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भाषायाः अर्थः

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Abstract:

भर्तृहरिविरचितस्य वाक्यपदीयस्य वाक्यकाण्डे विद्यमानस्य प्रतिभा वाक्यार्थः इति सिद्धान्तस्य गौरवः, आधुनिकभाषाशास्त्रमण्डलेऽपि अर्थमीमांसायां तस्य प्रसक्तिश्च दर्शयितुं लेखनेनानेन प्रयत्नः कृतः। ।वाक्यकाण्डकारिकाणां व्याख्यानम् अथवा प्रतिभाभेदानां विशकलनं च अत्र नोद्दिष्टम्।

आमुखम्

भाषया कथमाशयविनिमयः क्रियते, भाषाश्रवणेन अर्थबोधः कथं जायते, शब्दस्यार्थः कः इत्यादिविषयेषु चिन्तोद्दीपिका परिचर्चा वाक्यकाण्डे विद्यते। 'अर्थः' इत्युक्ते कः' इति न केवलम् आधुनिकभाषाविदग्धाः अपि तु ' Artificial Intelligence, Natural Language Processing, Cognitive sciene इत्यादीनां शास्त्रशाखानाम् अभिज्ञाः अपि अन्विषन्ति। अर्थविचिन्तने आधुनिकचर्चाः पद-पदार्थतले सामान्यतया प्रचलन्ति। तत्र प्रामुख्येन 'referential theory', Ideational theory', 'truth-value theory इत्यादिभिः सिद्धान्तैः अर्थस्य रूपविषये चर्चाः प्रवर्तन्ते। पदतले तु बहुविधाः समस्याः विद्यन्ते ननु यथा वाक्यपदीये वाङ्मयमवलोकनं कृतम्- संसर्गः अर्थः, संसृष्टः अर्थः, जातिस्त्वर्थः, व्यक्तिरर्थः, जातिविशिष्टव्यक्तिस्त्वर्थः,व्यष्टिर्वा समष्टिर्वा पदार्थः

(बिन्दौ च समुदाये च वाचकः सलिलादिषु)- पदं पदार्थद्वारा समग्रं वस्तु न निर्दिशति[i] यथा मधुपदेन मधोः माधुर्यं न ज्ञायते- वादानामेतेषां अन्यतमस्य स्वीकारेऽपि पद-पदार्थतले अव्याप्ति-अतिव्याप्ति दोषाः विद्यन्ते एव।

इत्थं भाषया आशयविनिमयः कथमिति सम्यगवलोकनं कृत्वा मत-मतान्तरानुपस्थाप्य अखण्डवाक्यसिद्धान्तं वाक्यकाण्डे प्रथमं प्रतिष्ठापयति भर्तृहरिः। सुप्रतिष्ठिते सति वाक्याखण्डत्वे,प्रतिभा वाक्यार्थः इति प्रतिभासिद्धान्तं च प्रस्तौति। -

प्रतिभावाक्यार्थः

विच्छेदग्रहणेऽर्थानां प्रतिभान्यैव जायते।
वाक्यार्थ इति तामाहुः पदार्थैरुपपादिताम्॥

श्रोतृपक्षे भाषाश्रवणसमये, भाषायाः सक्रमश्रवणे -पदानां सक्रमस्वीकरणे पदार्थाः विच्छेदेन भासेत, तथापि ऐकार्थस्य पूर्णवाक्यस्यैव अर्थबोधः बुद्धौ प्रतिभाति - तदेव भानं-प्रतिभानं - अर्थः, प्रतिभा एव अर्थः- इति यावत्।
वाक्यकाण्डस्य अखण्डवाक्यसिद्धान्तः प्रतिभासिद्धान्तश्च भाषायाः आशयविनिमयव्यवस्थां सम्यक् समर्थयति।अत्रेदानीं अर्थविचिन्तने पद-वाक्यादिघटनां तिरस्कृत्य 'भाषा' (language) इति आशयविनिमयोपाधिरूपा इति स्वीकुर्मः। भाषायाः वास्तविकः रूपः कः? संस्कृत-कन्नडादिवैविध्यं तु बाह्यवेषविधानभेद एव। वास्तविकरूपः कः इति विषये शास्त्रेण स्वीकृतं यत् वाचां अवस्थात्रयं चतुष्टयम्वा - वक्तृपक्षे, परा-पश्यन्ती-मध्यमा-वैखरीरूपा वाक्[ii],

श्रोतृपक्षे वैखरी-मध्यमा-पश्यन्ती-परा इति। वक्तृपक्षे आशयस्य आविष्कारः वाचा सम्भवति, श्रोतृपक्षे वैखर्या बुद्धौ यत् प्रतिभाति तदर्थः इति।

वाचःशब्दस्यचलक्षणंअर्थमीमांसायांप्रसक्तिश्च-

उच्यते इति वाक्, श्रूयते इति शब्दः -

उच्यते इत्यस्यैव 'वाक्' - 'वाक्' च वागिति उच्चारणस्थानादिद्वारा प्रवृत्तमानस्य कर्मेन्द्रियस्य 'उत्पन्नम्' । शब्दस्तु श्रोत्रस्य -ज्ञानेन्द्रियस्य 'विषयः'।

व्यक्त्यधिष्ठितं यदा अवलोक्यते, वाक् शब्दश्च प्रत्येकं भिन्नम् (एकस्यां व्यक्तौ)। वक्तुः वाक्, श्रोतुः शब्दः एतदुभयं बुद्धौ एव सम्मिलति यच्च विना भाषायाः प्रवृत्तिः असाध्या [iii]। शब्दः अर्थस्य निमित्तकारणं श्रोतृपक्षे, निमित्तकारणेन फलप्राप्त्यर्थं कोऽपि वृत्तिः **function** अपेक्षिता- सा वृत्तिः - शब्दश्रवणेन एकार्थस्य झटिति भानम्- एवंरूपा वृत्तिः अर्थः[iv]इति यावत्।

एकार्थस्य शब्दैककस्य (**speech unit – word, sentence, paragraph or an entire discourse which shares single purpose) पदस्फोटवाक्यस्फोट, भाषणस्फोट**[v]वा प्रतिभायाः निमित्तं भवति। उदाहरणार्थं 'जन्मगेहम्' इति पदविषये चिन्तयामः। यस्य सदा 'जन्मगेहं' मधुरस्मृतिं जनयति तस्य तत्पदग्रहणे प्रतिभा - मोहनार्थप्रकाशिका। यस्य 'जन्मगेहं' दुरितपूर्णस्मृतिं जनयति तस्य मनसि अर्थबोधः दुःखस्मृतिदायिका च स्यात्[vi]। एवं प्रतिभा अभ्यासानुसारी[vii]। स्मृतिपथे

- यस्य यस्य अनुभवस्य यथा यथा अनुभूतिः तस्य तस्य स्फुरणम्

पुनस्सम्भवति, निमित्ते सति। अत एव उक्तं

वक्रान्यथैवप्रक्रान्तोभिन्नेषूपपत्तृषु
स्वप्रत्ययानुसारेणशब्दार्थाः प्रविभज्यते॥ (२- १३५)

अथवा शब्दस्फोटः स्मृतिमण्डले यस्य स्फुरणं जनयति तदेव प्रतिभा, शब्दस्यार्थः इति यावत्। [viii][***Sphota prompts Pratibha in the smriti,*** **where sphota = language unit, pratibha = meaning, smriti = storage space of memories of experiences]**

एवं तर्हि एकैकस्य स्मृतिमण्डले स्मृतिरूपं अनुभवज्ञानं यदस्ति, तदनुसृत्य एव तस्य मनसि ततःपरस्य अर्थावबोधः सम्भवति इति वक्तुं शक्यते। तदेव कारणं श्लोकस्यैकस्यापि व्याख्यानानां बाहुल्यस्य[ix]।

प्रतिभाभाषार्थः

प्रतिभा वाक्यार्थः इत्यनेन प्रतिभा भाषायाः अर्थः इत्यपि सिद्धम् यतः वाक्यं भाषणस्य एककमिति वाक्याखण्डसिद्धान्तस्य विलम्बरः। प्रतिभायाः षाड्विध्यमपि प्रतिभा अर्थः इत्यत्र अन्तर्लीनमस्ति यथा-

