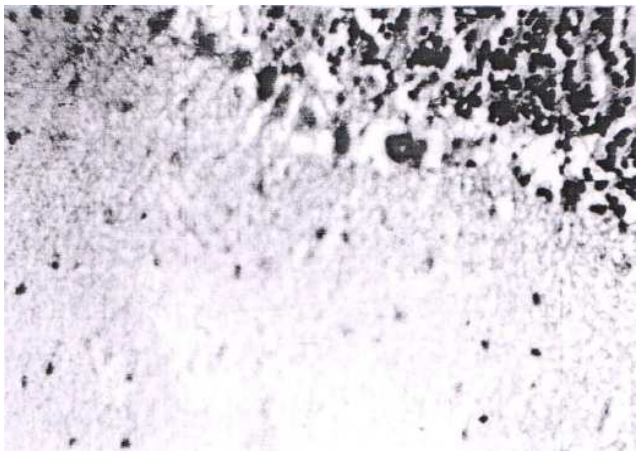

Fig. 3. Photomicrograph from AMALKI RASAYANA treated animals showing cerebral cortex. Neurons and neuroglial are normal.

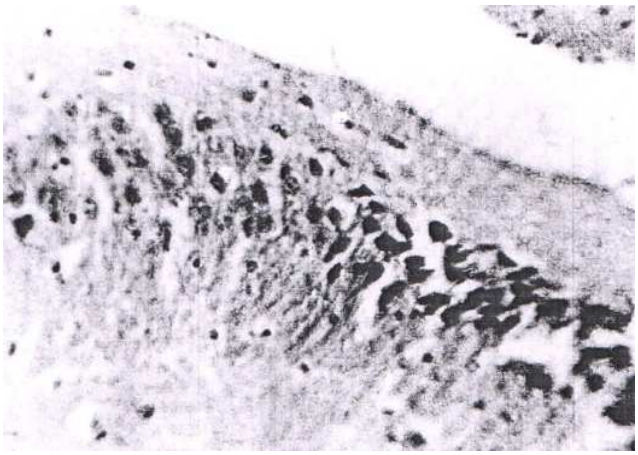

Fig. 4.Photomicrograph showing glial cell from hippocampus of AMLKI RASAYANA treated mice brain.

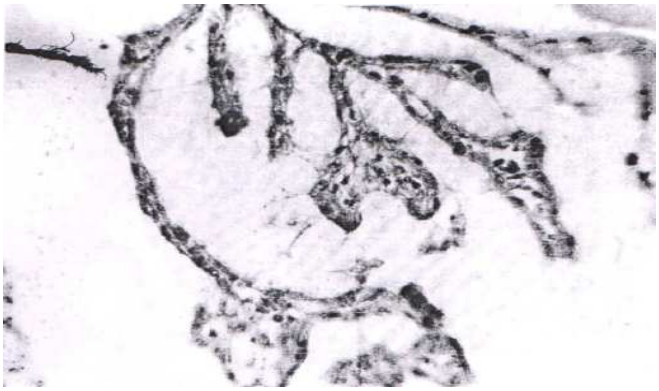

Fig. 5. Photomicrograph showing choroid plexus from AMALKI RASAYANA treated mice brain. Normal epithelial lining is seen.

Fig. 6.Electro Photomicrograph from cerebral cortex showing neurons. Nucleus shows dispersed chromatin and a prominent neucleoulus. Electron dense material deposition are seen in the cytoplasm appears to be Lipofuschin.
Ne = Nucleus Nu = Necleolus L f = LipofuschinMagnification

Fig. 7. Electron photomicrograph from AMALKI RASAYANA treated mice brain showing a portion of neuron. The nucleus is normal with a prominent nucleolus and regular continuous nuclear membrane. Perinuclear condensation is seen. Myline normal. There is no intracytoplsmic pigment deposition.

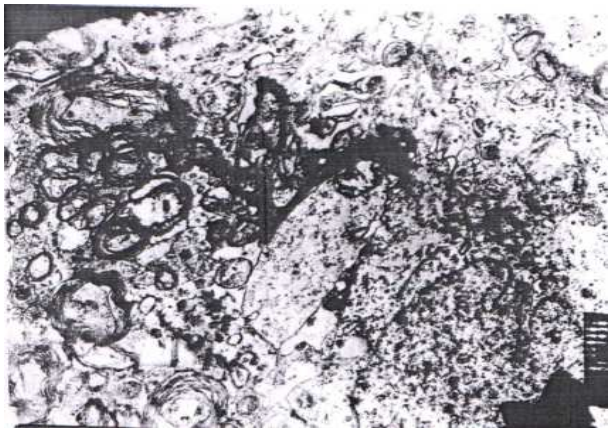

Fig. 8.Electron photomicrograph from AMALKI RASAYANA treated mice brain showing portion of neuron as fig. 7. Prominent myline figure and occasionally normal looking mitochondria are seen.

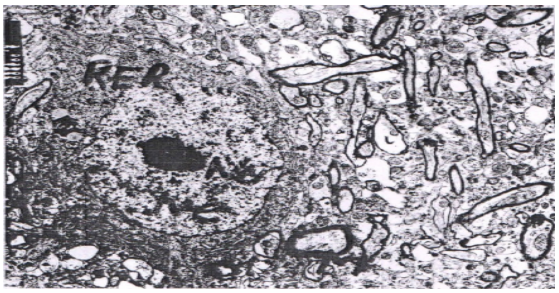

Fig. 9.Electronphotomicrograph from AMALKI RASAYANA treated mice brain. Prominent perinuclear condensation of cytoplasmic organelle is seen. Myline normal in appearance.

Fig. 10.Section from the control mice heart showing myocardium. There is slight increase in fibrous connective tissue ()

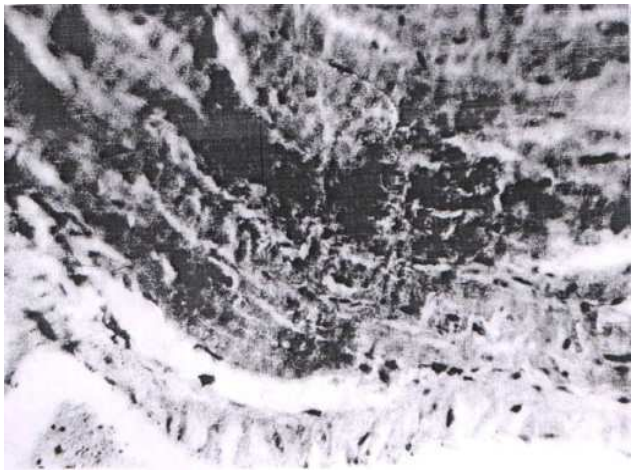

Fig. 11. Section from AMALKI RASAYANA treated mice myocardium. There is no myocardial fibrosis or pigment deposition.

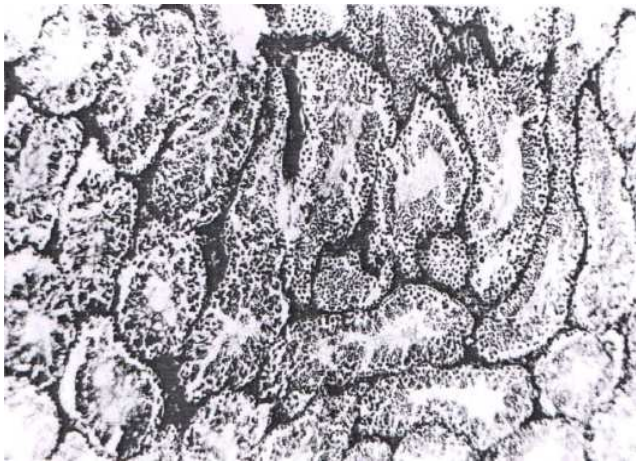

Fig. 12.Photomicograph from control mice testes after 20 weeks duration. Normal seminiferous tubules with sequential maturation are seen.

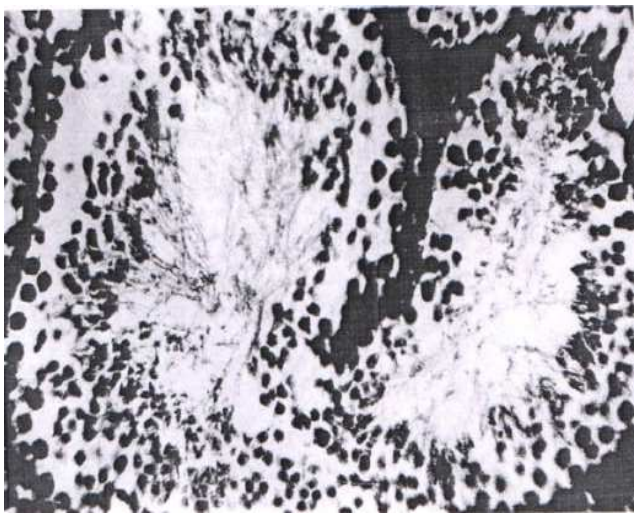

Fig. 13. Photomicrograph from control mice testes after 20 weeks duration seminiferous tubules shows mild deficiency.

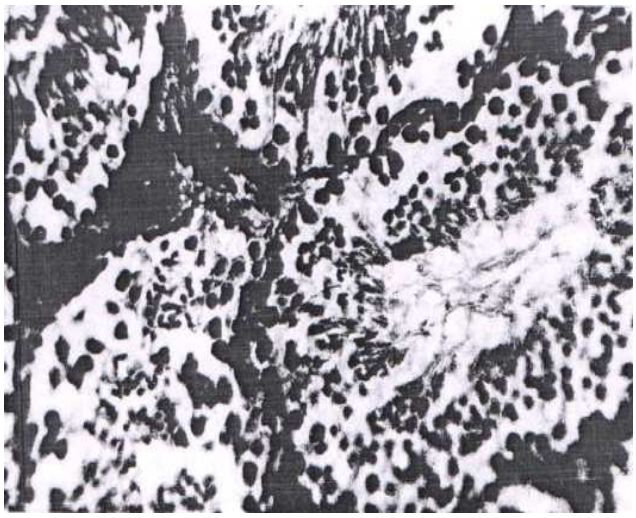

Fig. 14. High power view of AMALKI RASAYANA treated mice testes shows the normal spermatogenesis.

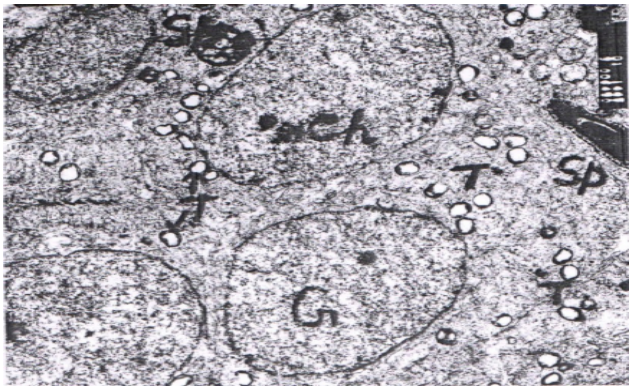

Fig. 15.Electrophotomicrograph of AMALKI RASAYANA treated mice testes shows group of germ cells in seminiferous tubules. Large number sperm tails are seen cut transversely. One of the germ cell shows condense chromatin near nucleus.
G = Germ Cells S p = Sperms T = Sperm tail

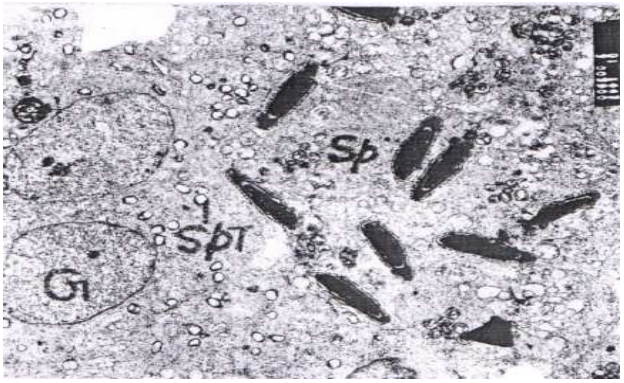

Fig. 16.Electrophotomicrograph from AMALKI RASAYANA treated mice testes normal germ ans sperms are seen. Several sperms are cut at tail level.
Sp T = Sperms Tail, G = Germ Cell

Fig. 17.Electronphotomicrigraph showing the magnification of the above area (fig. 16.), Normal sperm morphology is seen.

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INCIDENCE OF HELMINTH INFECTION IN COMMON MYNA (ACRIDOTHERES *TRISTIS*) : A MONTHLY BREAK-UP.

GAYATRI SINGH*

Declaration

The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, *Gayatri Singh* the author of the research paper entitled INCIDENCE OF HELMINTH INFECTION IN COMMON MYNA (ACRIDOTHERES *TRISTIS*) : A MONTHLY BREAK-UP. declare that , I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal , This research paper is my original work and no part of it or it's similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Abstract

The common Indian Mynas (Acridotheres trsitis) are entomophagous. Hence are of great ecological and agriculture importance. Their fast decreasing number is of great concern among the biologist. Among various reasons the prevalence of the gastro-intestinal infection of these birds could be important issues to probe into –since not much information are available about this. This study is intended to generate a database on the gastrointestinal infection of the helminth parasites in myna. The guts of myna collected from Chapra and around were examined on monthly basis for 3 consecutive years. Out of 433 sample examined about 215 (49.7 %) were found to be positive for having helminth infection. Month-wise studies of the birds showed the seasonal fluctuation in the extent of infection. Such findings will help developing the plans and policies to protect the species of myna and conserve the biodiversity.

Key words: Helminth infection, Month-wise, Sex wise, Myna.

Introduction

Common Indian mynas (*Acridotheres trsitis*.) belong to the family Sturnidae. They occupy a wide range of habitats in warm areas with access to water. In their native range, they mostly inhabit open agricultural areas such as farm lands.

Mynas move freely in the surrounding areas of houses in search of food, these birds have little or no supplementary feeding and are without any veterinary care, which makes them more vulnerable to parasitic infections (Soulsby 1982).

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They are important pollinating and seed-dispersal agents for many plants. Being entomophagous they are helpful in reducing insect populations in agricultural areas.

Common mynas remain much above their range of conservation status. Though due to rampant use of pesticides the no. of mynas has greatly reduced. Some tribes also hunt them and consume as food.

Parasites constitute an important component of natural community (Preston and Jhonson, 2010). With wide impact on health and ecology of their hosts (Arme and Owen 1967) and regulation of their host population (Freeland, 1979), they can profoundly influence social rank and growth of infected birds. The parasites of myna have considerable economic importance as they reduce their growth and weight.

The present work conducted on myna in the months of April, 2009 to June, 2012 is intended to complement and add more information to the existing knowledge. The study was made to assess the month-wise prevalence of intestinal parasite infecting mynas (*Acridotheres trsitis)* in areas in and around Chapra (district Saran) Bihar, India. Chapra is located 18.0 N-79.35 E longitudes in a temperate climate area, well marked with seasonal fluctuations. Saran district is between 25°-39' and 26°-14'N latitude and 84°-23' and 85°-12' E longitude.

Bihar is mildly cold in the winter, the lowest temperatures being around 5-10 degree Celsius (40 to 50 degree Fahrenheit).Winter months are December and January. It is hot in the summer with average highs around 35-40 Celsius (95-105 Fahrenheit). April to mid June are the hot months.

The monsoon months of June, July, August, and September see good rainfall. October & November and February & March have pleasant climate.

Survey of literature on month-wise variation of helminth infection in vertebrates reveals about a number of similar works by the earlier authors. Kennedy (1969) reported seasonal incidence of parasites in *Caryophyll aeuslaticeps* (Pallas).

Fake et al. (1991) found that 92 percent of the local chickens in eastern Nigeria were infected with at least one or more species of gastrointestinal helminthes during the dry season.

It is assumed that the information provided would help in planning effective control measures against gastrointestinal parasites and thus enhance the productivity of the indigenous myna.

Materials methods

The investigations were carried out on samples of mynas collected mostly as dead specimens from the agricultural field and the small forest around. In the span of three years of experimentation about 200-215 dead specimens were collected and investigated upon. To verify the results obtained from dead mynas similar investigations were also made on the live samples. Utmost care was taken while dealing with the live mynas so that no harm was caused to them. Before taking out the contents of gut the mynas were properly anesthetized, dissections were performed in sterilized condition and were kept under medical surveillance till they got completely healed up. Later on they were freed. During three years of study about 200 live mynas were operated upon. Sufficient antibiotic treatment was also given to mynas for their infection-free speedy recovery.

The mynas were collected for a period of three annual cycles from April, 2009 to June, 2012 in various months from different parts of Chapra and around. Samples were examined in laboratory condition and the helminth parasites collected were washed in physiological salt solution. The cleaned parasites were preserved and fixed quickly by using suitable reagents depending on the type of parasites. From the 1-2 days old dead samples of mynas the parasites were difficult to be identified.