स्वभावचरणाभ्यासयोगादृष्टोपपादिताम् ।
विशिष्टोपहितां चेति प्रतिभां षड्विधां विदुः ॥ 2-152

स्वभावसिद्धा प्रतिभा (प्रकृतेः महत्तत्वरूपेण परिणामः / सुषुप्त्यवस्थास्थितस्य जाग्रदवस्थाप्राप्तिः); चरणसिद्धा प्रतिभा- (शास्त्रविहिततपस्स्वाध्यायादिना सदाचारेण वसिष्ष्ठादीनांत्रैकालिकविषयप्रकाशः); अभ्याससिद्धा प्रतिभा-

(कूपखनकानां कुत्र जलं वर्तते इति ज्ञानम्); योगसिद्धा प्रतिभा (योगाभ्यासवशेन इतरेषाम् अभिप्रायग्रहणशक्तितः); अदृष्टसिद्धा प्रतिभा, सिद्धिसंपन्नविशिष्टव्यक्तिभिःसंक्रामिता प्रतिभा(उदाहरणम्- संजयस्य दूरस्थितभारतयुद्धसमाचारग्रहणशक्तिः कृष्णद्वैपायनेन संक्रामिता) -एवं वैविध्यं तु केवलं निमित्तभेदसूचकम्- सर्वत्र प्रतिभा एव अर्थः - स्फोटः (श्रुतभाषायाः एककं) स्मृतिमण्डले (अनुभवानां भण्डारे) प्रतिभां (अर्थस्य प्रतिभानम्) जनयति।

वाक्यकाण्डस्यव्यावहारिकत्वम्

भाषा इत्यस्याः व्यवस्थायाः आशयविनिमयसामर्थ्यं कथमित्युक्ते भर्तृहरिणा निरीक्षितं यत् लोकस्य शब्दानुविद्धत्वम्। यत् किमपि वस्तुः क्रिया, अनुभवः वा भवतु नाम, तत्सर्वं शब्देनैव सूचितं भवति। यथा- 'न सोऽस्ति प्रत्ययो लोके यः शब्दानुगमादृते'। या कापि भाषा वा भवतु, शब्दस्य (श्रवणेन्द्रियस्य विषयस्य) वाचः (वागिन्द्रियस्य उत्पन्नस्य) च मेलनं प्रत्येकस्य व्यक्तेः बुद्धौ एव सम्भवति, तद्विना भाषायाः प्रवृत्तिरसाध्या। अत्रापि सदा भाषया, सिद्धस्य साध्यस्य वा क्रियाकलापस्य विवरणत्वेन लोकज्ञानस्य आविष्कारः सम्भवति। (world of actions through words of actions)| क्रियायां अर्थानुसारं यथा यथा नामपदानि कारकानुसृतानि युक्तानि भवन्ति तथा तथा वाक्यघटना (syntax) सज्जा सिद्धा प्रसिद्धा च भवति विविधासु भाषासु। वाक्यघटनायाः अपि अधिष्ठानं तु वाक्यार्थः एव। वाक्यार्थः प्रतिभा।

एवं वाक्यपदीयस्य प्रथमे ब्रह्मकाण्डे भाषायाः आध्यात्मिकतलं, द्वितीये वाक्यकाण्डे व्यावहारिकतलं तृतीये पदकाण्डे विशकलनात्मकं (analytical study of language)चअवलोकनम् कृतमिति ज्ञायते। वाक्यकाण्डे भाषा का, अर्थः कः इत्यादि विषयेषु व्यवहारतले उपकारकाणि सर्वभाषाश्लेषकानि (न केवलं संस्कृतसम्बद्धः अपि तु भाषाशास्त्रसंबद्धः) तत्वरत्नानि विद्यन्ते।

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[i]दुर्लभंकस्यचिल्लोके
सर्वावयवदर्शनम्।
कैश्चित्ववयवैर्दृष्टै-
रर्थःकृत्स्नोऽनुमीयते॥ २-१६१भाषायाः परिमितिः limited meaning- limitation of language

[ii]परावाङ्मूलचक्रस्था पश्यन्ती नाभिसंस्थिता
हृदिस्था मध्यमा ज्ञेया वैखरी कण्ठदेशगा।

[iii] It is also important to note that 'sabda' and 'vak' are different with respect to any particular individual and they do get a common place for sharing, in the inner faculty - in the intellect, without which language does not work.

[iv]meaning is a function of sabda

[v]When the entire discourse is considered as a speech unit, it can be considered as पूर्णभाषणस्फोट (this word is not used in Vakyapadiya) which leads to a sudden flash of understanding – the gist of the discourse that is flashed in the listener's mind is the meaning, pratibha.

[vi]

[vii]अभ्यासात् प्रतिभाहेतुः शब्दः सर्वो 'परैः स्मृतः ।
बालानां च तिरश्चां च यथार्थप्रतिपादने ॥

अपरैः आचार्यैः सर्वः ध्वन्यात्मकः वर्णात्मकःपदवाक्यरूपश्च शब्दः
अभ्यासात् पुनःपुनरावृत्या प्रतिभाहेतुः नियतार्थहेतुः भूत्वाकार्यप्रवृत्तौ कारणं भवति इति स्मृतः ।

[viii]'Sphota' prompts 'pratibha' in the 'smriti' – where sphota is unit of language, pratibha is the meaning, smriti is the storage space of memories of experiences

[ix]भगवद्गीतायाः असंख्यानि व्याख्यानानि उपलभ्यन्ते- बुद्धिविचक्षणैरेव विरचितानि, उदाहरणाय - श्रीशङ्करस्य भाष्यम्, ज्ञानेश्वरस्य, बालगङ्गाधरतिलकस्य, विनोबामहाशयस्य, स्वामि रङ्गनाथानन्दस्य, चिन्मयानन्दस्वामिनः, भक्तिवेदान्तप्रभुस्वामिनः इत्यादि।

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Position of Women in Ancient Sanskrit Literature*-

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INTRODUCTION

सृष्टिस्थितिविनाशानां शक्तिभूते सनातनि ।

गुणाश्रये गुणमये नारायणि नमोऽस्तु ते ॥

"*By You this world is created. By You it is protected, By You it is consumed at the end, O Devi! You are Supreme Knowledge, as well as intellect and contemplation"*

By this verse of Devi Mahatmyam it is very much clear that the women occupied a very important & high position in ancient Sanskrit literature. Woman is Shakti, Devi, Maata who takes the pain. Everything is combination of male & female i.e. Prakriti & Purush. The soul of the family, female is soft substance. A woman plays different role throughout her life as a daughter, sister, wife, daughter in law, mother, mother-in-law and so on. Their role as a mother and wife is very crucial in nurturing the inherited values passed on to us since time immemorial. Manusmriti mandates that the highest respect and regard must be extended and full protection should be extended to women throughout their life-

पितृभिर्भ्रातृभिश्चैताः पतिभिर्देवृभिस्तथा ।

पूज्या भूषयितव्याश्च बहुकल्याणमीप्सुभिः ॥

Vedic women enjoyed position of dignity, honour, great respect and freedom in the society as Brihadaranyakopnishad reads- "**अर्थ या इच्छेद् दुहिता मे पण्डिता जायेत".** There was considerable freedom enjoyed by them in matters of marriage, education etc. They appeared freely at feasts and dances, participated in social and religious rites and were sometimes distinguished for their learning.

It is said that behind every successful man, there is a woman behind it. I think this proverb is truly taken from our ancient scriptures. This is an accepted fact that all male power comes from the feminine. We believe in trinity of God. The Trimurti (Brahma, Vishnu, Mahesh) all are powerless without their female counterparts. Without the grace of Saraswati, Brahma cannot do a worthwhile job as the creator. Any maintenance activity needs plenty of resources, mainly fiscal resources. So Lakshmi, the Goddess of wealth, is an essential companion to Vishnu. Shiva, as Destroyer, derives power and energy from Durga as she is called Shakti.

In Shiva Mahapurana the fusion of Shiva and Shakti (Parvati) in one body is depicted as Ardhanareeshwar, each occupying one half of the body denoting that one is incomplete without the other. This is why in today's era also husband and wife are called 'Better Half' of each other who are working together, hand in hand, as equal partners in the Universe. According to Atharvaveda [2]if a husband is Samveda then wife is Rigveda.

Even the Puranas also do not look down on women. The Devi Purana eulogizes the 'Shakti' aspect of women. The Brahmavaivarta Purana makes Radha the conscions magnetic force of Krishna. Manusmriti says that woman is component part of man, in the manner man is a component part of woman, and together they make a complete whole[3].

DAUGHTER

The Vedic society was Patriarchal society in its composition where the family was headed by the male member. The prayers for the birth of sons were brave worthy and religious[4]. The reason for such a preference was that he would perform religious rights to the ancestors; he is a boat to salvation. This preference resulted into a kind of unhappiness at the birth of a female child[5]. Atharvaveda[6] contains charms and rituals to ensure the birth of a son in preference to that of a daughter. In the later literature also we find sacrifices like Putreshti Yagna etc. to

ensure the birth of son. This naturally led to the degradation of the status of female in family and society.

Aitereya Brahman of Sama Veda[7] places sister next to the wife of her brother, making her inferior to that of a married woman from other family. It means that female child had an inferior existence in her own home where she had taken birth and she gained her place and respect after marriage due to her husband.

In Manusmriti 'santati' word is used for child in place of definite and indicative word[8]. Sons and daughters are equal[9] which should have been able to remove the social prejudice against a female child by advising people to treat daughters with tenderness and parents not to enter into arguments with them.

The girls were spending early years in Brahmacharya Ashram as indicated in Atharvaveda[10]. The Taitriya Brahmana[11] makes upanayana mandatory for women, non performance of which leads to the automatic lowering of her status to that of a shudra. But later on Manu took away their right of upanayana and merges with the marriage[12]. It is strange that such injunctions are made against those who he considers auspicious and blessed so much so that it advises parents not to name them with inauspicious and unacceptable names[13].

In modern India, the status of a daughter is composition of both Vedic and Manusmriti Period. In some places son is given preference and his birth is a matter of joy in the family. He is superior to daughter. Whereas in urban families, daughters are given equal rights and responsibilities. In *Sharda Act* daughters are given share in family property and parent's responsibility.

EDUCATION

The Grihya Sutras ordain education for women as otherwise they cannot perform fire sacrifices. Brahmcharya Sukta of Atharvaveda[14] emphases that girls should receive the same level of training as boys. Parents should gift their daughter intellectuality and power of knowledge when she leaves for husbands home[15].

The girls were spending early years in Brahmacharya Ashram as indicated in Atharvaveda. Even after Marriage they can continue their studies. Sadyodvahas were pursuing studies after marriage and Brahmavadinis were knower of the Ultimate.

The Chhandogya and Brihadaranyak Upanishads provide women an opportunity to study the Vedas[16]. In the Veda scholars like Ghosha, Lopamudra, Romasha, Indrani and in Upanishad philosophers like Sulabha, Maitreyi, Gargi etc. are mentioned. Panini mention's about Acharyani and Upadhyayani indicates women at that time the teachers of sacred Vedas.

In that time women were not liberally allowed learning Vedic Scriptures, but in contrast women seers such as Anusuya the wife of Rishi Atri was famous for her spiritual knowledge and chastity. In Shathapatha Brahmana it is mentioned that Gargi was so capable in spiritual knowledge, that she had spiritual dabate (shastrartha) with Yagyavlakya in the court of King Janaka. Yagyavalkya had two wives – one Maitreyi and other Katyayani. In Chandogyopanishad there is famous Yagyavalkya-Maitreyi samvad where Maitreyi has asked so many spiritual questions and ultimately took sannyasa along with Yagyavalkya. She was a Brahmavadini. The other one was well versed in practical dealings. All these examples reflect that there was arrangement for education of women in ancient times.

Now a days, to encourage girl education, special reservations are there in educational institutions for her. In today's India, women are not only having higher education but are holding many key positions also in all the fields. She is in charge of family and home as well as she is a bread winner of the family.

MARRIAGE

The Status of the women, in Vedic society, is assigned only when she attains marriageable age and establishes a home through marriage. After getting married only, women got status, respect and place in the family. It is the special injunction of the Vedas that no married man shall perform any religious rites, ceremony or sacrifice without being joined by his wife.

A woman was all free to choose her husband- **स्वयं सा मित्रं वनुते जने चित्**[17].

In Rigveda, a woman becomes head-mistress of the family after marriage -

सम्राज्ञी ससुरे भव, सम्राज्ञी श्वस्रवां भव ।

ननान्दरि सम्राज्ञी भव, सम्राज्ञी अधि देवृषु ॥[18]

We find that in Vedic times Widow-marriage was allowed. If a woman is widow, there was no restriction upon her remarriage. The funeral hymns in Vedas exhorts widow to marry the one who holds her hand and is willing to marry[19]. But Manusmriti is absolutely against the marriage of the Widows[20].

In ancient times, men were involved in polygamy. Aiteraya Brahman admits that a man can have more than one wife[21]. Even sages were having two wives. Yajnavalkya had two wives indicating the acceptance of polygamy by the society[22]. But polyandry was not accepted. Wife of Jamadagni, Renuka had been killed by male ego due to her illusion in some one. She was killed by Parashuram by order of his father. Sita was forced to give Agni Pareeskha for her purity. In ancient or modern literature, no male has done or was forced to give any test for his purity.

Widow marriage is accepted in today's society. But polygamy or polyandry in any form is prohibited and against the law and social norms.

WIFE

In performing vedic rites wife used to sit with husband. The wife is considered partner in the spiritual life of her husband, as Sahadharmini.The sacrifice is incomplete without the wife- **अयज्ञो वा एष योऽपत्नीकः**[23]. Wives of seers(Rishis) were helping them in running their gurukulas. Rishi Vashishth was teaching in his gurukula and rest of the management like food, residence for students etc. was being done by his wife Arundhati.

Rigveda declares that a home is that where Grihini-a home-maker is there- **जायेदस्तं मघ्वन .**[24].

And without Grihini house is not called as home- **न गृहं गृहमित्याहुः गृहिणी गृहमुच्यते**.

Manu has very high regards for married and family life and places women at the centre of men's life, equating her with the goddess of prosperity[25]. According to Taitriya Brahman a man is incomplete without wife – **अर्धो वा एष आत्मनः यत् पत्नी**[26]. Manu also regards the wife as the half of her husband[27]. She is a gift from gods as a result of man's meritorious work[28].

In Manusmriti, partiality and injustice to the women folk and caste bias is quite evident. Manu commands the faithful wife to worship her husband as a God, even if he is virtue-less and has no good qualities. The centre of her sacrifice, fast etc. must be the husband[29]. Generally daughters, married or unmarried, do not have any right to inherit or share in patrimony. As per the marriage hymn of Rigveda[30] the wife is the co-owner of the family property along with her husband.

Now also, a wife is given high respect as husband and wife both are called better half of each other. She has full right in husband's property. If the husband is corrupt, virtue less and incompetent, then wife has full right to leave him and ask for the alimony.

MOTHER

Women as a mother, has greatest reverence of her children in Indian religions and culture. She should never be shown disrespect even if highly offended[31]. Her image is that of earth, bearing all the trouble and pains for sake of children, compensation of which is not possible even in hundred years[32]. She is the care-taker of her children and as such they are not permitted to separate from them on any account[33].

In scriptures, Mother is the centre of the family and our highest ideal. Truly said that **कुपुत्रो जायेत क्वचिदपि कुमाता न भवति ।** In Taittriya Upanishad, the student is advised to consider mother as God **मातृदेवो भव**. A woman was called Brahma in Rigveda because she is the one

who creates knowledge in the children - **स्त्री हि ब्रह्मा बभूविथ**[34]. She is the first teacher of the child-

उपाध्यायान्दशाचार्य आचार्याणां शतं पिता ।

शतं च पितृन्माता गौरवेणातिरिच्यते ॥

But the irony of the scriptures is that the same mother, who was the ideal for the family, was not the decision maker.