Trematodes were fixed under pressure of cover glass in AFA solution.

Cestodes were fixed in AFA in between two slides or glass plates tied together at the ends by rubber bands and placed two hours in a jar or petridishes containing the fixative.

Nematode parasites were fixed in a hot and steaming 70 percent alcohol to which glycerin was added to give a level of approximately 10 percent.

Specimens of trematodes and cestodes were then transferred to separate vials containing the fixative. After 24 hours the fixed worms were preserved in 70 percent alcohol in separate vials.

Trematodes and cestodes were stained in Semichon's or Gower's Carmine stains.

The freshly fixed and preserved material was first treated with stain (diluted 10 times with 70 percent alcohol) for an hour (timings depend on the size of parasite).

The stained material was differentiated in acid alcohol and washed thoroughly in 70 percent alcohol to remove acid from the material.

The flukes then were dehydrated, cleared in methyl salicylate and then treated with Benzene and mounted in Canada balsam or D.P.X. The recorded data was analyzed to derive prevalence of infection and intensity of infection.

Results

The break - up of month-wise infection on the basis of each sex was recorded in *table - I and graphically depicted in Chart – I & II.*

Out of 433 mynas examined, 215 were found infected with one or more helminth parasites, which was 49.7 per cent of the total mynas examined.

Investigations were made every month and the fluctuations in the infection rate were observed. The mynas showed helminth infection between 40.5 per cent to 61.1 per cent throughout the year. With slight variations in the rate of infection in different months, it always remained above 40.5 per cent.

The prevalence rate was recorded 61.1 per cent in the month of March, 58.1 per cent in February, 54.3 per cent in January, 52.5 per cent in April, 50.0 per cent in both months of May and December, 48.8 per cent in June, 47.1 per cent in November, 46.2 per cent in July, 44.7 per cent in October, 43.8 per cent in August and 40.5 per cent in the month of September.

The maximum incidence of infection was recorded in the months of March (61.1 percent) and the minimum infection was observed in the month of September (40.5 percent).

The rate of infection was recorded higher during the months from December to May (between 50.0 percent to 61.1 percent) in comparison to the other months of the year, which was below 48.8 percent, but above 40.5 percent.

In Males

Out of 205 male mynas 93 (45.4 percent) were found infected with one or more types of helminth parasites.

The maximum prevalence of infection in male mynas was recorded in March, 57.9 percent followed by 57.1 percent in February and the minimum (35. 3 percent) prevalence of infection was recorded in the month of September.

The prevalence in male was observed from 35.3 per cent to 57.9 percent throughout the year.

The rate of infection in male mynas examined was higher (above 50.0 percent and below 57.9 percent) in the months from January to April in comparison to other months.

In Females

Out of 228 female mynas, 122 birds were positive with one or more helminth infection i.e. 53.5 per cent of the total female examined.

The maximum infection rate of female mynas examined was recorded in March (64.7 per cent) and the minimum (45.0 percent) was recorded in September.

The prevalence of infection in female mynas was recorded between 45.0 percent to 64.7 percent with slight variations in different months, but it was always above 45.0 percent.

The rate of infection in female mynas examined was found higher during all the months (between 50.0 percent to 64.7 percent) except September and October (between 45.0 percent to 47.8 percent).

Comparative study of month-wise prevalence of helminths in male and female mynas

Out of 433 birds examined, 205 were male mynas and 228 were female mynas. A total of 93 male mynas i.e. 45.4 percent and 122 female mynas i.e. 53.5 percent carried one or more helminth parasites. *(Table – I & Chart – I or II)*

The female of mynas showed higher prevalence rate (53.5 percent) of the parasites than that of the male mynas (45.4 percent).

The maximum prevalence of infection recorded in female mynas was 64.7 percent in the month of March, where as male mynas showed the maximum 57.9 percent prevalence in the same month, which is lower in comparison to that of females.

The incidence of infection was found minimum in the month of September in both sexes that was 35.3 percent in male mynas and 45.0 percent in female mynas.

The male mynas found to have less parasitic load than that of female mynas i.e. from 35.3 percent to 57.9 percent and the female mynas showed higher rate of prevalence from 45.0 percent to 64.7 percent.

The rate of infection was found higher during the months from January to April (between 50.0 percent to 57.9 percent) in comparison to that during the months May to December (between 35.3 percent to 46.7 percent) of male population and in the female population the rate of infection was found higher during all the months (between 50.0 percent to 64.7 percent) except September and October (between 45.0 percent to 47.8 percent).

Statistically these differences were found to be significant. (x^2 = 11 df: 40.76, P > 0.05).

T A B L E I M*onth-wise break-up of helminth parasites in both sexes of Acridotheres tristis*

Month	Total birds (M+F)			Male			Female		
	Examined	Infected	Percentage (%)	Examined	Infected	%	Examined	Infected	%
April	40	21	52.5	20	10	50.0	20	11	55.0
May	42	21	50.0	20	9	45.0	22	12	54.5
June	41	20	48.8	19	8	42.1	22	12	54.5
July	39	18	46.2	18	7	38.9	21	11	52.4
August	32	14	43.8	16	6	37.5	16	8	50.0
September	37	15	40.5	17	6	35.3	20	9	45.0
October	38	17	44.7	15	6	40.0	23	11	47.8
November	34	16	47.1	16	7	43.8	18	9	50.0
December	28	14	50.0	15	7	46.7	13	7	53.8
January	35	19	54.3	16	8	50.0	19	11	57.9
February	31	18	58.1	14	8	57.1	17	10	58.8
March	36	22	61.1	19	11	57.9	17	11	64.7
TOTAL	433	215	49.7	205	93	45.4	228	122	53.5

Chart-I

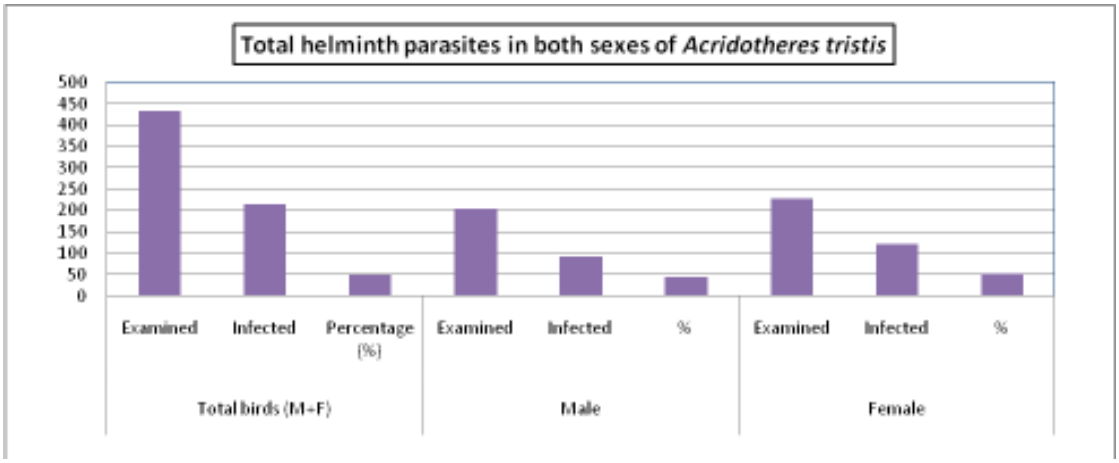
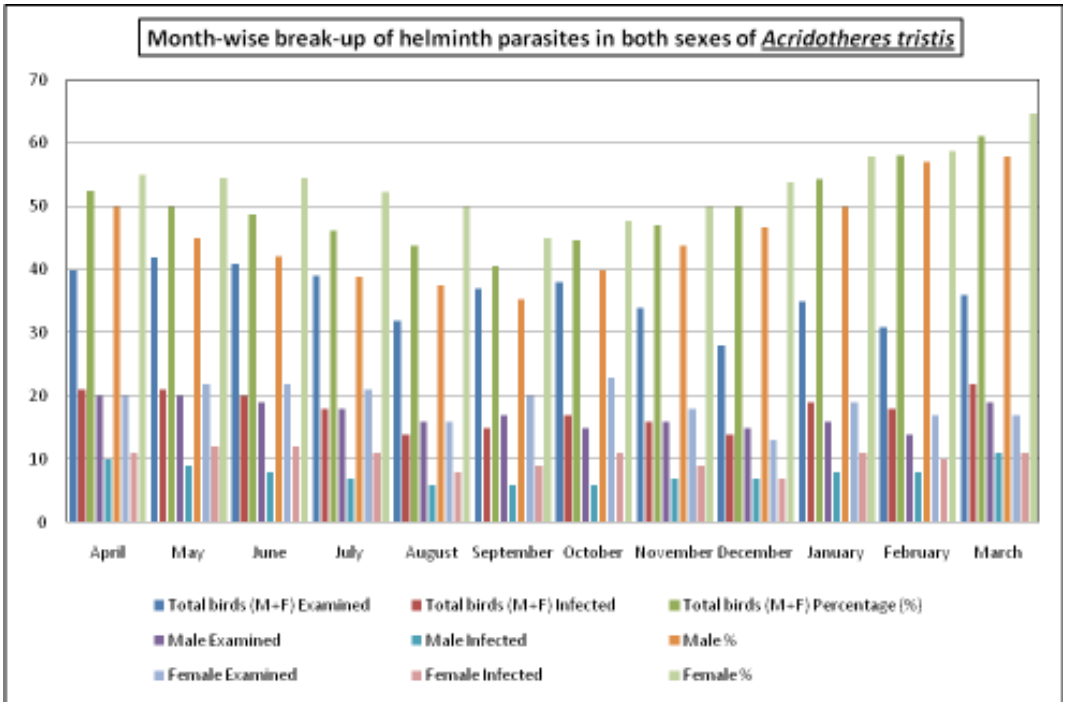


Chart- II



Discussion

Variation in incidence and intensity of helminth infection in relation to sex of the host have been recorded by a number of workers in birds (Owen and Pemberton 1963), but very few works have been reported on mynas.

In the present study, out of 433 mynas examined, 215 were found infected with one or more helminth parasites, which was 49.7 per cent of the total mynas examined. The mynas showed helminth infection between 40.5 per cent to 61.1 per cent throughout the year. The maximum incidence of infection was recorded in the months of March (61.1 per cent) and the minimum infection was observed in the month

of September (40.5 per cent). P. A. Nnadi and S. O. George (2010) recorded maximum prevalence between April and July in 1038 chickens. Difference in food habit and the climatic factors play important role in host-parasite relationship.

Not much work has been done regarding the helminth infection in mynas; however, this observation is in conformity with the incidences found in other birds. The observations of Illescas Gomez, M. P., Rodriguez Osorio M., Aranda Maza, F. (1993), Ashour, A. A. and Ahmed, S. E. (1996), Sinha Suceta (2003), A. P. Muhairwa, P. L. Msoffe, S. Ramadhani, E. L., Mollel, M. M. A. Mtambo and A. A. Kassuku (2007), E. O. Mungube, S. M. Bauni, B. A.Tenhagen, L. W. Wamae, S. M. Nzioka, L. Muhammed, J. M. Nginyi (2008) are almost nearer to the present observation.

Contrary to this, Lee, K. A.; Franson, J. C., Kinsella, J. M.; Hollmen, T., Hansen, S. P.; Hollmen, A. (2004) reported the rate of prevalence to be very low in 115 hunter-killed mourning doves (*Zenaida macroura*) in comparison to that of mynas.

Interestingly, very high prevalence of infection has been reported in adult pigeons (*H. columbae*), by P. L. M. Msoffe, A. P. Muhairwa, G. H. Chiwanga and A. A. Kassuku (2010), Adejinmi J. O. and Oke M. (2011).

Difference in the food habit may be the reason behind the low prevalence of infection in mynas.

Sex-wise, observation depicts that the female mynas show higher prevalence (53.5 per cent) than that of the males (45.4 per cent). Statistically, these differences were found to be significant.

This is in conformity with the observations of Sandeep K. Malhotra (1983), Maur, B. M., Dawam, N. N. and Malann, Y. D. (2010). They observed females to harbor more parasites than males in gastrointestinal tracts of local and exotic breeds of chickens, whereas contrary to this A. A. Biu, J. S. Rabo., J. S. Dawurung and A. A. Lagu (2012) found male guinea fowls with higher prevalence of infection compared to the females. However, Hossouni (2006) did not find any significant difference in the infection rate due to the sex of chickens.

Present study showed that female mynas are more prone to helminth infection than the males. Though, the exact reason for the sex preference by the parasite is not known, the difference of sex hormones and the behavioural pattern may be the reason.

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ROLE OF ZINC AND IRON IN PRE-TERM LABOR

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Declaration

The Declaration of the authors for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: We, *Sunita Tripathy and Ragini Srivastava* the authors of the research paper entitled ROLE OF ZINC AND IRON IN PRE-TERM LABOR declare that , We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in Anvikshiki journal , This research paper is our original work and no part of it or it's similar version is published or has been sent for publication anywhere else.We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the Editor of Anvikshiki Journal to own the copyright of our research paper.

Objectives: Micronutrients have a big role in fetal growth and in pregnancy. The purpose of this study was to find out whether micronutrients like iron and zinc have any role in the outcome of the pregnancy.

Study design: Pregnant ladies who delivered after 28 weeks but before 37 weeks of gestation were taken as cases. The number of cases at 28 weeks (n=12), 30 weeks (n=10), 32weeks (n=14), 34weeks (n=14) and 36weeks (n=12). Pregnant ladies with uncomplicated spontaneous pre-term labor were included in the study. Spontaneous term deliveries were taken as controls. Their blood samples were taken at 28, 30, 32, 34 and 36 weeks of gestation. 20 ladies could be followed upto term.

Results: The age of the study group ranges from 20-34 years. The mean and standard deviation calculated was 23.4±2.61 for cases and 23.9±3.64 for controls. Preterm term labor was more common in primipara. Seventy percent of cases reported no history of pre-term delivery. The level of iron in maternal serum is always lower in cases than in the control group. Serum zinc is also found to be lower in the cases than in the controls though the difference is not significant in both.

Conclusion: The present study shows that deficiency of iron and zinc are associated with preterm labour. Hypoxia due to iron deficiency and low immunity and loss of membrane integrity of feto-placental unit due to zinc deficiency might be the reasons for increased incidence of preterm labor in iron and zinc deficient pregnant ladies.

Keywords : iron, zinc, stress, CRH, preterm labour

Introduction

Pre-term labor occurs in approximately 7–10% of all births and contributes to leading cause of neonatal morbidity and mortality in the United States.[1] The majority of the neonatal mortality and morbidities are especially common among preterm deliveries at 32 weeks gestation. The pathophysiologic etiologies

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of preterm delivery are heterogeneous and variable. Some of these abnormalities have included inflammation (infection), decidual hemorrhage, and premature activation of maternal-fetal hypothalamic-pituitary adrenal systems.[2] The multi-factorial pathogenesis of preterm delivery has stimulated efforts at finding an early marker for prediction of preterm delivery.[3] Most of these tests have poor sensitivity and poor positive predictive value, with most deemed unreliable or unsuitable for routine use in clinical practice. Several authors suggested a role for placental corticotrophin-releasing hormone (CRH) in the mechanism of human parturition. [4-6.] It has been postulated that CRH acts as a placental clock by controlling the length of gestation, and that a sudden increase in CRH levels may precede the onset of preterm labor.

Our hypothesis was that second-trimester plasma CRH concentrations could improve risk assessment for preterm delivery in women at high risk for preterm delivery. Iron and zinc deficiency may also increase the risk of maternal infections, which can stimulate the production of corticotrophin-releasing hormone CRH, leading to for pre-term delivery.

Material and methods

The study of role of iron and zinc in pre-term labor was conducted in the Department of Biochemistry and Department of Gynecology and Obstetrics, Institute of Medical Science, BHU, Varanasi.

In this study, spontaneous deliveries before 37 weeks of gestation period were taken as cases. The number of cases delivered at 28 weeks (n= 12), 30(n=10), 32(n=10), 34(n=14) and 36(n=12) were included in the study. Venous blood (5ml) in a plain vial at the time of delivery was taken.

In the control group, spontaneous delivery after 37 weeks was included in the study. 20 patients were followed up from 28 weeks to delivery after 37 weeks. Venous blood (5ml) in a plain vial at gestation period 28, 30, 32, 34, 36 weeks were taken.

The blood was allowed to clot and serum was collected by centrifuge at 3000rpm for 10 min. Finally 1.5ml serum were taken as a sample which are stored in a deep freezer (-40^0 C) till they were analyzed.

The parameters measured were serum iron and serum zinc by UV-Vis Spectrophotometer and atomic absorption spectrophotometer (AAS) respectively.