In any given time, a woman as a mother enjoys high place of respect. In modern time also her place remains the same. India is a male dominant country. Earlier every where only fathers name was asked but now in every educational application form the name of the mother is mandatory alongwith the name of the father. It means that while taking a decision for the child, mother has equal place with father. She is also a decision taking authority in child's future.

INDEPENDENCE

Manusmriti on the one hand mandates that the highest respect and regard must be extended and full protection should be given to women throughout their life, on the other hand it declares that women not to seek independence, hence, in her every stage of life she should be under control of someone throughout her life i.e. either father, husband or son. Manu takes away their independence, liberty and freedom from women as such by laying down a general principle that nothing should be done independently by her –

पिता रक्षति कौमारे, भर्ता रक्षति यौवने ।

पुत्रस्तु स्थविरे भावे न स्त्री स्वातन्त्र्यमर्हति ॥

In modern India, a woman is fully independent in taking decision of her professional and personal life. She is free to go anywhere and enjoy her life. There is no restriction on her but for her own security point of view, she can be escorted by someone.

SOCIAL LIFE

Even in such a state of mind, there are reference that indicate the equal social and religious status that was available to the boys and girls in the Vedic society. Everyone's role was divided in the society. Basically woman takes care of the house-hold works and man was bread winner of the family.

The Vedic society was quite free and did not pose much restriction upon the free movement of their women. They were educated along with boys of their own age, free to move with them. The presence of ladies in social and public gathering was a normal feature in Vedic times[35]. They were quite free to associate themselves with others on the occasion of festivals and rejoicing[36].

According to Atharvaveda women should take part in the legislative chambers and put their views on forefront[37].

Shathpath Brahman declares the women ought not be killed[38]. Killng of women was a very disgraceful offence.

Women had lot of respect in the society. In Manusmriti it has been said that wherever women are respected there gods live and works become successful-

यत्र नार्यस्तु पूज्यन्ते रमन्ते तत्र देवताः ।

यत्रैतास्तु न पूज्यन्ते सर्वास्तत्राफलाः क्रियाः ॥[39]

It is further said that wife of another man should be treated as mother-

मातृवत्परदारेषु परद्रव्येषु लोष्टवत् ।

आत्मवत्सर्वभूतेषु यः पश्यति स पण्डितः ॥

Had the Kaurava brothers digested this fact, the Mahabharata would not had been in the existence, Had the Ravana accepted this fact, the battle of Ramayana would not had occurred and had the present times man would have understood this very fact, all rape etc. problems would not have arisen. Unfortunately, present society while completely ignoring the fact,

forgotten all moral & eternal values, going astray like a visually impaired leads other visually impaired- **अन्धेनैव नीयमाना यथाऽन्धाः** .

RELIGIOUS LIFE

Woman enjoyed all religious rights and privileges which men possessed. She has prerogative to enter into the Yagyashala first – **आह रोहन्तु जनयो योनिमग्रे**[40]**.** Her presence and cooperation is absolutely necessary in religious rites and ceremonies like Vedic education, Mantra Writing, Reciting of mantras, Vedic sacrifice, Vedic Sanskara[41]. This naturally increases her religious value. Man is not a spiritual whole unless accompanied by his wife[42], gods do not accept the oblations offered by a bachelor, and the husband alone cannot go to heaven[43].

Modern India fully follows the Vedic culture in matter of giving importance in religious life.

CONCLUSION

In the pretext of protection of their rights and personal security, women are forced to come under the complete control of men and made fully dependent upon them from birth till death. In the language of Manu, the social mobility, economic freedom and personal liberty are more or less fully curtailed and brought under the control of their men folk in the family.

In modern era, we are talking about women liberation, equal rights to women, women empowerment etc. but women enjoyed far greater freedom in the Vedic time than in later stage.

One of the fundamental questions raised is whether the traditional role of women in general is meant to remain traditional or whether we must learn to adapt with the changing times and allow more flexibility, adaptability and innovativeness. Woman was given highest place. She was duly respected and placed with god but was not given equal status. Even then she enjoyed much more safety and security. I conclude with a question to all readers that ***in earlier time a young woman who was protected by responsible parents, in her adult life by***

the husband and in old age by elderly children, how safe is she in present era and in present society at any stage of her life?

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Plant Oils for enhancing the Virulence of Cotton Bollworm, *Helicoverpa armigera* (Hubner) Nuclear Polyhedrosis Virus (*Ha*NPV) (Lepidoptera: Noctuidae)

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ABSTRACT

Although microbes resembling *Helicoverpa armigera* (*H. armigera*) Nuclear Polyhedrosis Virus (*Ha*NPV) is effective and ecologically safe, certain factors (virulence) limit their use under field conditions. To enhance the virulence of *Ha*NPV ($1x10^5$ POB/ml) investigations were carried out on the impact of certain vegetable oils i.e., Cotton, Neem, Soya bean, Sunflower and commercial Neem oil (Nimbecidine)). The per cent larval mortality recorded in Soya bean oil, Sunflower oil and Nimbecidine was significantly different ($P<0.05$) than cotton oil and neem oil treatments. The lowest larval mortality was confirmed in *Ha*NPV alone at different days, which was significantly different from that of combination of plant oils with *Ha*NPV. The results indicate that the plant oils can be used as synergistic agents to enhance the virulence of *Ha*NPV to manage *H. armigera.*

Key Words: *Helicoverpa armigera* - Nuclear polyhedrosis virus (*Ha*NPV) - Plant oils – Larval mortality

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INTRODUCTION

Plant products, being indigenous resources, are in practice for over a century in India to minimize losses due to insect pests. The Cotton Bollworm, *Helicoverpa armigera* (*H. armigera*) (Hubner 1806) is a polyphagous pest of worldwide occurrence and a dominant insect pest in agriculture. *Helicoverpa armigera* is commonly known as the cotton boll worm, tomato fruit borer, and gram pod borer[1]. The bollworm attacks a wide variety of food, fiber, oilseed, fodder and horticultural crops in addition to chickpea, pigeonpea, soybean, sunflower, cotton, tomato, sorghum[2]. Although microbes resembling *Helicoverpa armigera* Nuclear Polyhedrosis Virus (*Ha*NPV) is effective, ecologically non-disruptive, specific and safe, certain factors limit their use under field conditions. The NPV's delayed action due to prolonged incubation period, insufficient control against later stages of the insects and ineffectiveness against a broad spectrum of pests necessitated the need for integration with other methods for faster kill. Plant species with sources of biologically active chemicals were studied extensively in combination with biopesticides. Research and development on the use of plant products along with microbes has revealed that botanicals may be used to increase the susceptibility of the target pest[3]. The general principle of use is to apply the agents simultaneously or sequentially for a synergistic response. Exposure to a stressor might influence the susceptibility of the host to an active pathogen[4]. Hence, a laboratory experiment was conducted with second instar *H. armigera* larvae to see the effect of selected botanicals in combination with *Ha*NPV to enhance the virulence of *Ha*NPV.

MATERIALS AND METHODS

To enhance the virulence of *Ha*NPV, plant oils i.e., Neem, Cotton, Soya bean, Sunflower and commercial Neem oil (Nimbecidine) at 0.1, 0.2 and 0.5% concentration were mixed separately with *Ha*NPV at the rate of $1x10^5$ POB's/ml. Fresh leaves of chickpea (*Cicer arietinum* L.) were collected and sprayed using a hand automizer with the desired concentration of vegetable oils and added 0.1% Teepol as surfactant along with 1% jaggery as a phagostimulant. The petioles of the treated leaves were kept immersed in water taken in glass vials to avoid wilting. Then ten *H. armigera* second instar larvae of uniform age and size were allowed to feed

on them for 24 hours. After 24 hours of feeding, the larvae were transferred into individual vials consisting of semi-synthetic diet. Each treatment was replicated four times with ten second instar larvae per replication. Larvae treated on *Ha*NPV alone ($1x10^5$ POB/ml) were maintained as a control check. Observations were made on the larval mortality at fourth, sixth and tenth days after treatment.