Estimation of Serum iron was done by Spectrophotometer. Serum iron was liberated from its complex by the action of surfactants. Once liberated it is reduced to Fe^{+2}, which reacts with bathophenanthroline to produce a color complex which is photometrically determined by spectrophotometer at 540nm.

Standard blank, sample blank, standard and sample tubes were prepared according to the protocol. These all Solutions were taken in a Glass cuvette in a serial way from micropipette.

After adding all the reagent, the solution was incubated for 30min and then absorbance was taken at 540nm.

Calculation:

$$\text{Iron } (\mu g/dl) = \frac{\Delta \text{ A sample} - \text{A sample blank}}{\Delta \text{ A standard} - \text{A standard blank}} \times 166$$

Estimation of Zinc

Serum zinc was estimated by atomic absorption spectrophotometer (AAS). The ground state atom absorbs light energy of a specific wavelength and enters the excited state. If the number of atom in the light path is increased, light absorbed is also increased. The wavelength 213.9nm is used for Zn.

Standard solutions of zinc were taken from $ZnSO_4.7H_2O$ (0.4387gms) which dissolved in 100ml of non-ionized water.

Result

The age of the study group ranges from 20-34 years (Table-1). According to the observation most of the cases and control lie in the age group 20-24 years. The mean and standard deviation calculated was 23.4±2.61 for cases and 23.9±3.64 for controls. Preterm term labor was more common in primipara (Table-2). As parity increased, the chances of preterm labor decreased. Seventy percent of cases reported no history of pre-term delivery as shown in Table-3. The level of iron in maternal serum at different weeks of gestation is tabulated in Table-4 and the serum level of zinc is reported in Table -5 according to the weeks of gestation.

T A B L E 1 *Age distribution in cases and controls*

	CASES		CONTROLS	
Age(years)	No	%	No	%
20-24	41	70.68	14	70
25-29	14	24.13	4	20
30-34	3	5.17	2	10
MEAN ± SD	23.4 ± 2.67		23.9 ± 3.41	

T A B L E 2 *Distribution of parity in cases and controls*

	CASES		CONTROLS	
PARITY	No	%	No	%
1	25	43.10	8	40
2	18	31.03	2	10
3	8	13.79	5	25
4	4	6.89	3	15
5	3	5.17	2	10
MEAN ± SD	2.0 ± 1.15		2.45 ± 1.43	

T A B L E 3 *Distribution of risk factor in cases and control*

	CASES		CONTROLS	
	No	%	No	%
H/O pre-term delivery	13	22.64	2	10
No H/O pre-term delivery	45	77.35	18	90

T A B L E 4 *Level of iron (µg/dl) in maternal serum at different weeks of gestation in the study group:*

GEATATIONAL AGE (WEEKS)	CASES	CONTROLS	t	p
28	64.42± 13.14	70.8± 11.16	0.6	NS
30	63.77± 13.07	69± 10.27	0.65	NS
32	56.82± 11.9	66.2± 9.41	1.23	NS
34	51.58± 10.21	63.4± 10.21	0.86	NS
36	53.84± 7.37	59.4± 10.11	1.24	NS

T A B E L 5 *Level of zinc (µg/dl) in maternal serum at different weeks of gestation in the study group:*

GESTATIONAL AGE(WEEKS)	CASES	CONTROL	t	p
28	58.66 ± 16.71	69.2 ± 10.08	0.91	NS
30	62.76 ± 5.2	65.8 ± 9.5	0.5	NS
32	61.8 ± 16.85	63.6 ± 8.82	0.03	NS
34	47.54 ± 25.86	61.2 ± 8.22	1.23	NS
36	47.8 ± 11.8	58.2 ± 7.94	2.05	NS

Discussion

The age of study group ranges from 20 to 34 years. Most of the cases belong to the age group of 20-24 years (70%) which means preterm labour is common in young age which keeps on decreasing with increase in the age of the mother as shown in Table -1. Preterm labour is also more often seen in primipara (Table-2) and the incidence keeps on decreasing with parity. Previous history of preterm labour is absent in 77% of the population (Table-3). It means that it is state of present pregnancy which decides whether it is going to be term or pre term delivery and not that one is pre-disposed to pre term labour.

The role of trace elements in fetal development and growth is well documented in literature [7-8]. The serum level of iron in cases and controls is shown in Table-4. It shows that the level of iron keeps on decreasing with gestation time as the requirement of iron increases with the growth of the fetus. The level of serum iron in cases is always lower than the levels in the controls. It means that deficiency of iron is associated with preterm labour though the incidence is not significant ($p>0.05$). Rasmussen (2001)[9] has summarized some biological mechanism that might lead to pre-term delivery, According to him, iron deficiency leads to hypoxia, which causes increase in concentration of nor-epinephrine[10]. This increase in nor-epinephrine level cause's increase in the level of cortisol and corticotrophin-releasing hormone (CRH) and this increase in CRH level may also create a state of stress in the pregnant lady. Allen. LH (2001)[11] also explored the potential biological mechanism that might explain how anemia / iron deficiency / both cause pre-term delivery. Anemia and iron deficiency can induce maternal and fetal stress, which stimulates the synthesis of corticotrophin-releasing hormone (CRH) and this elevated corticotrophin-releasing hormone are a major risk factor for pre-term labor.

Zinc requirement is increased in pregnancy, which is to promote the growth of the fetus, placenta and maternal tissues. The serum level of zinc in cases and controls is shown in Table-5. It shows that the level of zinc keeps on decreasing with gestation time as the requirement of zinc increases with the growth of the fetus. The level of serum zinc in cases is always lower than the levels in the controls. It means that deficiency of zinc is associated with preterm labour though the incidence is not significant ($p>0.05$). Bahl (1994)[12] observed significantly low levels of zinc in pregnant women as compared to non-pregnant women and explain it on the basis of uptake of zinc by the fetus and other products of conception, diminished quantity of zinc binding proteins circulating in blood / changed binding affinities of zinc and also because of hormonal changes like CRH elevation during pregnancy. Inadequate availability of maternal zinc to the fetus is plausible etiological factor in fetal / placental growth failure because amongst its many important physiological roles of zinc are necessary for DNA synthesis, replication, embryogenesis, protein synthesis and fetal growth and transcription. The concept of zinc fingers explains the role of zinc in gene expression and endocrine function, and mechanisms of action of zinc involve the effects of the metal on DNA synthesis, RNA synthesis, and cell division[13]. Zinc also interacts with important hormones involved in bone growth such as somatomedin-c, osteocalcin, testosterone, thyroid hormones, and insulin[14].

Conclusion

The present study shows that deficiency of iron and zinc are associated with preterm labour. Hypoxia due to iron deficiency and low immunity and loss of membrane integrity of feto-placental unit due to zinc deficiency might be the reasons for increased incidence of preterm labor in iron and zinc deficient pregnant ladies. Due to the small size of the study group further studies are required to be done with bigger groups. These biochemical parameters can work as predictors of the

preterm if they are studied in maternal serum from early pregnancy at definite intervals and this can play a vital role in prevention of maternal and fetal morbidity and mortality.

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COMPARATIVE EVALUATION OF DIFFERENT TYPES OF KSHAR SUTRAS IN MANAGEMENT OF PILONIDAL SINUS (NADI VRANA).

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Declaration

The Declaration of the authors for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: We, *V Saxena, L Singh and M Sahu* the authors of the research paper entitled COMPARATIVE EVALUATION OF DIFFERENT TYPESOF KSHAR SUTRAS IN MANAGEMENT OF PILONIDAL SINUS (NADI VRANA). declare that , We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in Anvikshiki journal , This research paper is our original work and no part of it or it's similar version is published or has been sent for publication anywhere else.We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the Editor of Anvikshiki Journal to own the copyright of our research paper.

Abstract

Pilonidal sinus is a midline post anal sinus commonly seen in young adults usually without any communication with rectum and anal canal. To treat the cases of Pilonidal sinus, there are many treatment modalities in medical science like excision, primary closure and excision with reconstructive flap, but the question is of recurrence and complications.There are many treatment available to cure Nadivrana in Ayurveda. Sushruta gave more emphasis on Kshara sutra. Kshara sutra therapy is one of the most potentiated efforts of kshara karma for curing Nadivrana. It is a minimal invasive operative technique and requires fewer instruments. The procedure may be performed even under local anesthesia with minimal stay.Hence,in this research study, randomly selected 33 patients suffering from pilonidal sinus of either sex were treated with three types of Kshara sutra (Snuhi kshara sutra,Guggulu kshara sutra & Udumber kshara sutra). As per observations of the study Udumber Kshara Sutra showed highly significant results over the two other Kshara Sutra and maximum advantages were found like minimum hospital stay, no post-operative hemorrhage, and no adverse bowel effect. Patients were able to return their normal works after 3-4 days and it had been found overall cost effective procedure.

Key words: Pilonidal sinus, *Shalya Tantra*, *Nadi Vrana chikitsa*, *Kshar Sutra,* UCT(Unit cutting time)

Introduction

Herbert Mayo is reported to have published the first case of Pilonidal sinus in 1833[1]. It is a midline post anal sinus commonly seen in young adults usually without any communication with rectum and anal canal. Pilonidal sinus means Nest with hair inside, where hair is invigilated in subcutaneous tissue as a Bulbous Diverticula

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with branching and bifurcating from side. The origin of Pilonidal disease is not fully understood, although hormonal imbalance, presence of hair, friction and infection are often implicated[2]. Pilonidal sinus is lined by squamous epithelium and hair lies loose or embeded in the granulation tissue.They are responsible for persistent infection and sinus fails to heal. Pilonidal sinus is common in the Gluteal cleft. While sitting, the buttocks move and the hair is broken off by friction. The term Nadi implies a tube like structure and the Nadi vrana is treated as a sinus. The 'Sushrut Samhita',[3] describes a condition *'Shalyaj Nadi Vran'* which is similar to a type of 'Pilonidal sinus'. *'Shalyaj nadi vran'* is a track which is described to be due to presence of pus, fibrosed unhealthy tissue & hair etc. Sushruta has advocated a very unique minimally invasive treatment i.e. '*Kshar Sutra*' procedure for management of *Nadi vran* (PNS)[4]. it comes under Dusta vrana because of its non-healing nature.

Aims & Objectives

- To establish the effectiveness of *Ksharasutra* therapy in the management of Sacrococcygeal Pilonidal disease (*Nadivrana*) with minimum disadvantages over to the other conventional methods.
- To compare the role of three different types of *Kshara sutra* ligation for PNS.

Material and method

The 33 patients were randomly selected from the OPD &IPD of Shalya tantra dept. IMS, BHU. and randomly divided into three groups of 11 each. Three types of *Kshara sutra* were prepared by the standard method.

T A B L E 1 *Types of Kshara sutra*

Group	Group A Snuhi Kshara sutra	Group B Guggulu Kshara sutra	Group C Udumber Kshara sutra
Contents	Snuhi ksheer *(Euphorbia neriifolia Linn)* Apamarga Kshara *(Achyranthes aspera Linn.)* Haridra *(Curcuma longa Linn.)*	Guggulu *(Commiphora mukul)* Apamarga Kshara *(Achyranthes aspera Linn.)* Haridra *(Curcuma longa Linn.)*	Udumber latex *(Ficus glomerata Roxb.)*

Inclusion criteria

- Patients diagnosed to have Pilonidal Sinus disease at sacro-coccygeal region or intergluteal region with straight tract.
- Primary disease
- Age between 18 and 60, both gender.
- No evidence of malignancy.

Exclusion criterion

- Anemic patients (Hb < 9 gm %)
- Malnourish patients
- Bleeding disorder and Uncontrolled diabetes mellitus
- Patient in ARF and Tubercular
- Recurrent Sacrococcegeal Pilonidal sinus (PNS) and sinus having multiple openings

- HIV and HBsAg positive patient.

Investigations

- Blood:- Hb%, TLC, DLC, ESR, FBS, PPBS, CT, BT, Blood urea and Creatinine.
- Urine: Routine and Microscopy
- Stool: Ova and Cyst; Occult blood.
- Pus: Culture and sensitivity.
- Sinogram and other investigations as required.

Methodology

After all the routine investigations, Local examination like Inspection, Palpation, Digital rectal examination (DRE) and Instrumentation were done. The consent was taken and patient was advised to take laxatives, injection Tetanus Toxoids given and Part was prepared.Under aseptic measures and under proper anesthesia, patient was made to lie down in prone position and track was identified with the help of a probe. After cleaning the track, *Kshara Sutra*was applied in the track. It was then dressed with sterile gauze pad. *Kshara sutra* was changed weekly. Simultaneouscutting and healing occurs, thus the length of track and the *Kshara sutra* goes on decreasing on subsequent visits. The assessment was done once in a week till cut through, then for six months.

Assessment criteria

The patients were assessed on the basis of both subjective and objective parameters before and after treatment as follows:

TABLE 2 *Objective &Subjective Parameter*

GRADE		DISCHARGE	PAIN	TENDERNESS
0	**No**	No discharge.	Absence of pain/ no pain.	Tolerance to pressure
1	**Mild**	If discharge wets one pad of 4x4 cm gauze.	Pain that can be easily ignored.	Little response on sudden pressure
2	**Moderate**	If discharge wets 2 pad of 4x4 cm gauze.	Pain that cannot be ignored and needs treatment.	Wincing effect on gentle pressure.
3	**Severe**	If discharge wets >2 pad of 4x4 cm gauze.	Pain which needs constant attention.	Patient resist to touch and shows rigidity.

Unit cutting time= Total number of days of *Ksharasutra* treatment/ initial length of the tract (*Kshara sutra)*

Follow up

The cases were followed after the trial period for up to 6 months period advising the patient to come to the hospital on every 15th day after treatment. The assessment of following features was taken up

1. Recurrence
2. Swelling in the surrounding area
3. Any pain or tenderness
4. If any discharge

Observations& results- Statistical

For comprasion of improvement in pain, discharge and tenderness in between group A (Snuhi Kshara sutra), group B (Guggulu Kshara sutra) and Group C (Udumber Kshara sutra) was done by Wilcoxon signed ranks test.*(Table -3)*

Between the group comparison(**Wilcoxon Signed Ranks test)**							
Symptoms	Group	Mean		S.D	Z	p-value	significant
Pain	Group A	F0	1.18	0.874	Z=1.394	p=0.163	NS
		F4	0.73	0.786			
	Group B	F0	1.64	0.809	Z=2.739	p=0.006	S
		F4	0.36	0.505			
	GroupC	F0	1.73	0.905	Z=2.754	p=0.006	S
		F4	0.18	0.405			
Discharge	Group A	F0	1.09	0.944	Z=1.994	p=<0.046	S
		F4	0.36	0.505			
	Group B	F0	1.73	1.009	Z=2.887	p=0.004	S
		F4	0.18	0.405			
	GroupC	F0	1.64	0.924	Z=2.887	p=0.004	S
		F4	0.09	0.302			
Tenderness	Group A	F0	2.45	0.522	Z=2.976	p=0.003	S
		F4	0.45	0.522			
	Group B	F0	2.36	0.674	Z=2.976	p=0.003	S
		F4	0.36	0.505			
	GroupC	F0	2.45	0.522	Z=2.980	p=0.003	S
		F4	0.27	0.467			

Unit Cutting Time in pilonidal sinus

To compare UCT between the groups ANOVA Test and Post HOC Test was apply *(Table-4)*

Group	Unit Cutting Time Mean ±SD
Group A	6.87 ± 0.282
Group B	7.07 ± 0.595
Group C	7.78± 0.836
Between the group comparison(One way ANOVA Test)	F= 6.71 P= 0.004
Post HOC Test significant pairs (p<0.05)	(I, III),(II, III)

Results and Discussion

Pilonidal sinus is a surgical condition having high postoperative recurrence rate. Ksharasutra therapy in Sacrococcygeal Pilonidal Sinus (Nadivrana) is a simple, safe, and sure treatment with very negligible recurrence rate. In this comprative study three different type of Kshara sutra were apply in 33 patients out of which 70.95% patients were males and 29.05% patients were females which is similar to those reported by Tocchi and coworkers (72%)[5]. Mean age of patients was 20 (ranging from 16—63 years),47.2% patient belongs to poor socio-economic status, followed by 39.6% middle and 13.2% upper status. This shows maximum patients belong to poor socioeconomic status may be due to poor hygiene and 58.95% patients were having higher BMI. These observations are in accordance with other studies[6]. *Snuhi kshara sutra* (group A) can be effectively used in previously operated cases where scar of pilonidal sinus is tough, fibrosed or recurrent PNS as it has less UCT. During the study it was found that it was not much effective in reducing pain as compared to other *Kshara sutras*, it may be because of *Katu rasa* and corrosive action of kshara. Guggulu kshar sutra is having UCT in between two groups A & C, but not much effective in reducing pain, tenderness and burning sensation. Here Udumber kshara sutra (group C) was significantly more effective in reducing pain, burning sensation and tenderness inspite of lesser UCT because of snigdha, laghu guna, kasaya rasa and sheeta virya, so it can also be used in grishma ritu and in pittaja prakriti patients as said in study. Latex of Udumber possessanti-inflammatory action and Latex is applied externally on chronic infected wounds to alleviate edema, pain and to promote the healing[7]. Pus culture was done in majority of Patients where E.Coli was the major source of infection. It was effectively controlled by Udumber Kshara sutra which is proved by study[8]. The Unit Cutting Time was minimum for group A (6.87 ± 0.282) as compared to other two groups B (7.07 ± 0.595) and group C (7.78± 0.836). Between the group comparison by one way ANOVA test p=0.004 shows significant difference between the three groups but by *Post HOC* test shows group C is significant to group A & B.