STATISTICAL ANALYSIS

The percentage mortalities were subjected to angular transformation and all the data were subjected to Analysis of Variance (ANOVA) with Duncan Multiple Range Test (DMRT) (SPSS 2008).

RESULTS

Different combinations of plant oils with *Ha*NPV tested at different concentrations are given in Table 1. The highest mean larval mortality of *H. armigera* (19.71%) was recorded in Soya bean oil on the fourth day of treatment. While zero per cent mortality was observed in *Ha*NPV alone. The per cent larval mortality found in Soya bean oil was significantly different ($P<0.05$) from other treatments (Table 1).

On the sixth day, the highest larval mortality of *H. armigera* (82.65%) was recorded in Soya bean oil in all the concentrations followed by other oils; while 37% mortality was noticed in *Ha*NPV alone. The per cent larval mortality recorded in Soya bean oil was significantly different ($P<0.05$) from other treatments.

On the tenth day, cent percent larval mortality of *H. armigera* was recorded in combination of *Ha*NPV with Soya bean oil and Sunflower oil in all the concentrations followed by other oils; while 75% mortality was noticed in *Ha*NPV alone (Table 1). The per cent larval mortality of *H. armigera* recorded in Soya bean oil, Sunflower oil and Nimbecidine was significantly different ($P<0.05$) from other treatments.

Soya bean oil increased the *Ha*NPV virulence in terms of per cent mortality of *H. armigera* larvae among the different concentrations of plant oils tested against second instars of *H. armigera*, which was comparatively higher than that of *Ha*NPV alone (Table1).

DISCUSSION AND CONCLUSION

H. armigera Nuclear Polyhedrosis Virus mixed with soyabean oil showed the highest per cent mortality of the second instar larvae of *H. armigera* compared to different plant oils mixed with *Ha*NPV. Soya bean oil, neem oil and nimbecidine with *Ha*NPV induced the larval mortality on the fourth day itself, whereas *Ha*NPV alone resulted in no larval mortality on the fourth day after treatment. It has been reported earlier that Soya oil at 0.01 per cent was found to be a good adjuvant for NPV in reducing the larval population of *H. armigera*[5] .

Among various evaluated combinations, *Ha*NPV with Soya bean confirmed to be the best one against 2nd instar larvae of *H. armigera*. Therefore, it can be concluded that some secondary metabolites present in the plant oils of Cotton, Neem, Soya bean, Sunflower and commercial Neem oil (Nimbecidine) have the capacity to increase the virulence of the NPV of *H. armigera.* It is also true that mortality obtained in the laboratory does not give the exactness of the mortality that can be observed under field conditions. Hence, field trials will provide better input on the interaction of vegetable oils and NPV for commercial exploitation of the usefulness of vegetable oil combinations in Biopesticide preparations for safe IPM programmes. The data generated here comprises initial baseline information for future studies.

Table 1. Per cent larval mortality of *H. armigera* at different concentrations of plant oils with *Ha*NPV (1x10^{5}POB's/ml)

Plant oils	Per cent mortality in different concentrations											
	4th Day after treatment				6th Day after treatment				10th Day after treatment			
	0.1 %	0.2 %	0.5 %	Mean	0.1 %	0.2 %	0.5 %	Mean	0.1 %	0.2 %	0.5 %	Mean
Cotton oil + *Ha*NPV	00.00 ^{b} (00.00)	00.00 ^{c} (00.00)	00.00 ^{c} (00.00	00.00 ^{c} (00.00)	43.60 ^{b} (41.02)	70.00 ^{ab} (56.94)	100 ^{a} (90.00)	71.20 ^{b} (62.65)	75.25 ^{c} (60.30)	100 ^{a} (90.00)	100 ^{a} (90.00)	91.75 ^{b} (80.10)
Soya bean oil + *Ha*NPV	10.00 ^{a} (13.28)	16.65 ^{a} (23.78)	32.50 ^{a} (34.49)	19.71 ^{a} (23.85)	67.50 ^{a} (55.71)	80.47 ^{a} (63.98)	100 ^{a} (90.00)	82.65 ^{a} (69.90)	100 ^{a} (90.00)	100 ^{a} (90.00)	100 ^{a} (90.00)	100 ^{a} (90.00)
Sunflower oil + *Ha*NPV	00.00 ^{b} (00.00)	00.00 ^{c} (00.00)	00.00 ^{c} (00.00)	00.00 ^{c} (00.00)	32.50 ^{a} (34.33)	34.33 ^{cd} (42.11)	50.00 ^{c} (45.00)	38.94 ^{d} (40.48)	100 ^{a} (90.00)	100 ^{a} (90.00)	100 ^{a} (90.00)	100 ^{a} (90.00)
Neem oil + *Ha*NPV	00.00 ^{b} (00.00)	10.27 ^{ab} (16.11)	13.87 ^{b} (21.62)	08.04 ^{b} (12.57)	25.67 ^{b} (30.36)	46.65 ^{cd} (43.03)	72.15 ^{b} (59.30)	48.15 ^{cd} (44.23)	71.82 ^{c} (58.50)	89.70 ^{b} (73.86)	100 ^{a} (90.00)	87.17 ^{c} (74.12)
Nimicidine + *Ha*NPV	00.00 ^{b} (00.00)	07.50 ^{bc} (11.25)	12.50 ^{b} (17.89)	06.66 ^{b} (09.71)	33.32 ^{b} (35.22)	57.50 ^{bc} (49.45)	76.10 ^{b} (62.08)	55.64 ^{c} (48.91)	97.20 ^{a} (85.11)	100 ^{a} (90.00)	100 ^{a} (90.00)	99.06 ^{a} (88.40)
*Ha*NPV	00.00 ^{b} (00.00)	00.00 ^{c} (00.00)	00.00 ^{c} (00.00)	00.00 ^{c} (00.00)	37.00 ^{b} (38.45)	37.00 ^{b} (38.45)	37.00 ^{b} (38.45)		75.00 ^{c} (60.00)	75.00 ^{c} (60.00)	75.00 ^{b} (60.00)	
SEM	4.42	5.27	4.42		5.72	4.72	6.02		5.30	4.73	3.42	
CD @ 5%	7.66	9.14	7.66		9.91	8.18	10.44		9.20	8.20	5.93	

- In a column, means followed by similar letters are not significantly different (P = 0.05) by DMRT
- Figures in the parenthesis are transformed (Arc- sine percentage) values

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PIC Microcontroller Based Temperature Monitoring System

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Abstract— Purpose of this project was to build a system that can control and monitor temperature in any room, work space or any desired place. Temperature monitoring and control are very important in most modern process control applications and industrial environments.

The specific input could be light, heat, motion, moisture, pressure, or any one of the other environmental phenomena. The output is generally a signal that is converted to readable display at the sensor location or transmitted electronically over a network for reading or further processing. Sensors are widely used for measurement of temperature.

This project included the design and construction of a Microcontroller-based automated temperature control system along with a temperature display using LCD. A working system was ultimately demonstrated to validate the design. The system made is only a prototype. A larger system can be made using this prototype as a model.

Keywords — LM35, PIC16F877A, 16×2 LCD

INTRODUCTION

Temperature monitoring and control are vital in many industrial processes [1]. Accurate control of temperature is essential in all chemical processes. Temperature is measured using temperature sensors. These sensors come in many different forms and a number of techniques have evolved for the measurement of temperature. There are new forms of sensors that require no contacts with the medium whose temperature is to be sensed.

A temperature sensor converts the temperature into an equivalent voltage output. In this paper, the authors describe a simple temperature measurement and display system based on LM35 sensor and PIC16F877A microcontroller. The temperature in degrees Celsius is displayed on a 16×2 LCD.