Out of 33 patients only2 patient has wound infection of group A and 1 each of group Band group C. Out of which one patient was athlete, it might be because of sweating encourage infection as proved by study. Some young adults with wounds healing by secondary intention report that they stop participating in sport as they are fearful that the dressing will become dislodged or that sweating will encourage infection[9].

All the patients were advised to follow up for 6 months at the interval of 15 days for 3 months then monthly. Three patients did not turned up and 2 patients had recurrence of the disease.In our study we observed that patients who underwent*Ksharasutra therapy* have minimal recurrence rate, minimal side effects, minimal complications were noted during the study and *udumber kshar sutra* is better than other type of *kshar sutra*.

Conclusion

Hence it is concluded that group C inspite of having high UCT is better on the basis of other subjective and objective parameters. The UCT was lower in group A and group B as compared to group C. So Snuhi and guggulu kshar shutra can be used in recurrant, fibrosed pilonidal sinus with tough scar but least effect on pain and burning sensation. The UCT of Udumber was higher but it did not produce any complications like burning sensation etc and much effective in reducing pain, tenderness and discharge. So it can be used effectively in patients of pilonidal sinus. The difference between the three groups was statistically insignificant. No adverse effect like post-operative stricture, incontinence and least recurrence rate were seen during study. This type of treatment needs minimal expenditure and can be performed under local anesthesia. So we can say that this minimally invasive procedure Kshar Sutra has good potential in management of Pilonidal sinus.

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REVIEW OF THE FACTORS INFLUENCING MALE INFERTILITY

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Declaration

Introduction

"Infertility" is defined clinically as the inability of couples to conceive a child after 1 year of unprotected intercourse. It may be due to a single cause in either of the couple, or a combination of factors that may prevent a pregnancy from occurring. The inability to have children affects couples worldwide and causes emotional and psychological distress in both men and women. According to WHO (world Health Organization) one in every four couples in developing countries is estimated to be affected by involuntary infertility [1]. Male infertility refers to the inability of a male to achieve a pregnancy in a fertile female. In humans it accounts for 40-50% of infertility.

The causes associated with Male infertility are myriad and increasing consistently, these include [2,3,4,5]

Pre-testicular factors

(These factors refer to conditions that impede adequate support of the testes and include situations of poor hormonal support and poor general health) include

- Hypogonadotropic hypogonadism (Gonadotropin Deficiency)
- Drugs use, Alcohol consumption and Radiation exposure
- Strenuous riding (bicycle riding, horseback riding)
- Common chemicals (pesticides, fungicides) and Medications (chemotherapy, anabolic steroids,

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cimetidine, spironolactone; asphenytoin; sulfasalazine and nitrofurantoin)

- Genetic abnormalities such as a Robertsonian translocations
- Tobacco smoking Male smokers also have approximately 30% higher odds of infertility
- Common inherited gene variants and DNA damage associated with increased risk of sperm DNA damage and male infertility.

Testicular factors

(Testicular factors refer to conditions where the testes produce semen of low quantity and/or poor quality despite adequate hormonal support), Including Age, Genetic defects on the Y chromosome, Abnormal set of chromosomes (Klinefelter syndrome), Neoplasm, (e.g. seminoma),Idiopathic failure, Cryptorchidism, Varicocele, Trauma, Hydrocele, Mumps], Malaria, Testicular cancer, Acrosomal, Idiopathic oligospermia

Post-testicular causes

(Post-testicular factors decrease male fertility due to conditions that affect the male genital system after testicular sperm production like defects of the genital tract) Including Vas deferens obstruction or absence, Infection (prostatitis), Retrograde ejaculation, Ejaculatory duct obstruction, Hypospadias, Impotence

Global rise in Male infertility???

Considerable interest and controversy over a possible decline in semen quality during the 20th century, has led to reports of global rise in male infertility cases appearing in both research and media [6]. Inducing escalated concern that semen quality could have reached a critically low level where it might affect human reproduction and initiating numerous studies world-wide comparing the reproductive parameters and the health-related, lifestyle and educational factors in middle-aged healthy men and male partners of infertile couples to assess reproductive health [7].

Studies assessing reproductive health in men from the general population and monitoring changes in semen quality over time have been done, yielding contradictory information. Some results clearly indicate that the quality of semen has decreased in populations over the study period [8]. While others concluded that there are no changes or the changes observed in the semen parameters analyzed have showed no evidence of deteriorating sperm quality [9]. But all of them have observed changes in the semen parameters with time, emphasizing on the need to determine the causes for the changes.

Accurate estimates of prevalence of and trends in infertility are needed for determining the underlying causes and development of prevention strategies. Several countries including France [10], Sweden [9], Poland [11], Spain [12], Italy [13], Korea [14] and USA [15] have done population assessments of male infertility and reached different or opposing conclusions making it difficult to reach a consensus.

Technology and infertility

In today's society, modern man strives to become increasingly efficient. Our fast pace lives have been the driving forces behind vast technological innovations such as the Internet, email, and most recently, the "Smartphone [16,17,18]. Concerns have been raised about the potential health consequences (in particular neurological and reproductive disorders) of technological advancements as they influence both the

environment and lifestyle.

Males are exposed to the effect of various environmental factors which may decrease their reproductive capabilities. A decrease in male fertility is a phenomenon which occurs over the years. This may suggest that one of the reasons for the decrease in semen parameters is the effect of the development of technology in the surrounding environment. A hazardous effect on male fertility may be manifested by a decrease in the amount of sperm cells, disorders in their motility, as well as structure[19].

The causative agents may be chemical substances, ionizing radiation, stress, as well as electro-magnetic waves Radio and television broadcasting, mobile phones, pagers, wi-fi devices cordless phones, police and fire department radios, point-to-point links and satellite communications which can all produce RF EMR (Radiofrequency electromagnetic radiation).

Other milder sources of RF fields include microwave ovens, radar, industrial heaters and sealers, and various medical applications [20].

The RF-EMR has been classified as a potential carcinogenic (category 2B) by WHO,

Can cell phones cause infertility?

Cell phones are a vital part of modern life with over 6 billion subscriptions world-wide. The significance of mobile phone radiation on male reproduction is a key element of debate since several studies have suggested a relationship between mobile phone use and semen quality. several studies supports a growing claim that cell phone usage may have a detrimental effect on sperm parameters leading to decreased male fertility [21]. Nonetheless, other studies showed no conclusive link between male infertility and cell phone usage [22].

Since there is evidence that RF-EMR in both the power density and frequency range of mobile phones enhances mitochondrial reactive oxygen species generation by human spermatozoa, decreasing the motility and vitality of these cells while stimulating DNA base adduct formation and, ultimately DNA fragmentation [23,24,25]. These findings have clear implications for the safety of extensive mobile phone use by males of reproductive age, potentially affecting both their fertility and the health and wellbeing of their offspring.

The ambiguity of these results can be attributed to the lack of a centralized assay for measuring inflicted damage caused by cell phones. Study design, ethics, and reproducibility are all aspects which must be standardized before any conclusions can be made.

Diet and Infertility…… Can junk food or toxins cause it?

Junk food is a derisive slang term for food that is of little nutritional value and often high in fat, sugar, salt, and calories. Junk foods typically contain high levels of calories from sugar or fat with little protein, vitamins or minerals. Foods commonly considered junk foods include salted snack foods, gum, candy, sweet desserts, fried fast food, and sugary carbonated beverages. A sedentary life style combined with increased consumption of Junk food is a leading cause for Obesity [26].

Current scientific findings suggest an elevated risk of infertility among couples in which the male partner is obese [27]. In obese men can be found reduced serum levels of androgens and SHBG and increased estrogen levels without compensatory increase in FSH. Among other impacts of male obesity that may contribute to increased risk of infertility are altered retention and metabolism of environmental toxins, lifestyle, sexual dysfunction, genetic factors, excessive secretion of hormones derived from adipose tissue, oxidative stress, sperm specific proteomic changes or elevated levels of cytokines [28]. The increasing prevalence of obesity calls for greater clinical awareness of its impact on male fertility [29].

Other Metabolic syndromes like diabetes, Dyslipidemia, hypertension, have also shown association with infertility [30].

In recent times numerous other substance which can be ingested as part of a diet are being studied as etiological causes for infertility which include:

Ø Aflatoxins are naturally occurring mycotoxins that are produced by many species of Aspergillus, a fungus, has also been assessed as a potential cause for infertility [31]. International sources of commercial peanut butter, cooking oils (i.e. olive oil, etc.), and cosmetics have been identified as contaminated with aflatoxin.

In the recent years, there has been an increasing interest in the contribution of occupational and environmental exposures to toxic pollutants towards human male infertility.

Ø A long list of Endocrine-disrupting substances, [32] have been implicated for Infertility in men, which include herbicides, fungicides, pesticides and other industrial effluents. The levels of these substances are on a rise due to modernization and pollution.

Ø Metals are pervasive in food, water, air, tobacco smoke, and alcoholic beverages.

Experimental studies suggest that many metals have adverse effects on the male reproductive function [33]. These toxicants can accumulate in male reproductive organs.

Epidemiological studies have been equivocal on effects of heavy metals like cadmium and lead [34,35] on hormone concentrations, male fertility and semen parameters.

Can infertility occur due to life style?

Lifestyle has been shown to affect fertility in both males and females, with compelling evidence that smoking and being under or overweight impairs natural and assisted fertility, and other factors such as stress and caffeine have also been implicated [36].

Modern sedentary lifestyle [37] and has been assessed and shown significance in contributing to male infertility. Studies have also implicated habits of smoking [38] and alcohol consumption [39] as potential causes for male infertility.

A holistic approach to Infertility counseling

Research has highlighted that knowledge is a key factor associated with fertility self-care and the initiation of treatment , concluding that education about fertility issues is needed to prevent fear and unnecessary delay in seeking help when faced with problems conceiving helping prevent infertility [40] .

However, there is a lack of fertility knowledge in the general population. Hence counseling in case of infertility involves an educating process which will help the patient understand the problem and also convey it to others.

Since infertility involves factors from a genetic to environmental level which are being widely researched, there could be a constant growth of information, emphasizing on the need to be constantly updated.

Counselors must collect authentic information separating facts from fiction then apply the available information in a personalized method for evaluation in each case and then convey the risk factors or beneficial factors in an easily comprehensible manner to ensure effective counseling and optimum benefits to the patient.

The recent advances and ever growing list of factors influencing Male infertility have made counseling a complex process of learning and teaching with a motto, *"Knowledge about fertility and influencing factors is a core motivator behind engaging patients in the effective management for infertility"*

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STANDARDIZATION OF PREPARATION OF UDUMBER BASED KSHARA SUTRA

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Declaration

The Declaration of the authors for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: We, *V Saxena, L Singh and M Sahu* the authors of the research paper entitled STANDARDIZATION OF PREPARATION OF UDUMBER BASED KSHARA SUTRAdeclare that , We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in Anvikshiki journal , This research paper is our original work and no part of it or it's similar version is published or has been sent for publication anywhere else.We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the Editor of Anvikshiki Journal to own the copyright of our research paper.

Abstract

Standardization is an important step for the establishment of a consistent biological activity, a consistent chemical profile, or simply a quality assurance program for production and manufacturing of herbal drugs. WHO specific guidelines for the assessment of the safety, efficacy and quality of herbal medicines, as a prerequisite for global harmonization, are of utmost importance. For gaining popularity and acceptability, any treatment needs to be standardized and Kshara sutra is considered as medical device, so to maintain its quality level depending on different parameters it should be standardized. The aim of the present study is to briefly describeabout standardization of preparation of Udumber latex and bark (Ficusracemosa). Standardization of Udumber latex and bark is completed in few steps, likeselection and collection of raw drugs, pharmacognostical characteristics, extraction and analysis of stem bark and chromatography.

Keywords: TLC, HPLC, Phytochemical, Fluorescence analysis study.

Introduction

Standardization is a system that ensures a predefined amount of quantity, quality & therapeutic effect of ingredients in each dose[1]. Herbal product cannot be considered scientifically valid if the drug tested has not been authenticated and characterized in order to ensure reproducibility in the manufacturing of the product. Moreover, many dangerous side effects may occur, including allergic reactions, effects from contaminants, andinteractions with herbal drugs[2]. Standardized herbal products of consistent quality and containing well-defined constituents are required for reliable clinical trials

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and to provide consistent beneficial therapeutic effects With the emerging worldwide interest in adopting and studying traditional systems and exploiting their potential based on different health care systems, the evaluation of the rich heritage of traditional medicine is essential,which need to be standardized[3]. The parameter required for herbal formulation include pharmacognostic parameters, physiochemical parameters, phyto chemical parameters, and chromatographic fingerprints analysis.

Aim and objective

Therefore, the aim of this paper is to present an overview of pharmacognostical, phytochemical florescence investigations and chromatography carried out on the aqueous extract of Udumber latex and Udumberstem bark.

1. *Selection and Collection of Raw Drug: Udumber* stem bark and latex have been identified and collected from the garden, DhanwantaribhavanShalyatantra dept. Faculty of Ayurveda, I.M.S. B.H.U Varanasi. Barbour thread on which *Kshara sutra* had been prepared was purchased from registered shop of market.
2. *Pharmacognostical characteristics;* All parts of this plant (leaves, fruits, bark, latex, and sap of the root) are medicinally important. Apart from the usage in traditional medicine, scientific studies indicate *F. racemosa*possess various biological effects Such as hepatoprotective[4] chemo preventive[5], antidiabetic[6] anti-inflammatory[7], antipyretic[8], antitussive[9], and antidiuretic[10] effects.

*Macroscopic:*Bark obtained from fairly old trunks is reddish grey, grayish green and actual color of the surface skin is dusty brown with a thickness from 0.5-2 cm. Barkis uneven and cracked, on rubbing white papery flakes come out from the outer surface, inner surface light brown, fracture fibrous, taste mucilaginous without any characteristic smell, but astringent in taste. Texture is homogeneously leathery.

Microscopic: Transverse section of the bark shows cork, 3-6 layers of thin walled polygonal or rectangular cells filled with brownish content. Cork cambium is single layered. Secondary cortex is 6-12 layered, composed of thin walled, rectangular cells arranged regularly, contain starch grains and some contain rhomboidal crystals of calcium oxalate, most of the cells filled with chloroplast giving green appearance.

T.S. of Udumber

Rhomboidal crystals of calcium oxalate

2. Extraction

(a) Stem bark extract: The stem bark was thoroughly washed with water to remove adhering debris followed by rinsing with distilled water. Then it was spread in thin layers in stainless steel trays and dried under shade. After drying, the materials were grounded in a mechanical grinder and the resulting

powder was passed through sieve No. 60 to obtain uniform coarse powder. The coarse powder was kept in polythene jars and used for extraction[11]. 10 g of air-dried powder was added to distilled water and boiled on slow heat for 2 hrs. It was then filteredand centrifuged at 500^{0}C for 10 min. The supernatant was collected. This procedure was repeated twice. After 6 hours, the supernatant collected wasconcentrated to make the final volume one-fourth of the original volume. It was then autoclaved at 121 ^{0}C and at 15 lbs. pressure andstored at 4 ^{0}C.

*(b) Latex extraction: Udumber*latex was collected in morning hours. The aqueous extract was obtained by Reflux method and then dried in oven at 100^{0}C.

3. Analysis of extracts

Theseboth extracts were analyzed using various standard parameters like:

T A B L E 1 *(Solubility and pH value)*

	Udumber latex acqueous extract		*Udumber* stem bark acqueous extract	
Reagent	Solubility	pH	Solubility	pH
Water	Soluble at Room Temp.	6	Soluble at Room Temp.	6.5
Dimethyl sulphoxide (DMSO)	Soluble at Room Temp.	6	Soluble on Heating	6.5
Methanol	Slightly Soluble at Room Temp.	6	Insoluble	-
Ethanol	Insoluble	-	Insoluble	-

T A B L E 2 *Organoleptic characters*

S.No	Parameters	*Udumber* latex Aq. Extract	*Udumber* stem bark Aq. Extract
1.	Color	Reddish Brown	Reddish Brown
2.	Smell	Characteristic aromatic	Characteristic aromatic
3.	Taste	Kashaya	Kashaya
4	Consistency	Hard	Hard

T A B L E 3 *PhysioChemical parameters*

S.No	Parameters	*Udumber* latex Kshara sutra	*Udumber* stem bark Kshara sutra
1	Loss on drying	1.5%	5%
2	Water soluble extract(%w/w)	1.2%	5.2%
3	pH	6.0	6.5
4	Ash value (%w/w)	1%	12.5%
5	Acid insoluble ash(%w/w)	0.2%	3.2%
6	Sulphated ash(%w/w)	0.8%	2.2%

Qualitative Phytochemical Analysis

Phytochemicals are those chemical compounds that occur naturally in plants and responsible for color and organoleptic properties, such as the deep purple of blue berries and smell of garlic.The phytochemical investigation was carried out as per standard extraction procedure[for the presence or absence of different chemical constituents present in latex and stem bark of *Ficusracemosa.*.

T A B L E 4 *Preliminary Phytochemicals Investigation*

S.No	Components	*Udumber* latex extract	*Udumber* stem bark extract	Test name
1	Alkaloid	Present	Present	Dragendroff test
	Present	Present	Mayer's reagent	

2	Saponins	Present	Present	
3	Phlobatanin	Absent	Absent	
4	Tannin	Present	Present	
5	Steroid	Present	Present	Libermannbuchard's test
6	Terpenoid	Present	Present	Salkowskis test
7	Phytosterol	Present	Present	Salkowskis test
8	Cardiac Glycosides	Present	Present	Keller-kellani test
9	Protein	Present	Present	Bradford method
10	Aminoacids	Absent	Absent	Ninhydrin test
11	Carbohydrate	Present	Present	Mohlish test
12	Phenol	Present	Present	
13	Anthraquinone	Absent	Absent	
14	Triterpenoid	Absent	Absent	
15	Flavanoid	Present	Present	
16	Oil	Absent	Absent	

Thin layer Chromatography

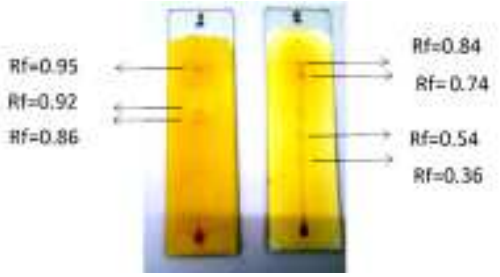
Thin-layer chromatography, is a solid-liquid form of chromatography where the stationary phase is normally a polar absorbent and the mobile phase can be a single solvent or combination of solvents. T.L.C. study of the samples was carried out by using the following conditions:

Adsorbent layer - Silica gel G pre-coated plates (E-Merck)
Sample 1- Aqueous extract of *Udumber* latex.
Sample 2- Aqueous extract of *Udumber*stem bark
Solvent system1: N butyl alcohol: Acetone: Water: Acetic acid (4: 4: 2:0.2) -1 Day
Solvent system2: N butyl alcohol: Acetone: Water: Acetic acid (4.5:4.5:1:0.2) -1 Day

Densitometry scanning of the TLC pattern of sample 1showed three spots corresponding to Rf values (Retardation factor) 0.95, 0.92, 0.86, Whereasfour spots corresponding to Rf values 0.84, 0.74, 0.54, 0.36 were obtained when the TLC plate was visualized with sample 2.

T A B L E 5

Sample	Stationary Phase	Mobile Phase	Number of spot	Distance of spot (cm)	Solvent per cm	R.f (value)
Aqueousextract of Udumber latex	Silica gel	N butyl alcohol: 4 mlAcetone: 4 ml Water : 2ml Acetic acid: 0.2ml	3	10.5 10.2 9.5	11	0.95 0.92 0.86
Aqueousextract of Udumber stem bark	Silica gel	N butyl alcohol: 4.5 mlAcetone: 4.5 ml Water : 1mlAcetic acid: 0.2ml	4	10.5 9.3 6.8 4.5	12.5	0.84 0.74 0.54 0.36



HPLC of Udumber latex and Stem bark

High performance liquid chromatography (HPLC) is a technique used in herbal drugs identification and characterization. Preparative and analytical HPLC are widely used in pharmaceutical industry for isolating and purification of herbal compounds. There are two type of preparative HPLC: Low pressure HPLC (typically under 5 bar) and high pressure HPLC (pressure >20 bar)[12]. Shikimic acid, major bioactive phenolic compound of Udumber (*Ficusracemosa*) , was estimated by HPLC in two of its extracts – Udumber latex and udumber stem bark and its content was found to be 5.53/100gm in udumber latex extract and 130.9/100gm in udumber stem bark extracts.

Similarly HPLC analysis of udumber stem bark extract provided information about Garlic acid, the major bioactive phenolic compound of udumber and its content was found to be 3.8mg/100gm in udumber stem bark.

Fluorescence Analysis study

Fluorescence analysis study of powdered drug material with different reagents was carried out to observe the color reactions.

T A B L E 6

S.No.	Sample	*Udumber* latex		*Udumber* stem bark	
		Color in day light	Color in UV light	Color in day light	Color in UV light
1	Powder	Reddish brown	Black	Brown	Dark black
2	Powder + 0.1 N sodium hydroxide	Reddish brown	Black	Black	Yellowish black
3	Powder + Acetic anhydride	Yellowish black	Turbid Blackish brown	Blackish brown	Light black
4	Powder + Acetic acid	Yellowish brown	Precipitated Blackish brown	Blackish brown	Black
5	Powder + 0.1 N HCl	Dark brown	Black	Light brown	Blackish brown
6	Powder + Water	Light brown	Black	Reddish brown	Dark black

A) Physical parameters

The ingredients and the part used are given in *(Table-7).*

S.no.	Constituents	Coating
1.	Barbour thread	Single layer
2.	Udumber stem bark extract	11 coatings
	Udumber latex extract	11 coatings

The two hangers were placed on the stand. Clean piece of gauze was dipped separately in *Udumber* latex and stem bark dissolved in distilled water in the ratio of 1: 2 and smeared over two different threads. The smearing needed to be such that the uniformity was maintained.

Once all the threads were coated, they were placed in Kshara sutra cabinet, for drying. The Kshara sutra cabinet was maintained at 40°C. The coating of udumber was thus repeated for 11 times. Each time subsequent coatings has been to be done only after the previous coating had dried well. Finding after each coating was noted and compared.

TABLE 8 *Measurements of the thread*

Udumber latex based kshara sutra-

	Length (cm)	Thickness (mm)	Weight (mg)	T strength	pH Value
Initial	31.332±0.605	0.508 ± 0.011	87.6 ± 0.675 mg	5 kg	6.0
Final (after 11 coating)	31.332±0.605	1.508 ± 0.009	131.29 ± 0.758	5 kg 76.61 gm	6.0
Change	No	1.00 mm	43.69 mg	76.61 gm	No

Udumber latex based kshara sutra

- Average change in thickness of each thread after each coating=0.084 ±0.24 mm
- Average Change in weight of each thread after each coating =4.10 ±0.05 mg
- Average amount added on after each coating = 3.97 mg

TABLE 9 *Udumber stem bark based kshara sutra)*

	Length (cm)	Thickness (mm)	Weight (mg)	T strength	pH Value
Initial	31.332±0.605	0.508 ± 0.011	87.6 ± 0.675	5 kg	6.5
Final (after 11 coating)	31.332±0.605	1.964 ± 0.022	421.4 ± 8.845	5 kg 78.08 gm	6.5
Change	No	1.456 mm	333.8 mg	78.08 gm	No

Udumber stem bark based kshara sutra

- Average change in thickness of each thread after each coating=0.106 ±0.12 mm
- Average Change in weight of each thread after each coating =32.16 ±0.65 mg
- Average amount added on after each coating = 30.35 mg

The Kshara sutra thus prepared was dried and sealed in glass tubes along with one silica bag. This sealed tube was stored in incubator maintained at 35-40°C.

Results and Discussion

Characteristics of pharmacogonsticalsignificance of*Ficusracemosa* latex andbarks shows, total ash, acid insoluble ash, loss on drying, water soluble extractive value wasdetermined. The standardized values of *Ficusracemosa*bark had higher values than that of latex. *Ficusracemosa* are frequently used as an herbal remedy for an array of human disorders.

The extracts also reported to inhibit insulinase activity from liver andkidney..The variousextracts of *Ficusracemosa*latex and barks showed the presence of Phytochemicalconstituents namely alkaloids, flavonoids, saponins, tannins have hypoglycemic activities; anti-inflammatory activities[13]. Previous reports revealed that saponins possesshypocholestreolemic and antidiabetic properties[14]. Steroids, triterpenoids and Saponins of *F.racemosa*showed the analgesic properties and central nervous system activities[15]. Latex (milky juice) is appliedexternally on chronic infected wounds to alleviateedema, pain and to promote the healing[16].Thelatex is reportedly used for treating piles[17].

Bark is acrid,cooling, galactagogue and good for gynaecologicaldisorders. The stem bark is used to treatmenorrhagia, leucorrhoea, gonorrhoea, urinarydiseases, haemorrhage and skin diseases[18]. The bark is highly efficacious inthreatened abortion and also recommended inurological disorders, diabetes, hiccough, leprosy,asthma and piles.

Conclusion

Hence, in recent years, ethnomedicinal studies received much attention as this brings to light the numerous little known and unknown medicinal virtues especially of plant origin which needs evaluation on modernscientific lines such as phytochemical

analysis, pharmacological screening and clinical trials. *Ficusracemosa*possesses various pharmacological activities as discussed in presentpaper.Since the study was conducted in a controlled manner, the phytochemical results can be used forthe standardization of the above mentioned drugs. A preliminary screening and more researchhas to be undertaken to explore the wonderful therapeutic properties of these medicines. Toconclude the presence study, we have found that most of the biologically active phytochemicalswere present in the aqueous extracts of the *Ficusracemosa*latexand bark.It was found that standardized pharmacognosticalparameter of*Ficusracemosa*bark were more than that of*Ficusracemosa*latex.

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A CASE OF SEPTIC ABORTION WITH UTERINE PERFORATION WITH FETAL BONES IN ABDOMINAL CAVITY.

DR ANJALI RANI* AND DR KALPANA SINGH**

Declaration

The Declaration of the authors for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: We, *Anjali Rani and Kalpana Singh* the authors of the research paper entitled A CASE OF SEPTIC ABORTION WITH UTERINE PERFORATION WITH FETAL BONES IN ABDOMINAL CAVITY. declare that , We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in Anvikshiki journal , This research paper is our original work and no part of it or it's similar version is published or has been sent for publication anywhere else.We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the Editor of Anvikshiki Journal to own the copyright of our research paper.

Abstract

23 year old female at 13 weeks gestation underwent illegal abortion by untrained personnel. This patient reported to us with fever, pain abdomen, distension of abdomen. In this patient after stabilization laparotomy done and there was lots of pus present . There was uterine perforation and macerated fetal bones were found in abdominal cavity. Pus was drained. Uterine perforation closed. Fetal bones removed. Abdominal lavage done with normal saline. Abdomen closed in layers. Postoperative period was uneventful.

Key words : Septic abortion, Uterine perforation , Fetal bones

Introduction

Septic abortions with complications are still very common in India. Failure to detect uterine perforation during surgical abortion may result in adverse patient outcome besides having medicolegal implications[1]. Septic abortions are causing maternal mortality and morbidity. They can be prevented with education and proper infrastructure.

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Case report

23 year old female G4P1+2 at 13 weeks of gestation resident of Baliya (U.P.) underwent illegal abortion by some untrained personnel in a village.Initially she has excessive bleeding per vagina. After two days patient developed fever , distension of abdomen, burning micturition.Then she reported to our hospital. On examination patient was having pallor. Temperature was 103 degree. Antibiotics were started and investigations were done. Hemoglobin was7.0 gm.Total leucocyte count was 18000. USG showed collection inside the peritoneal cavity. Hemoglobin was 8 gm . One blood transfusion was done. After initial stabilization exploratory laparotomy was done

Per operative Findings are;

1. Pus was present in peritoneal cavity.
2. Uterus was covered with white slough like material.
3. There was perforation on posterior wall of uterus as shown in figure 1. This perforation was stitched.
4. In abdominal cavity fetal bones were found as shown in figure 2. They were rmoved

Bowel were explored to rule out any perforation there was no bowel injury. Drain was put inside peritoneal cavity. Abdomen was closed in layers.

Post-op period patient was uneventful. Patient was given another blood transfusion.Antibiotics given were ceftriaxone, metrogyl and gentamycin.

Patient was discharged and still in follow up.

Figures

Fig 1. Uterine perforation

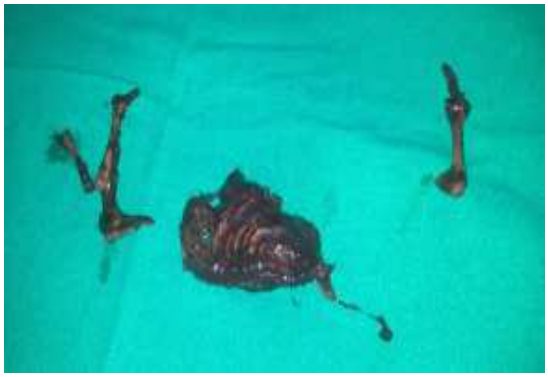

Fig 2 Fetal bones

Discussion

Uterine perforation can be because of number of causes which can be either spontaneopus or iatrogenic. The iatrogenic procedures include procedures like dialatation and curettage, hysteroscopy, insertion of intrauterine devices or brachytherapy tandems[8,9]. Dilatation and curettage is a commonly performed gynecological abortion procedure and is considered to be relatively safe with low overall complication rate of 0.7 % [10]. The incidence of uterine perforation with this procedure is reported to be in between 0.07 % to 1.2 % [11]. According to World health Organization (WHO) estimates there is a case fatality rate of 250-500 deaths per 100,000 illegal abortion procedures. Some factors like instillation of saline or prostaglandins, advanced gestational age have been associated with a higher complication rate

Conclusion

Maternal mortality and morbidity due to septic abortions can be prevented. So its high time to make people aware for where they have to go for abortions so that maternal mortality and morbidity can decreased. We should take strong actions against untrained persons doing abortions. We should start more awareness programmes about septic abortions.

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RADIATION CHARACTERISTIC OF METALLIC NANO-PARTICLE WITH APPLICATION TO NANO-ANTENNA

ANAND MOHAN*

Declaration

The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, *Anand Mohan* the author of the research paper entitled RADIATION CHARACTERISTIC OF METALLIC NANO-PARTICLE WITH APPLICATION TO NANO-ANTENNA declare that , I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal , This research paper is my original work and no part of it or it's similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Abstract

Nanostructure materials often possess unique electrical, chemical, structural, optical and magnetic properties allowing for use in a variety of novel applications including information storage, bio sensing applications, and biomedical engineering . The behaviour of strongly coupled plasmas and the capability of manipulating light on the nanometre scale make nano antennas particularly useful in microscopy and spectroscopy. the highly doped graphene sheet with a negative permittivity will start to support transverse magnetic (TM) surface plasmon polariton (SPP), which opens a door for a strong light-matter interaction between the graphene and metallic nanostructures. the properties of optical nano-antennas can be tailored to fulfil desired functions. Applying this specific and unique property of graphene to design nano antennas could tune the characteristics and enhance the performances of nano antennas

1. Introduction

Nanotechnology has become a broad and interdisciplinary research field. It is involving engineering, chemistry, physiology, biology and so many other branches of sciences. It has been growing exponentially in the past few years. It is showing great potential for several technical and medical applications, such as early detection, accurate diagnosis and personalized treatment of diseases. Nano scale materials and devices are typically smaller than several hundred nano meters and are comparable to the size of large biological molecules such as enzymes, receptors, and antibodies. With a size about 100 to 10000 times smaller than human cells, these nano scale devices can offer unprecedented interactions with bio

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molecules both on the surface of and inside cells[1] The use of nano materials in biotechnology and medicine merges the fields of material science, chemistry, physics and biology. Nano structured materials, such as nano particles, nano electronics nano wires, nano tubes and thin films, provide a particularly useful platform for successful development of wide-ranging therapeutic and diagnostic applications in the biomedical area. Magnetic nanoparticles, in particular, have been developed and optimized for fundamental scientific interest but they have also found many biomedical applications ranging from contrast agents in magnetic resonance imaging to bio sensing applications[2]. Nanostructure materials often possess unique electrical, chemical, structural, optical and magnetic properties allowing for use in a variety of novel applications including information storage, bio sensing applications, and biomedical engineering[3,4]. Nan particles possessing magnetic properties offer great advantages in that they can provide selective attachment to a functional molecule, confer magnetic properties to the target, and allow manipulation and transportation to a desired location through the control of a magnetic field produced by an electromagnet or permanent magnet .