PIC16F877A MICROCONTROLLER

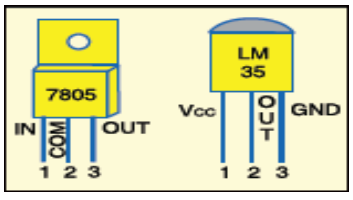
PIC16F877 is one of the most advanced microcontrollers from Microchip[2]. This controller is widely used for experimental and modern applications because of its low price, wide range of applications, high quality, and ease of availability. It is ideal for applications such as machine control applications, measurement devices. The PIC 16F877 features all the components that are present in modern microcontrollers [4].



a. PIC16F877 chip [3]

LM35 TEMPERATURE SENSOR

It is a precision integrated-circuit centigrade temperature sensor whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in degree Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling. For each degree Celsius change in temperature, the sensor output changes by 10 mV. The sensor can measure temperature in the range of 0 to 100°C, i.e., the output of the sensor varies from 0 to 1000 mV. The LM35 operates over the temperature range of -55° to +150°C, while the LM35C is rated for a -40°C to +110°C range (-10°C with improved accuracy)[5].



b. Pin diagram of IC LM35

Pin layout of the sensor is as follows:

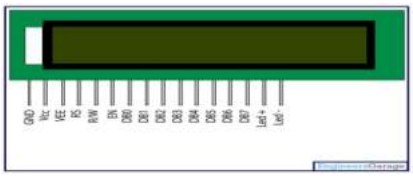
Pin 1-VDD

Pin 2-Output of the sensor

Pin 3-VSS.

16x2 LCD

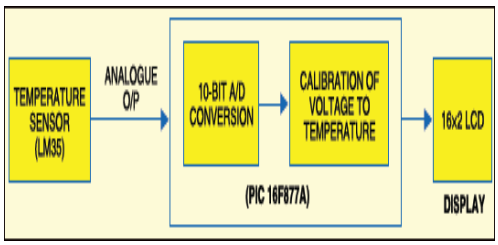
A 16×2 LCD (liquid crystal display) based on HD44780 controller is used for displaying the temperature. The control lines EN, R/W and RS of the LCD module are connected to pins RA1, RA2 and RA3 of Port A of the microcontroller, respectively. The commands and the data to be displayed are sent to the LCD module in the nibble mode from Port D of the microcontroller. The higher four bits of the LCD (D4 through D7) are connected to the lower nibble of Port D (RD0 through RD3)[5].



c. 16X2LCD

BLOCK DIAGRAM

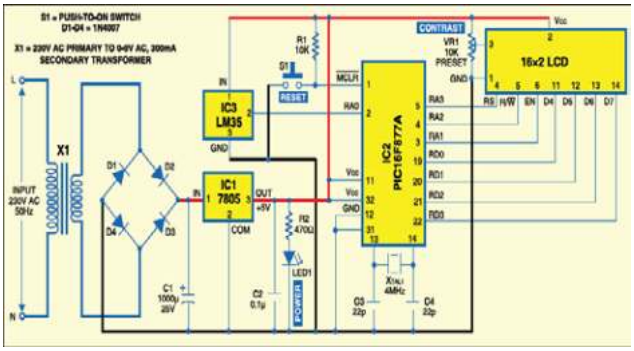
Figure shows the functional block diagram of the PIC16F877A-based temperature monitoring system. The key features of this system are continuous monitoring of temperature with 1-second update interval (which can be varied in the program).Temperature measurement is done using LM35 precision integrated-circuit sensor and the analog-to-digital conversion is done using in-built 10-bit analogue- to-digital converter (ADC) of PIC16F877A microcontroller[1].



d. Block Diagram

CIRCUIT DIAGRAM

The circuit mainly consists of the LM35 temperature sensor, PIC16F877A microcontroller and HD44780 controller based 16×2 LCD. The output of the sensor is fed to the internal ADC of the microcontroller. Pin 2 of the microcontroller (RA0/AN0) is channel-1 of the internal ADC. The analogue voltage output of the sensor is converted into its equivalent digital value by the ADC and then its equivalent degree Celsius value is calculated by the software. The calculated temperature value is displayed on the LCD[1].



e. Circuit diagram

PROCEDURE

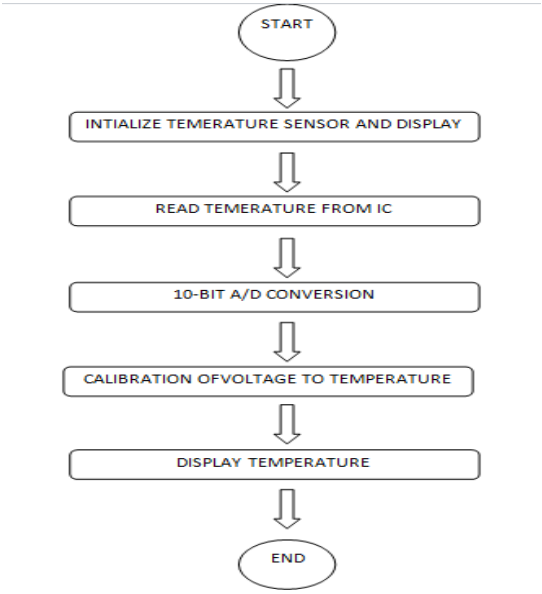
A 230V AC primary to 0-9V AC secondary step-down transformer is used to step down the 230V mains supply. The output of the transformer is rectified using a bridge rectifier consisting of diodes D1 through D4 and regulated to 5V using 7805 voltage regulator.

The analog output of the temperature sensor LM35 (IC3) from its pin 2 is connected to RA0/AN0 pin of PIC16F877A microcontroller (IC2).

A 4MHz crystal (XTAL1) is connected to pins 13 and 14 of the microcontroller.

The 16x2 LCD is interfaced with the microcontroller using Port A and Port D. The control signals for the LCD are provided using Port-A pins RA1, RA2and RA3. The command and data for the LCD are provided using Port-D pins RD0 through RD3.

FLOW CHART



SIGNIFICANCE

Temperature monitoring system is used in various applications which are useful for various industries and day to day applications. Some of the examples are barn temperature and humidity monitoring with a Wireless Network, motor temperature monitoring and control with a wireless network monitoring, hot glue detection on a package water, waste water and wireless tank monitoring, monitoring rotating equipment in unsafe or harsh conditions[6].

CONCLUSION

This project work "Temperature Monitoring System Using PIC 16F877A" was successfully designed tested and a demonstration module was fabricated. This is a prototype module. The analog to digital converter employed in the project work is an 8-bit, ADC and it has only one channel. We are interfacing the ADC and the LCD display with the Microcontroller PIC 16F877A.

ACKNOWLEDGMENT

We would like to express our gratitude and appreciation to all those who gave us the possibility to complete this report.

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LIGHT FOLLOWING AND OBSTACLE DETECTION ROBOT USING PIC16F690

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Abstract: Main objective of this project is to develop an application which can sense objects in the path when vehicle is in move. This project uses PIC 16F690 microcontroller and whiskers to detect obstacles and LDR to sense light which are present in front of the moving object. LDR works for only short distance. The LDR is used as light sensor which together with the 10K trim port works as the voltage divider circuit. The voltage supplied to this input will vary according to the light intensity. The DC geared motor is controlled by the two channels SGS-Thomson L293D motor driver chips.

Keywords- Light following Robot, PIC16F690, Microchip PICKit-2 Programmer

INTRODUCTION

Light following robots are monotype mobile robot having the ability to follow a light very accurately which has an on board hardwired control circuit and Usage of light following robot is also increasing day by day, mostly in the industrial areas, wherever the automation is very much desired[1]. A new kind of line follower robot can accelerate automatic transportation. As a consequence a light following robot is designed using artificial intelligence for autonomous driving and to follow the Light. This robot team avoids collision among each other. Moreover, it is uncertain whether it can detect collision with obstacle or not. This design procedure is capable of tracking destination and avoids collision through sensors. A mobile robot controlling algorithm is developed having the ability of avoiding barriers. Most researchers preferred to show their designed robot performance through simulation. To meet the requirement of autonomous light based transportation, a new kind of light following robot has to be designed. This paper provides an answer to that kind of requirements where there will be multiple obstacles and the robot should have the ability to detect and avoid the obstacles, and it should follow the Light. This robot is designed for practical applications which may include guidance system for industrial robots moving on

shop floors, household applications or even at offices for transporting files from one room to any other room.