The behaviour of strongly coupled plasmas and the capability of manipulating light on the nanometre scale make nano antennas particularly useful in microscopy and spectroscopy[5]. These applications rely on the characteristics of nano antennas involving the resonance frequency, bandwidth, directivity, far-field radiation pattern, near-field distribution, and local density of states. The characteristics of the nano antenna can be modified with geometrical size and shape as well as material composites. Graphene is a mono atomic carbon with a honeycomb lattice which has attracted much research interest in recent years[6-7]. Graphene has been used as a transparent electrode due to the properties of high optical transmittance and conductivity. Due to the forbidden inter band transitions by the Pauli blocking, the chemically or electro statically doped grapheme supports strong plasmonic effects typically at the far-infrared or terahertz regime. The capability of dynamically modifying chemical potentials through tuning the gate voltage of the graphene-metal nanoantenna as shown in the left side of Fig. 1 enables to fabricate controllable devices by introducing the graphene sheet. Over the past few years, an exciting development in nano-optical research has set in with the recognition that metallic nanoparticles with their plasmon resonances may be used in a fashion very similar to the way electrical engineers of the twentieth century have developed radio -frequency Antennas. This introduces the concept of optical nano-antennas. Following many of the same rules that apply to RF antenna design, also the properties of optical nano-antennas can be tailored to fulfil desired functions. Applying this specific and unique property of graphene to design nano antennas could tune the characteristics and enhance the performances of nano antennas.

2. Structure and formulations

Here, we have proposed a novel metal-graphene nano antenna. One unit cell of the antenna is shown in the right side of Fig. 1. The proposed architecture involves a conventional gold (Au) dipole antenna comprising two Au arms separated by a feed gap, the graphene sheet, and aluminium oxide Al_2O_3 as an insulator inserted between the dipole antenna and graphene.

The chemical potential of graphene can be electro statically tunable by changing the back gate voltage. The right figure shows a unit cell of the metal-graphene nanoantenna. The graphene sheet is deposited at the bottom of Al_2O_3. The geometric parameters are as l = 720 nm, w = 40 nm, h = 40 nm,and *Gap* = 20 nm.The resonant dipole antenna induces a strong confined field in the narrow feed gap, which is caused by the couplings between two metal arms[8,9]. The arm lengths of the metallic dipole antenna should be carefully engineered so that the strong interaction between metallic plasmonics and graphene plasmonics occurs at the infrared regime. The geometric parameters of the Au dipole antenna

are given in the caption of Fig. 1 for guaranteeing the resonant wavelength (3200 nm) model, for simplicity and manipulation, is taken as $d0 = 0.5$ nm, which is sufficiently guaranteed the convergence

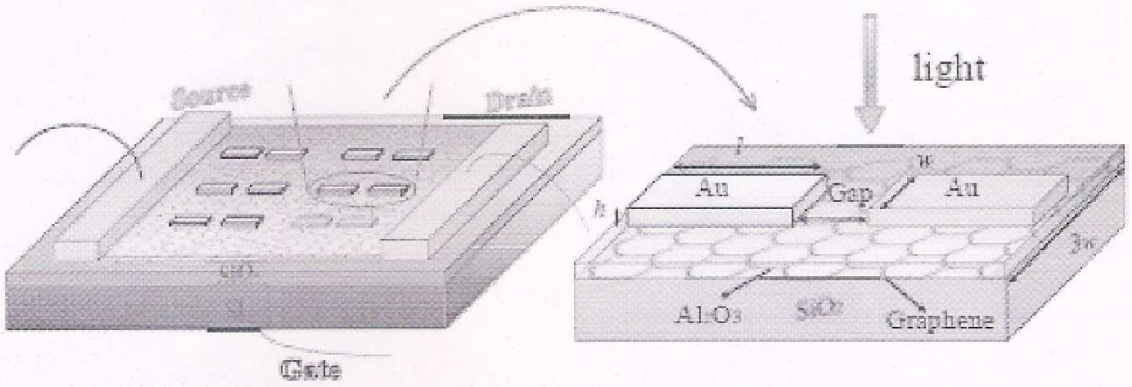


Fig. 1. A schematic pattern of metal-graphene nanoantennas.

of our calculation. The electrical permittivities of the insulator and Au are $\sum = 3.065$ and given by Johnson and Chrity respectively. In addition, the insulator (with thickness of 4 nm) is inserted to reduce the electrical (quantum) tunneling effect from the graphene to metal. Consequently, the responses of the metal-graphene nanoantenna only depend on its optical effects governed by Maxwell's equations.The surface conductivity of infinitesimally thin graphene is calculated by the Kubo formula as a function of the frequency (ω), chemical potential (μc), carrier scattering rate Gamma (Γ) and temperature (T) [, 10]: Where $f_d(\varepsilon) = \{exp[(\varepsilon - \mu_c)/k_B T] + 1\}^{-1}$ is the Fermi-Dirac distribution function and kB is the Boltzmann constant. The carrier scattering rate Gamma is set as $\Gamma = 11\ \mathrm{meV}/\hbar$.

It should be noted that: (i) The conductivity used in our simulation should be converted to the volume conductivity $\tilde{\sigma} = \sigma / d_0$ where σ, $\tilde{\sigma}$ are the surface and volume conductivities, respectively; and $d0$ is the effective thickness of the graphene sheet. (ii) This volume conductivity is contributed to the in-plane permittivity($\varepsilon_{\parallel}$), while the out-of-plane permittivity is chosen to while the out-of-plane permittivity is chosen to be the dielectric permittivity . the real and imaginary part of the normalized surface conductivity of the graphene sheet are highly tunable with different chemical potential. The imaginary part of the conductivity of graphene, corresp onding to the real part of the in-plane permittivity $(\varepsilon_{\parallel} = \varepsilon_r - j\tilde{\sigma}/\omega\varepsilon_0)$, becomes negative value near the visible regime with an appropriately adjusted chemical potential. In detailed, the imaginary part starts to be negative at the wavelengths of λ =820, 740, 680 nm corresponding to the chemical potentials μc =0.9μ can be achieved by a high doping which could be promisingly obtained in near future experiments. Resembling noble metals, the highly doped graphene sheet with a negative permittivity will start to support transverse magnetic (TM) surface plasmon polariton (SPP), which opens a door for a strong light-matter interaction between the graphene and metallic nanostructures.

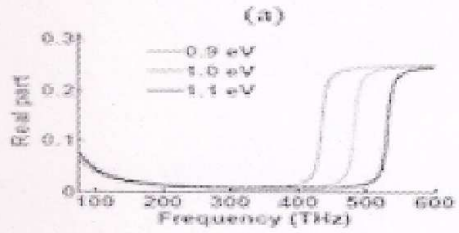
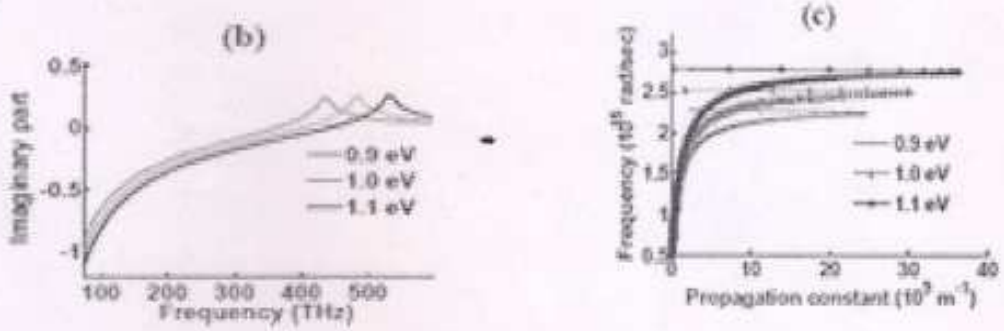


Fig. 2. The optical properties of graphene at different chemical potentials (μc = 0.9, 1.0,1.1 eV). Other physical quantities are set as T = 300 K and (Γ) = 11 meV/$\hbar$. (a) The real part, (b) The imaginary parts

of the normalized surface onductivity (defined as σ/σ_0 and $\sigma_0 = e^2/\hbar$) and $\lceil 0 = e2/\lceil h$) of the graphene sheet. (c) The analytical dispersion relation of the grapheme sheet sandwiched by the semi-infinite insulator Al_2O_3 and SiO_2. (d) The near field distributions of the doped graphene sheet ($\lceil \mu c = 1.1$ eV) inserted by 4 nm Al2O3 and 100 nm SiO2 (as shown in the inset) at the wavelength of 3.000 nm

The dispersion relation of the infinitely thin graphene sheet inserted between two dielectric media has been theoretically determined in the literature[11]. In our case, the graphene is sandwiched between Al_2O_3 and silicon oxide (SiO_2).



The dispersion relation of the sandwich configuration for the TM mode is given by

$$\beta(\omega) \approx \varepsilon_0 \frac{\varepsilon_{r1} + \varepsilon_{r2}}{2} \frac{2j\omega}{\sigma(\omega)} \qquad \text{----------(1)}$$

Where $\beta(\omega)$ is the propagation constant, ε_o is the permittivity of air, and $\varepsilon r1$ and $\varepsilon r2$ are the electrical permittivities of the two dielectric media and $\varepsilon r1 = 3.065$ and $\varepsilon r2 = 2.25$ for Al_2O_3 and SiO_2, respectively. Moreover, ω is the angular frequency and $\sigma(\omega)$ is the surface conductivity of the graphene sheet. Figure 2(c) shows the dispersion relation of the Al_2O_3-graphene-SiO_2 configuration for the TM SPP mode. It can be easily found that the plasmonic resonance is blue-shifted when the chemical potential increases from 0.9 eV to 1.1 eV. In addition, the near field is shown in Fig. 2 (d) for the thin graphene layer inserted by 4 nm Al_2O_3 and 100 nm SiO_2 (the configuration is shown in the inset) which is much more close to our proposed configuration.

The bounded plasmonic wave was found around the doped graphene sheet ($\mu c = 1.1$ eV) at the wavelength of 3000 nm that is near the resonant wavelength of the Au dipole antenna. This will enable the mode couplings or hybridizations between the highly doped graphene sheet andthe dipole nanoantenna.

3. Results and discussions

The proposed metal-graphene nanoantenna is theoretically studied through rigorously solving Maxwell's equations by finite-difference time-domain (FDTD) method Within the wavelength range of interest, the normalized extinction cross section (ECS)[12] is calculated and illustrated in Fig. 3(a). The single resonant peak due to the fundamental dipole mode of the dipole antenna without the graphene sheet is located at the wavelength of 3200 nm. After introducing the graphene layer, this resonant peak is blue-shifted more importantly, the single resonant peak splits into two individual resonant peaks at the wavelengths of 2900 nm and 3050 nm for the metal-graphene hybrid antenna. According to the coupled

mode theory , the low resonant peak at the short wavelength of 2900 nm is attributed to the outof-phase coupling between the surface wave of graphene and dipolar mode of nanoantennas,while in-phase coupling is contributed to the high resonant peak at the longer wavelength of 3050 nm. Besides, Fig. 4 shows the near-field E-field distribution of the hybrid nanoantenna with respect to the four wavelengths denoted by the arrows of Fig. 3(a). As indicated in a very strong E-field is expected in the feed gap and the edges of the two Au arms when the incoming plane wave is polarized along the metal arms. The constructive interferences between two SPPs of the metallic arms not only produce a strong field enhancement at the gap but also introduce evanescent waves going down to the graphene sheet. The evanescent waves also offer additional momentums to excite the graphene plasmonics. Furthermore, compared to those in the insulator and metal, the near-field distributions corresponding to the dip between the two resonant peaks (denoted by the arrow 3 in Fig. 3(a)) is concentrated around the graphene sheet where light drives the coherent electron oscillations in the ultra-thin graphene sheet with a high mobility. This oscillation also plays an important role in forming the strong field confinement in the graphene sheet.

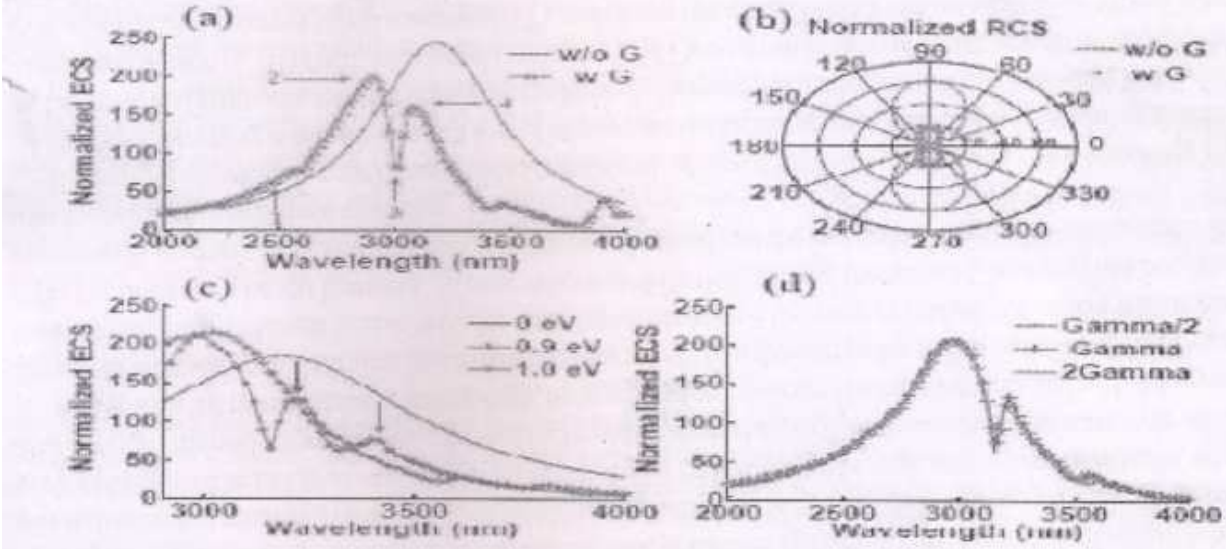


Fig. 3. The characteristics of the metallic dipole nanoantenna with and without the graphene sheet. Both the extinction cross section and radar cross section are normalized with the geometrical cross section area of the metallic dipole antenna (2*wx*1) (a) Extinction cross section.

(b) The polar plot of the far-field radiation pattern. (c) Extinction Cross Section at different chemical potentials.(d) Extinction Cross Section at different scattering rate Gamma(with μc =1.0 eV).With the graphene, the full width at half maximum (FWHM) of the extinction cross section (normalized to unity) is decreased by 18% for the hybrid nanoantenna. Another characteristic of the nanoantenna called normalized radar cross section (RCS) or far-field radiation pattern from the reciprocal theorem, is also calculated and drawn in Fig. 3(b). The far-field radiation intensity has been drastically reduced by 70% due to the optical absorption induced by the graphene plasmonics. The most important property of the metal-graphene hybrid nanoantenna lies at its tunable or switch on/off feature which is also shown in Fig. 3(c). It is apparently seen that the high resonant peak at the longer wavelength is dynamically tunable through increas ing the chemical potential from 0.9 eV to 1.0 eV by increasing the gate voltage.

Especially,the hybrid nanoantenna can be restored to the conventional metallic dipole antenna by simply employing an intrinsic graphene (μc=0 eV) or electrostatically tuning the chemical potential of graphene less than 0.6 eV.

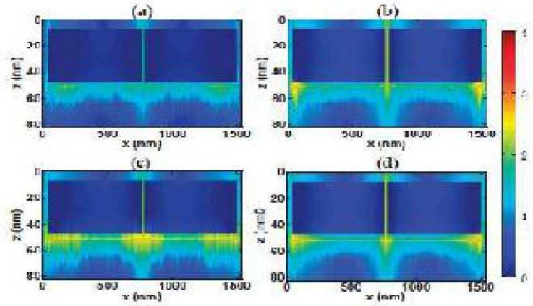


Fig. 4. The near-field distributions (in log scale) of the metal-graphene nanoantenna corresponding to the four wavelengths denoted by the arrows of Fig. 3(a). (a) 2500 nm; (b) 2900 nm; (c) 3000 nm; (d) 3050 nm.

This provides a new opportunity to control the optical nanoantenna through nanoelectronics devices. In addition, we also investigate the carrier scattering rate Gamma (Γ) that could influence mode coupling of the proposed nanoantenna in terms ofthe normalized ECS. As shown in Fig. 3(d), the coherent mode coupling between the ultra-thin graphene and Au dipole antenna can be supported either by adopting a smaller carrier scattering rate $\Gamma/2$ or a larger carrier scattering rate 2Γ. A smaller carrier scattering induces significant resonance splitting. Contrarily, an increasing carrier scattering rate or Ohmic loss of grapheme reduces the difference between the peak and valley of the normalized ECS and further slightly increases the bandwidth of the antenna.

4. Conclusion

In summary, we have analyzed and designed a tunable metal-graphene hybrid nanoantenna. By dynamically tuning the chemical potential of graphene, the mode couplings between the doped graphene sheet and metallic nanoatenna can be obtained. The splitting resonance peaks of the hybrid nanoantenna confirm the strong interaction between the graphene plasmonics and metal plasmonics. The simulation results also reveal a strong field enhancement and confinement in the graphene sheet. Particularly, the near-field distribution, resonance frequency, bandwidth,and radiation pattern of the convectional metallic dipole antenna are strongly modified and highly tunable after the introduction of graphene. This work is helpful to design new electrically-tunable optical nanoantennas.

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GENERAL CONCEPT OF THE UNIVERSE

NITISH SRIVASTAVA*

Declaration

The Declaration of the author for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: I, *Nitish Srivastava* the author of the research paper entitled GENERAL CONCEPT OF THE UNIVERSE declare that , I take the responsibility of the content and material of my paper as I myself have written it and also have read the manuscript of my paper carefully. Also, I hereby give my consent to publish my paper in Anvikshiki journal , This research paper is my original work and no part of it or it's similar version is published or has been sent for publication anywhere else. I authorise the Editorial Board of the Journal to modify and edit the manuscript. I also give my consent to the Editor of Anvikshiki Journal to own the copyright of my research paper.

Conjecture; For a given period of time the volume of whole universe at first increases and after attaining the maximum volume the volume of whole universe slightly decreases and then volume becomes constant.

Proof; It has already been proven that the volume of the whole universe is increasing continuously .

On the basis of this concept ,we can say that there are many heavenly bodies in universe which are emitting energy in the form of heat and radiations. This energy in the form of heat and radiations is taken up by nearby bodies which are at lower temperature to increase their volume.

Now we can think of a situation when the energy emitting heavenly bodies would stop to emit these enormous amounts of energy and the bodies which were taking heat will now not have any source of acquiring heat energy, so their volume will attain a maximum point (say V).Now their volume will not increase, applying these conditions for the whole universe we can say that the universe will attain its maximum volume at a certain time.

So we can conclude from the above concepts that the volume of universe will attain finally a maximum possible value.

Second Part; The heavenly bodies which were emitting heat energy can have variation in emission of heat energy.

For example-consider two bodies A and B of this type which are at very large distance and let A is emitting more energy than B so the heat taking bodies nearby A will expand more than objects nearby B.

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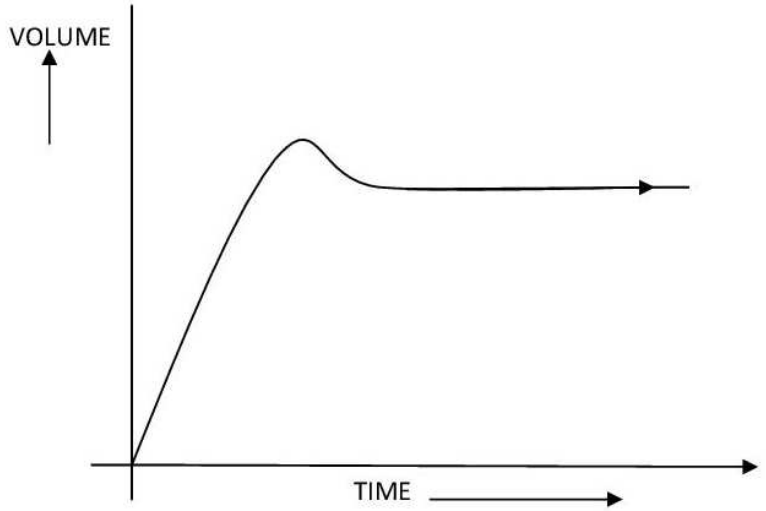
From the above example we can conclude that there will be different temperature at different points in universe.

Now the bodies which have taken up more heat energy to expand their volume will have higher temperature than other bodies so they will try to come in equilibrium temperature(as there is difference in temperature) and so they will release some of their heat energy and also by doing this their overall volume will decrease.

Now there is huge amount of atmosphere in universe so some heat energy will also be lost in these atmospheres.

Hence we can conclude that slight decrease in the overall volume of universe as some energy is lost in the atmosphere.

We can show the situation by the following graph-



Part Three; Now there is a great dilemma why gravitational force will not let the universe collapse when the overall volume of the universe is decreasing when the bodies try to come in lower temperature after attaining the maximum volume (V).

This can be explained as follows:

In the process of expansion of universe, the volume of universe expands to a certain maximum value as shown in the above graph.

Now when the volume of universe starts to decrease there can be counter arguments that gravitational force will make the universe to collapse!!!

Arguments Against The Motion

As till now we have assumed that our universe is not collapsing due to the effect of gravitational force, so it also not effect during the contraction phase. As all the bodies will approach each-other in the same proportion and hence they will maintain a separation between them proportional to their previous separation(instant at which the universe had a maximum volume).

Conclusion

Hence from the above described concepts we can conclude that the above conjecture is true.

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ANALYSIS OF INTER DIGITAL CAPACITORS

Dr. Udit Kumar Yadav* AND Dr. Somnath Pathak**

Declaration

The Declaration of the authors for publication of Research Paper in The Indian Journal of Research Anvikshiki ISSN 0973-9777 Bi-monthly International Journal of all Research: We, *Udit Kumar Yadav and Somnath Pathak* the authors of the research paper entitled ANALYSIS OF INTER DIGITAL CAPACITORS declare that , We take the responsibility of the content and material of our paper as We ourself have written it and also have read the manuscript of our paper carefully. Also, We hereby give our consent to publish our paper in Anvikshiki journal , This research paper is our original work and no part of it or it's similar version is published or has been sent for publication anywhere else.We authorise the Editorial Board of the Journal to modify and edit the manuscript. We also give our consent to the Editor of Anvikshiki Journal to own the copyright of our research paper.

Abstract

This paper describe Inter Digital Capacitor on Co–planer wave guide. The full wave equivalent circuit has also been presented. The capacitor structures are simulated using software ADS Momentum and realized on PCB (Printed Circuit Board). The capacitor constructed on printed circuit board are measure using VNA (Vector Network Analyzer).

Index Term : PCB (Printed Circuit Board), VNA (Vector Network Analyzer), ADS Software.

Introduction

Inter Digital capacitor on coplanar wave guide find application in filter circuits, hybrid couplers, dc blocking circuits, turning elements in impedance matching network RF by pass circuits and slow wave structures[1]. The Inter Digital capacitor on coplanar wave guide and their full wave equivalent circuits have been studied[2,3]. The effective dielectric constant of the capacitor can be formulated based on a quasi–static conformal mapping techniques[4]

In this paper we made an attempt to study the performance of inter digital capacitors on printed circuit board. The structure are simulated using software ADS momentum, an approximate circuit equivalent mode is used formulated de emulate the capacitance value from the simulation result.

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Series Capacitor

The equivalent circuit of a series capacitor on CPW is shown in figure –I. The capacitance of this configuration can be de-emulated from simulation scattering parameters. The structure with and without the capacitive structure is simulated. The S parameters obtained From simulation is converted to Z and Y parameters using the functions "stoz (S,Z0)" and "stoy (s,Z0)" available in ADS. Then the extraction of the capacitance is done in ADS using function equations.

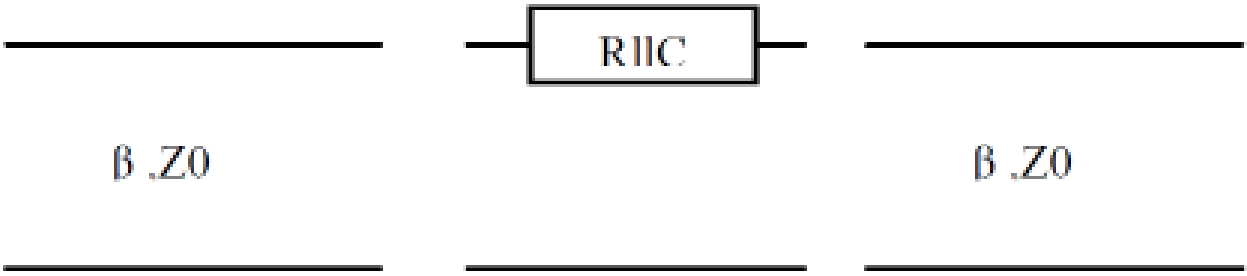

Fig. I Equivalent circuit of series capacitor on CPW

The design data of CPW line of characteristics impedance of 50 ohm and the series capacitor of 1.25pF are given in table –1

T A B L E 1 *Design Values Of Series Capacitor*

CPW LINE	
Copper thickness	18um
Dielectric height	160um
Dielectric constant	3.6
Strip width	3100um
Strip spacing	250um
Effective wave length	5200um
CAPACITOR	
2S	300um
2g	300um
1	200um
S1	150um

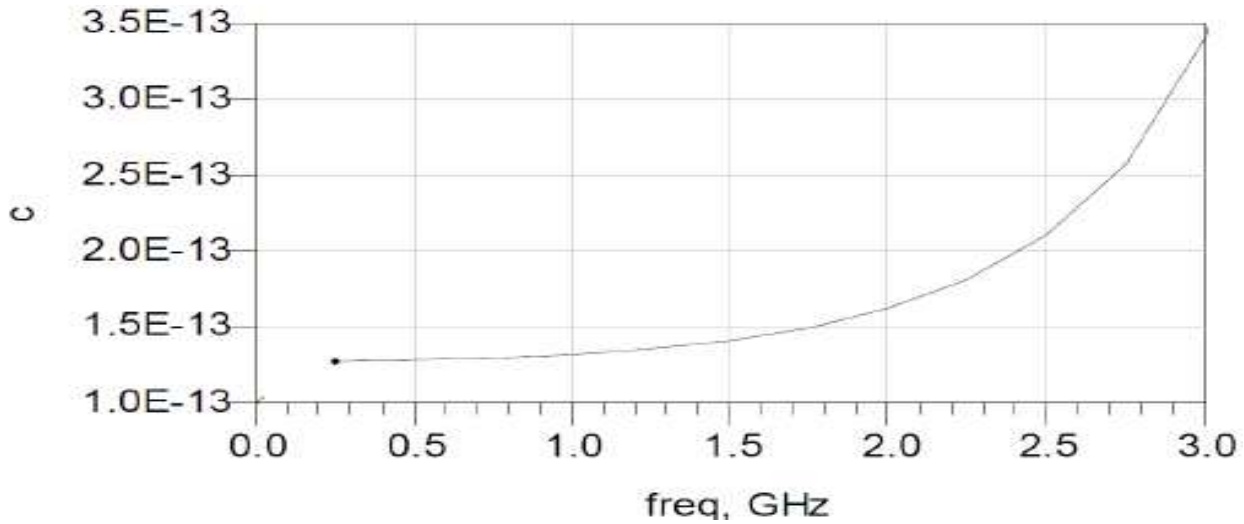

Fig. 2 : Extracted capacitance plot from simulation

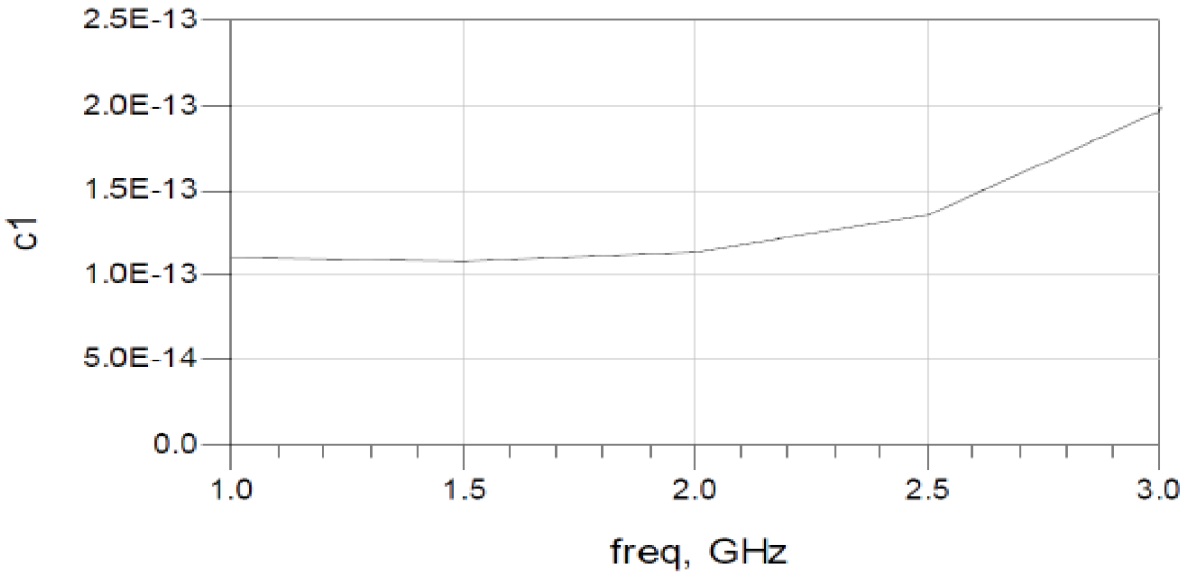

Fig. 3 : Extracted capacitance plot from measurement

T A B L E 2 *Design Values Of Series Capacitor*

CPW LINE	
Copper thickness	18um
Dielectric height	160um
Dielectric constant	3.6
Strip width	3100um
Strip spacing	250um
Effective wave length	5200um
CAPACITOR	
2S	250um
2g	250um
L	250um
S1	5200um

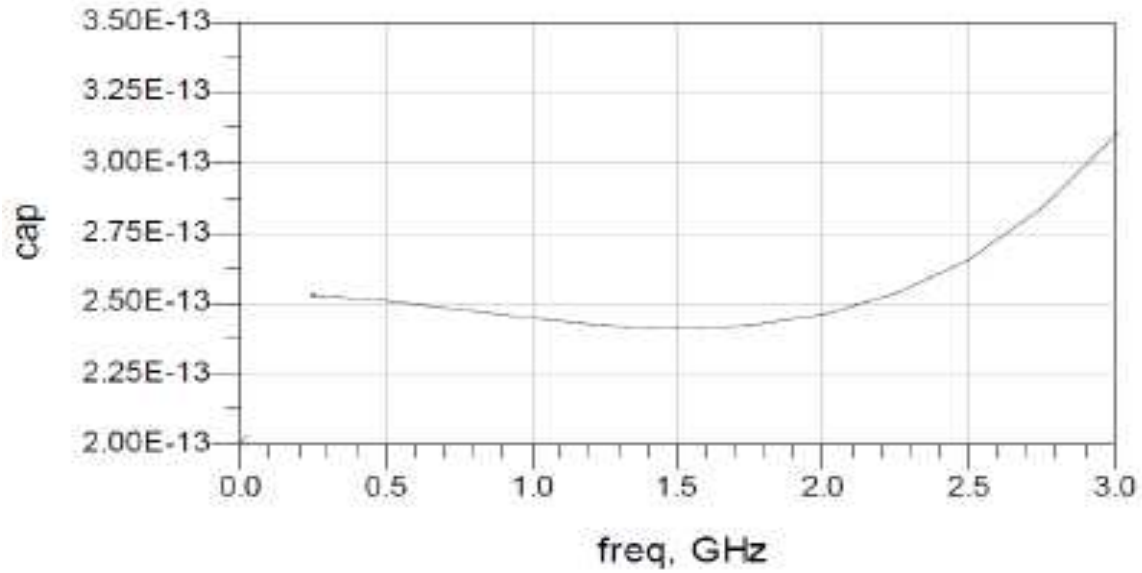

Fig 4 : Extracted capacitance plot from simulation

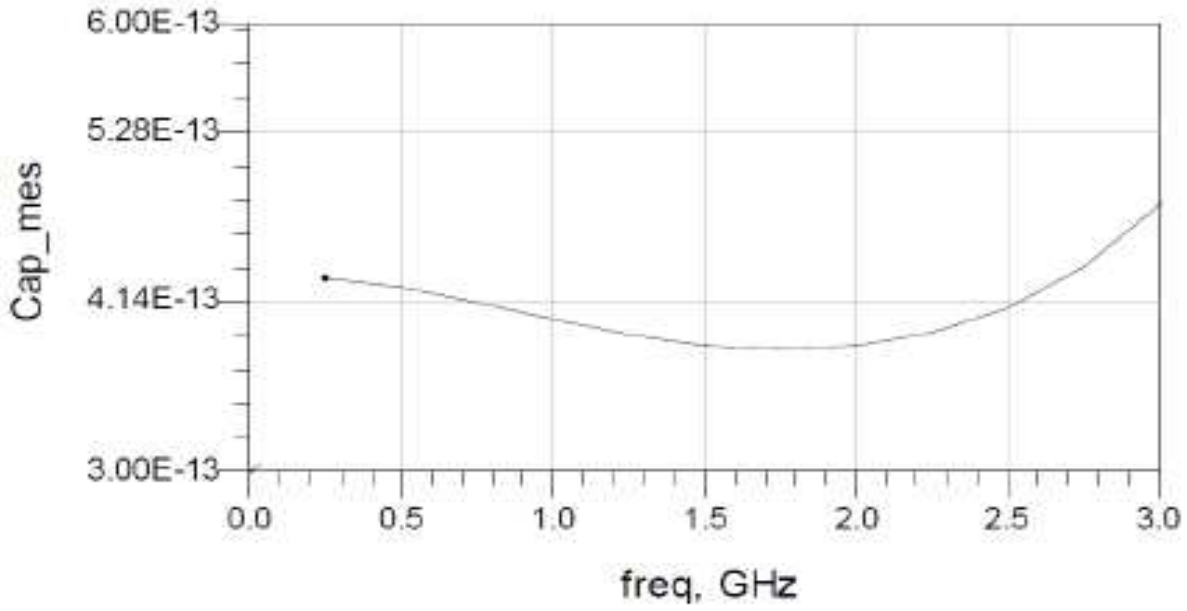

Fig 5 : Extracted capacitance plot from measurement

Measurement

The capacitance structures are fabricated in printed circuit board (PCB), using PCB fabrication methods. The negative film of the structure is used to used to transfer the pattern to the PCB, the fabricated structured is measured using vector network analyzer (VNA). The S parameters measured using VNA is feed to the ADS momentum using option add files, then the capacitance values are extracted using functions in ADS.