The goal of the project was to build a robot which followed an active source of light. The vehicle uses optical sensors (photodiodes) to follow a moving light source which in this case is a torch held by the user. The hardware is self constructed and thus was the major part of this work.

HIGH-LEVEL DESIGN

The vehicle uses photodiodes to locate its position relative to the light source. The state of the photodiodes is captured, and the robot is controlled accordingly by a PIC 16F690 microcontroller. The robot on detecting a small perturbation (change in intensity of the oncoming signal), can correct its path by steering in the appropriate direction.

HARDWARE

The hardware for this project was the bulk of the work. Because it was for making a moving vehicle, it was decided that it would be best to have the circuitry on PCB boards. As the PCB boards are inexpensive, there was no need to disassemble the robot after its demonstration. This required a fair amount of labour, but it was well worth at the end.

The car selected was fairly simple to operate. It had a simple two wheel drive, which was powered by a DC motor. The steering was achieved by applying a difference of voltages across the two batteries. Two H-bridges (L293D) were used to deliver power to the steering and the drive motor. Because of the current requirements (the drive motor and steering solenoid could draw several amps), 20-gauge wire was used for the high-current areas of the H-bridges rather than the 30-gauge wire used for the rest of the circuit.

The photodetectors were mounted just ahead of the front wheels on a threaded rod to allow for reposition depending on the necessity. The current through the photo-transistor depends on the intensity it detects which was dealt with in the sensor characterization section.+

A regular torch served as light source. It produced a fairly localized beam about 5 cm across maximum intensity to a distance of 50 cm.

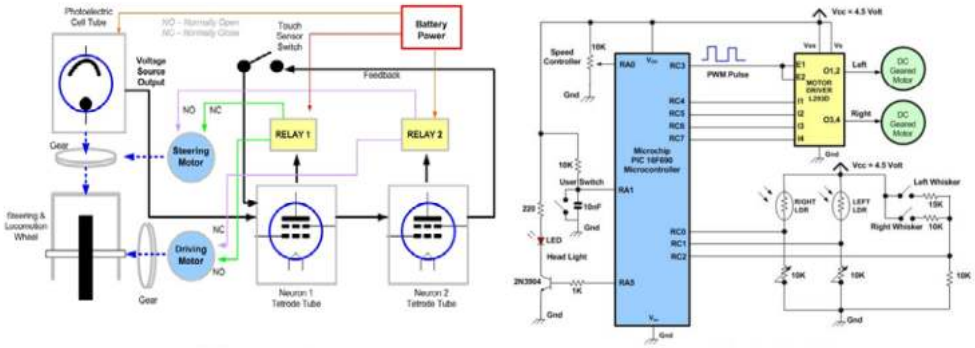
The logic runs on 5V while the car's motors run on 12V. The power for both these applications was one from a single on board 12 V battery.

SENSOR CHARACTERIZATION

The light source was moved in a straight line along the direction of the sensor. The following points were notes and curve fit. It was found that 1/r^2 variation of the Intensity on the incoming light with r being the source distance from the sensor, since it was a fairly narrow beam of light. The system was not characterized under those conditions. If that was done so, it would have helped to determine the orientation of the car with respect to the light source. **SOFTWARE**

The software for the robot was not overly complicated, but provided most of the expected functionalities. The drive motor was controlled by the PIC16F690's pulse width modulator to give good control over the speed of the vehicle. The drive direction, steering control, and photo-sensors use I/O ports. The heuristic described in the "high level design" section above was implemented using a state machine design style.

BLOCK DIAGRAM & CIRCUIT DIAGRAM



EXPLANATION FOR BLOCK DIAGRAM

The steering motor is connected to the photoelectric cell tube sensor and it only rotates in one direction. When there is dark environment, the steering and the driving motor will turn slowly. When the photoelectric cell captures a bright enough light, the steering motor will stop to rotate (relay 1 on) and the robot moves towards it (light attracted). When the light becomes too bright, the steering motor starts to rotate (relay 2 on) and the robot turns away from the light (light avoided). The touch sensor switch is connected to the clear plastic shell that covers the robot's body. When the shell bumps on to the object, the two stages

amplifier will start to oscillate because of the feedback signal generated by the closed touch switch until the robot successfully avoids the obstacle[2].

CIRCUIT EXPLANATION

The DC geared motor is controlled by the two channels SGS-Thomson L293D motor driver chips. This chip is used to make circuit more simpler compared to the standard transistor's base H-Bridge driver, the L293D chip is able to handle non-repetitive current up to 1.2 Amperes for each channels and it is equipped with the internal EMF(Electromotive Force) protection diodes.

The L293D enables input (ENABLE1 and ENABLE2) for both channels and is controlled by PWM supplied by the PIC16F690 microcontroller RC3 port which configured as single output PWM, pulse steering mode. The PWM width is controlled by user trim port attached to RA0 port. This makes BRAM's speed could be adjusted (faster or slower) by adjusting this 10k trim port.

The LDR (Light Dependent Resistor) is used as light sensor which together with the 10k trim port works as the voltage divider circuit to the RC0 and RC1 ADC ports. The voltage supplied to this input will vary according to the light intensity. Using the well known R-2R ladder resistor circuit, simple 2-bits DAC circuit is used to read the two bumper switches (whiskers) through the PIC 16F690 microcontroller RC2 ADC port. There are two reasons to use the DAC circuit to read the switches. The first one is that the output is not just for reading the switch status but to use the value to generate random number for the avoidance behaviour algorithm. The second one is to use just a single ADC microcontroller's port to read many switches at the same time[3].

APPLICATIONS

- It could be a watch dog robot which sends an email to the cell phone when it detects a light in the house when it should be off.
- Darkness sensing lighting.
- Robotic butler that registers when to turn on the light.
- It can also be used in Artificial intelligence.
- Street lighting.
- Alarm devices.

- This technology can also be used to measure light intensity for application that requires greater precision.
- Camera can use this to determine the proper exposure time.
- Possibility to use in automated vacuum cleaner.
- With further advancement and modification it can be used as a tracking system.
- Distance measurement system.
- Auto parking assistance system.

RESULTS AND DISCUSSION

The concept of the microcontroller based light following; obstacle detection robot is practically implemented in this paper based on PIC Microcontroller, sensors. Simultaneously it used instructions from sensors and on board PIC Microcontroller which performed the physical movements. The robot succeeded to locate and follow the target by giving instruction through microcontroller. This robot could follow not only light but also detected the obstacles and moved on. If the conditions are properly set and calculations are accurately done, then performance rate and accuracy will be more than ever.

CONCLUSION

Obstacle detection, and hence obstacle avoidance is very important in any navigation robot technology. These types of robots have a wide range of applications such as service robots in household work, in scientific exploration and emergency rescue. In challenging environments, navigation robots need to gather information about their surroundings to avoid obstacles.

The above "LIGTH FOLLOWING AND OBSTACLE DETECTION ROBOT USING PIC16F690" project is successfully demonstrated to show its performance. It was successful in avoiding the obstacles on its path and sensed and followed the source of light.