Conclusion

In this paper, the inter digital capacitors on co–planer wave guide have been studied. The full wave equivalent circuit has also been presented. The fabrication of series and shunt type inter digital capacitor on co–planer have been found to be wave guide very simple to fabricate. In this paper the inter digital capacitors are wave guide has been studied and analyzed.

The capacitor structures are simulated using software ADS Momentum, and realized on PCB. The capacitors constructed on PCB are measured using VNA. The simulation and measurement are not giving the capacitor vales directly; the results are in terms of S parameters. Capacitances are calculated from the S parameters by converting in to Z and Y parameters the vales are tabulated below.

T A B L E 3 *De Emulated Capacitance Values*

Capacitor	Design value	Simulation	Measured
Series capacitor	1.2E–13	2.1E–13	1.4E–13
Shunt capacitor	5.8E–13	2.6E–13	4.41E–13

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SYNTHESIS OF BI-METALLIC NANOPARTICLES AND ANALYSIS OF THEIR PERFORMANCES

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Declaration

Abstract

A review on nano materials their characteristics, stability and applications such as early detection, accurate diagnosis and personalized treatment of diseases. The stability of nanoparticles has become subject of concern. That has also been discussed here. The concept of optical nano-antennas has also been described for the application in microscopy and spectroscopy. Nano particles offer exciting opportunities for technologies at the interfaces between chemistry, physics and biology.

The optical properties of these nanoparticles, embedded in a transparent matrix, have also been described.

*Key words :*Nanotechnology, plasmas, optical nano-antennas, bi-functional nanoparticles.

1. Introduction

Nanotechnology has become a broad and interdisciplinary research field. It is involving engineering, chemistry, physiology, biology and so many other branches of sciences. It has been growing exponentially in the past few years. It is showing great potential for several technical and medical applications, such as early detection, accurate diagnosis and personalized treatment of diseases. Nano scale materials and devices are typically smaller than several hundred nano meters and are comparable to the size of large biological molecules such as enzymes, receptors, and antibodies. With a size about 100 to 10000 times smaller than human cells, these nano scale devices can offer unprecedented interactions with bio molecules both on the surface of and inside cells[1] .The use of nano materials in biotechnology and

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medicine merges the fields of material science, chemistry, physics and biology. Nano structured materials, such as nano particles, nano electronics nano wires, nano tubes and thin films, provide a particularly useful platform for successful development of wide-ranging therapeutic and diagnostic applications in the biomedical area. Magnetic nanoparticles, in particular, have been developed and optimized for fundamental scientific interest but they have also found many biomedical applications ranging from contrast agents in magnetic resonance imaging to bio sensing applications[2].Nanostructure materials often possess unique electrical, chemical, structural, optical and magnetic properties allowing for use in a variety of novel applications including information storage, bio sensing applications, and biomedical engineering[3-4]. Nano particles possessing magnetic properties offer great advantages in that they can provide selective attachment to a functional molecule, confer magnetic properties to the target, and allow manipulation and transportation to a desired location through the control of a magnetic field produced by an electromagnet or permanent magnet[5-6].

The behaviour of strongly coupled plasmas and the capability of manipulating light on the nanometre scale make nano antennas particularly useful in microscopy and spectroscopy[7-8]. These applications rely on the characteristics of nano antennas involving the resonance frequency, bandwidth, directivity, far-field radiation pattern, near-field distribution, and local density of states. The characteristics of the nano antenna can be modified with geometrical size and shape as well as material composites[9-10]. Graphene is a mono atomic carbon with a honeycomb lattice which has attracted much research interest in recent years[11-12]. Graphene has been used as a transparent electrode due to the properties of high optical transmittance and conductivity[13-14]. Due to the forbidden inter band transitions by the Pauli blocking, the chemically or electro statically doped grapheme supports strong plasmonic effects typically at the far-infrared or terahertz regime[15-16]. Over the past few years, an exciting development in nano-optical research has set in with the recognition that metallic nano particles with their plasmon resonances may be used in a fashion very similar to the way electrical engineers of the twentieth century have developed radio -frequency Antennas[17]. This introduces the concept of optical nano-antennas. Following many of the same rules that apply to RF antenna design, also the properties of optical nano-antennas can be tailored to fulfil desired functions. Applying this specific and unique property of graphene to design nano antennas could tune the characteristics and enhance the performances of nano antennas.

2. Nanoparticle Stabilisation

Nanoparticles of some metals are known to be pyrophoric, i.e., they spontaneously ignite in air at room temperature; therefore, the creation of a protective shell on such nano particles (encapsulation) is a widely used protection and stabilisation method.Carbon is often used as the protective coating. The carbon layers formed on the metal surface are usually graphite-like and, hence, conductive. In those cases where an electrically insulating coating is required, boron nitride layers are used.Encapsulation of magnetic nanoparticles makes them stable against oxidation, corrosion and spontaneous aggregation, which allows them to retain the single-domain structure. The magnetic particles coated by a protective shell can find application as the information recording media, for example, as magnetic toners in xerography, magnetic ink, contrasting agents for magnetic resonance images, Ferro fluids and so on. If the nano-sized magnetic particles are retained after compaction, the materials based on them can serve as excellent initial components for the preparation of permanent magnets.The coating of metal particles by carbon (carbonisation) was first observed in the research of heterogeneous catalysis. this process was comprehensively studied. it has been used deliberately to stabilise nanoparticles. The first structurally characterised carbon-encapsulated nanoparticles were obtained as side products in the electric arc

synthesis of fullerenes. Subsequently, special studies have been carried out to identify the possibilities of using this method for the targeted Ferrimagnetisms below T_N is typical of nanoparticles of all antiferro-magnetic phases, because, unlike bulk samples, the magnetic moments of sub lattices are not fully compensated. In particular, the arrangement of magnetic moments in the near-surface layer of nanoparticles differs appreciably from that in the bulk, which is specified by the type of crystal lattice and the type of exchange interactions. Synthesis of encapsulated nanoparticles, especially magnetic ones. the method became applicable for the synthesis of reasonable amounts of encapsulated magnetic nanoparticles (Fe - Co, Mn - Al). The perfection of the experimental technique allowed the researchers to eliminate completely the formation of pure carbon-containing products. This procedure was used to obtain Fe, Co and Ni nanoparticles (56, 40 and 37 nm, respectively) coated by 3 or 4 layers of graphitised carbon. The attempts to prepare encapsulated nanoparticles of hard magnetic materials, NdFeB or SmCo5, proved unsuccessful. Several Other methods for the synthesis of encapsulated magnetic nanoparticles are based on the use of high-temperature plasma, laser pyrolysis and thermal vaporisation. Thus the cobalt and carbon vapours formed upon an arc discharge in a helium atmosphere were condensed in the gas phase prior to deposition onto a cooled substrate. This gave spherical particles with a radius of 10 to 100 nm consisting of a metallic core and a carbon shell, which contains up to 30 graphite-like carbon layers. Such a shell is considered to prevent toxidation of the metallic core. Other compounds can also be used to form the protective shell.Thus treatment of a mixture of boron and cobalt powders with H_2 and NH_3 at 800 8°C for 3 h furnished Co nanoparticles(20 - 60 nm) coated by a ~ 5-nm thick BN coating.189 A CVD process for one-stage synthesis of □-Fe_2O□ nanoparticles (20 - 30 nm) coated by a SiO_2 layer with the same thickness has been developed. Due to the high temperature of carbon evaporation, the synthesis in radiofrequency plasma burners is considered to be most promising for obtaining large-scale amounts of encapsulated magnetic nanoparticles. Nanoparticles of metals, alloys, carbides and oxides can be prepared by this method. A drawback of this method is inhomogeneity of nanoparticles and differences in their composition. Chemical methods are also used successfully for encapsulating magnetic nanoparticles. Thus stirring of a solution of tetraethoxy-silane in alcohol with an aqueous suspension of a-Fe_2O_3 nano-particles (24 h, 50 8°C) gives Fe_2O_3 nanoparticles (4 - 5 nm) coated by amorphous SiO_2. The particles were found to retain the composition, the size and the shape after heating at 250 8°C in an O_2 atmosphere. Hydrolysis of Si, Ti and Zr alkoxides in the presence of metal nanoparticles is a general method for forming shells of the oxides of these elements on the particle surface. In some cases, the synthesis of oxides takes place simultaneously with the synthesis of the nanoparticles. This method was used to prepare Comagnetic nanoparticles coated by SiO_2 layers. The starting com-pounds used were Fe(acac)3 and Si(OEt)4, the oxidative thermal decomposition of which in a flow reactor at 1000° C gave the corresponding particles.The coating of magnetic nanoparticles by a thin layer of a non-magnetic metal is considered to be a promising method for their stabilisation. For example, the synthesis of Fe_3O_4 nanoparticles (5 nm) coated by metallic gold has been reported. When determining the composition and the structure of these objects, the researchers faced serious difficulties. Much attention has been devoted in recent years to the methods for the formation of thin polymeric coatings (especially those based on biocompatible and readily biodegradable polymers) on the surface of magnetic nanoparticles.. Self-assembled monolayers on the nanoparticle surface Self-assembled monolayers (SAM) on the nanoparticle surfaces are represented by monomolecular layers of amphiphilic molecules, which protect the particles from aggregation and simultaneously stabilise their suspensions (solutions) in certain solvents.

In a typical example of the self-assembly of a monolayer of amphiphilic molecules of fatty acids on the Fe_3O_4 nanoparticle surface, the freshly prepared nanoparticles (obtained by the standard procedure

by treatment of a mixture of Fe^{2+} and Fe^{3+} chlorides with aqueous NH3) were washed, separated into fractions by centrifuging and treated with an excess of lauric or decanoic acid, whose molecules were adsorbed on the surface of each particle. The protective role of amphiphilic molecules was manifested most clearly in the targeted synthesis of Co - Pt3 nanoparticles of a strictly specified size (1.5 - 7.2 nm). In the researchers' opinion, the success of the synthesis is related first of all to the use of a new stabilising agent, 1-adamantanecarboxylic acid.

The effect of cationoid (cetyltrimethylammonium bromide,CTAB) and anionoid (sodium didecylbenzenesulfonate, DBS) surfactants on the stabilisation of □-Fe_2O_3 nanoparticles (4 - 5 nm) has been studied.200 A nanoparticle having a large number of defects and dangling bonds on the surface is considered to interact with the surfactant rather strongly. This interaction has a pronounced influence on the electronic structure of the particle surface.Self-assembled monolayer are needed to create aqueous dispersions of magnetic nanoparticles. Diverse magnetic colloid isotropic (magnetic emulsions anisotropic and lyotropic ferronematics have been obtained on the basis of nanoparticles coated by a surfactant monolayer

3. Mdification In Magnetic Properties Of Nano Particles

When a piece of a magnetic material is made smaller and smaller, it acquires simpler magnetic domain structure ,since less domain walls are needed in order to minimize the stray field energy. The extreme limit is represented by single domain particles. Below a size of about 500 nm it is no more energetically favorable to form many domains. *A further reduction of the size leads to single domain particles*. Nano particles offer exciting opportunities for technologies at the interfaces between chemistry, physics and biology. Their appeal stems not only from their use as single particles, but also from their potential to form self-organized films and solids. Magnetic nanoparticles are useful for a wide range of applications from data storage to medicinal imaging.High capacity information storage requires smaller particle size that decreasing the particle size lowers the anisotropy energy responsible for holding the magnetic moments along certain directions and it becomes comparable to the thermal energy. Thermal fluctuations randomize magentic moments which are the essence of the so-called super paramagnetic behavior. Core/shell structured magnetic systems have an extra source of anisotropy that increases the stability of magnetic moments up to certain temperature called blocking temperature.Increasing the blocking temperature as close as possible to room temperature as we keep the particle size small is the main challenge in this field.Current magnetic-nanoparticle technology is challenging due to the limited magnetic properties of iron oxide nano particles. Increasing the saturation magnetization of magnetic nanoparticles may permit more effective development of multifunctional agents for simultaneous targeted cell delivery, magnetic resonance imaging contrast enhancement, and targeted cancer therapy in the form of local hyperthermia. Delaware researchers have recently synthesized novel iron-based nanoparticles (FeNPs) coated with biocompatible bis-carboxyl-terminated poly(ethylene glycol) (cPEG). In comparison to conventional iron oxide nanoparticles similar in size (10 nm), FeNPs particles have a much greater magnetization and coercivity based on hysteresis loops from sample magnetometry. Next-generation FeNPs with a biocompatible coating may in the future be functionalized with the attachment of peptides specific to cancer cells for imaging and therapy in the form of local hyperthermia.

4. Bi-Functional Nanoparticles For Magneto-plasmonic Function

the case of CoAu and CoAg Nanoparticles associating a noble metal and a ferromagnetic metal are appealing from a magneto-plasmonics point of view, in addition to the problematics of magnetic

anisotropy tailoring of surface protection (resistance to oxidation), and of nanoalloy original geometries. The very recent field of magneto-plasmonics aims at combining optical properties (localized surface plasmon resonance, LSPR) and magnetic properties. The use of mixed bi-metallic particles offers additional possibilities for the LSPR control and opens the way to new functionalities (bio-compatibility, detection, targeting, reactivity and catalysis...). However, particles considered are mostly chemically synthesized and there is almost no reported result on small nanoparticles (in the size range between 2 and 5 nm in diameter) so that there are still a lot of open questions (structure, electronic, magnetic and optical properties). We intend to study CoAg and CoAu nanoparticles prepared by low energy cluster beam deposition where clusters (in the 2-5 nm size range) formed by laser vaporization are codeposited in various matrices in order to avoid interactions and coalescence. A core-shell structure is expected for CoAg and CoAu, but other original structures can be envisaged for particles of a few nanometers diameter. It is expected that Au atoms segregate to the surface, first observations on CoAu clusters have revealed the existence of small alloyed particles and chemically ordered FeAu nanoparticles have also been detected. Moreover, the potential structure and chemical order transitions upon annealing, and induced by the matrix, still need to be investigated, as well as the noble metal magnetic polarization and the magnetic anisotropy energy. For the proposed research work, the cluster samples prepared at the ILM will be characterized by high resolution transmission electron microscopy (HRTEM, for the structure and morphology), by magnetometry and by x-ray photoelectron spectroscopy measurements. The optical properties of these nanoparticles, embedded in a transparent matrix, will also be investigated and first experiments trying to detect a magneto-plasmonic coupling will be performed in collaboration with the “Nanostructures for optics” group. The obtained results should shed light on the interplay between magnetism and structural/morphological changes in these bimetallic nanoparticles.

5.Conclusion

Magnetic nanoparticles play an important role in the rapidly developing branches of science specialising in the study of objects (existing in nature or, more often, artificially produced) with nano-sized structural blocks. Despite the fact that the extensive use of magnetic nanoparticles and nanomaterials containing them is delayed by the difficulty of producing materials with a narrow size distribution of particles and stable reproducible characteristics and the high cost of their large-scale production, such nanoparticles are used more and more often in the everyday practice. Some companies have already arranged the manufacture of the first samples of nanomaterials. In our opinion, it is time for extensive search for the ways of practical use magnetic nanoparticle.

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