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BREAKFAST CONSUMPTION PATTERN AND ITS NUTRIENT ADEQUACY AMONG ADOLESCENT GIRLS (15- 17 YEARS)

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Abstract: Nearly 30% of the Indian adolescents tend to skip breakfast, and the prevalence of this trend has been growing gradually over the years. From the BMI of all the 213 subjects, it was found that a majority of regular breakfast eaters (75.55%) were under the normal BMI range, while minimal belongs to overweight range (6.25%). Mean energy intake was 1250Kcal in subjects less than 16 years among regular breakfast eaters and skippers. The nutrient adequacy ratio (NAR) was also found to be similar (0.53). The NAR in the subjects belonging to the age group of 16 years was found to be 0.50, which shows 50% adequacy in the regular breakfast eaters and skippers. Statistically significant difference in NAR was observed in the age group of 16- 17 years, where the protein intake was higher in the regular breakfast eaters (0.66) and skippers (0.65) with a significance difference (p value 0.001). The mean carbohydrate intake was higher in regular breakfast eaters when compared to skippers in all age groups. Surprisingly high intake of fat was observed and the same could be attributed to high snack consumption. The NAR for calcium was nearly 0.42 and mean intake was below 50% of the RDA. Mean iron intake of regular eaters (21g) was more or less similar to the skippers (20g). A low intake of only 10% RDA was observed for Vitamin A in all age groups. Breakfast adequacy depicted that regular breakfast eaters consume a significantly adequate breakfast as compared to breakfast skippers (p value 0.005).In the less than 16 years age group, it was found that only 37.5% of regular breakfast eaters and 42.9% of skippers consumed an adequate breakfast. However, in the 16- 17 years age group 51.1% regular breakfast eaters were consuming adequate breakfast as compared to 26.5% of the breakfast skippers. The difference observed between regular breakfast eaters and skippers was found to be significant (p value 0.014).

Keywords: Breakfast, Dietary adequacy, breakfast skippers, Nutrient Adequacy Ratio (NAR)

INTRODUCTION

Breakfast has been described as the most important meal of the day due to the extended time span between an evening meal and the time at which breakfast is eaten on the next day, in which valuable nutrients are not being consumed. Frequency of breakfast food consumption has been linked with a range of health benefits; better weight management, lower cholesterol, reduced risk of metabolic syndrome, diabetes mellitus, coronary heart disease, better digestive functioning, fewer upper respiratory tract illnesses, and better mental health[1]**.** Despite positive traits of breakfast, many children go to school without having breakfast. As nutrition is a key component of the health of children and adolescents, nutritional requisites during period are greater, especially conferring to growth; deficiencies can hence occur more often and their consequences can be more serious. Since breakfast needs to account for nearly about one- third of the daily nutritional requirement; skipping breakfast at the school and college going age can lead to deficiencies and related lifestyle issues.

Regular breakfast consumption is correlated with higher intake of important micronutrients[2]. The evidence that regular breakfast eating is associated with better nutrient intake is even stronger. They are more likely to feel hungry and irritable and they are less likely to be energetic.The present study was an attempt to assess the association between the frequency of breakfast consumption and nutrition adequacy.

MATERIAL AND METHODS

Research design and setting

A cross sectional study with a pre-structured questionnaire was conducted with a random sample of 213 students belonging to 11th standard/ Ist year PUC, from three selected Pre - University women colleges, situated in urban Bangalore.

Study Tools

An adequate breakfast was defined as consumption of 25% of the caloric requirement per day, as given for Indians by the National Institute of Nutrition[2]. Based on this other nutrient requirements were calculated. However, the Breakfast consumption pattern was classified based on the frequency of breakfast consumption as:

1. Regular breakfast consumers - subjects who had breakfast for more than 4 days in a week.

2. Breakfast skippers - those who had breakfast for less than 4 days in a week.

A three-day dietary recall was conducted for all the college going students selected under the study. Regular utensils were standardized as per the quantities of cooked foods that may be consumed

to facilitate ease and accuracy for describing the amount of food eaten. The nutrient adequacy for each of the study subjects was calculated. This average consumption was compared to the RDA of Indians given by the National Institute of Nutrition for each nutrient[2]. The breakfast adequacy for subjects were determined by comparing the average nutrient intake for the breakfast meal consumed over three days to 25% of the RDA (NIN, 2010)[3]. Breakfast must meet at least 25% of the daily RDA requirement for Indians[4].

RESULTS AND DISCUSSION

Out of 213 study subjects, 27% of the subjects were breakfast skippers and 73% of them were regular breakfast eaters (Fig.1).In the age wise distribution (Fig 2), 10.3%, 58.1%, and 31.6% regular breakfast eaters belonged to the age group of less than 16 years, 16 to 17 years, and more than or equal to 17 years, respectively. Among the breakfast skippers, majority of the subjects were from the age group of 16-17 years (58.6%), followed by 17 years (29.3%) and minimum in the age group of less than 16 years (12.1%).

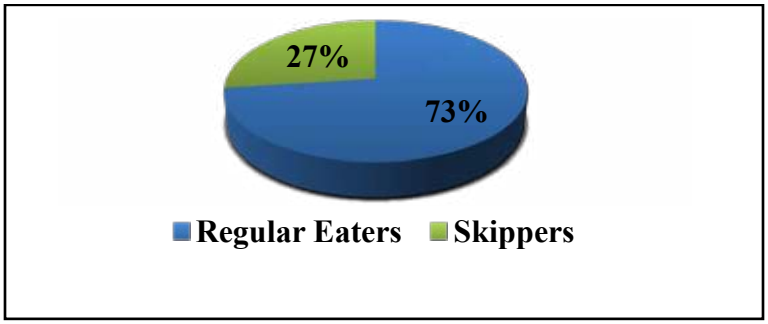

Figure 1: Breakfast Consumption Pattern of College Going Girls (15-17 years)

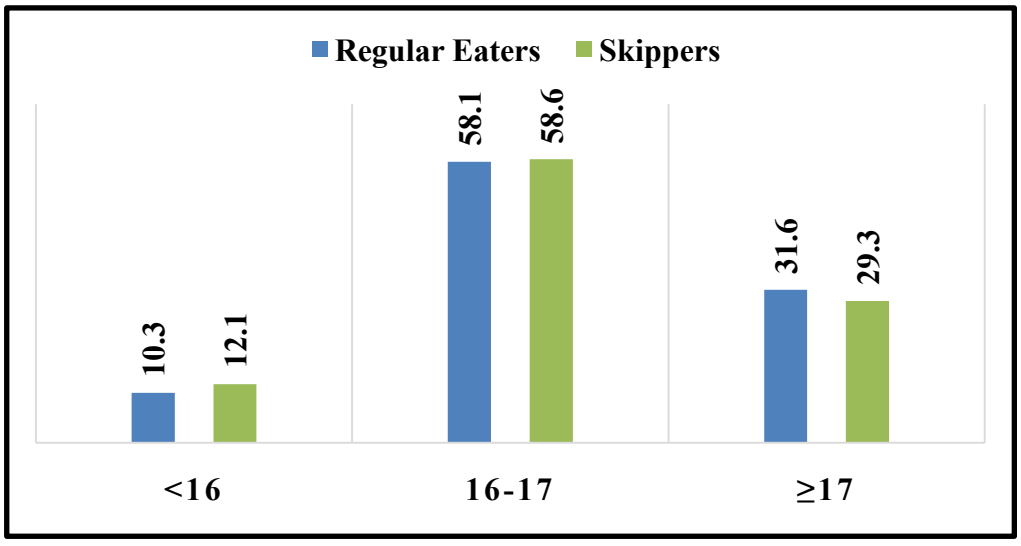

Figure 2: Age-wise Distribution of Regular Breakfast Eaters and Skippers

Association of breakfast consumption pattern with the mean socio- economic status of the study subjects has been observed (Table 1). The socio- economic status has been calculated based on the total income of the mother and father. It was observed that, as the family income increases, consumption of breakfast reduces and vice- versa. An Australian study on adolescents concluded that physical self-esteem was lowest among overweight girls from upper middle socio- economic status[5]. This could be a possible reason for girls from high socio-economic backgrounds to skip breakfast in an attempt to lose weight.

Table 1: Socio economic status and its association with breakfast consumption pattern

Socio Economic Status	Breakfast Consumption Pattern	
	Regular Eater (n=155) No (%)	Skipper (n=58) No (%)
Below Average	35 (85.36)	6 (14.63)
Average	86 (72.26)	33 (27.73)
Above Average	34 (64.15)	19 (35.84)

The mother's educational level was classified into five categories. It was found that the mother's educational level was directly proportional to breakfast consumption pattern of the study subjects.The mean educational scores of the mothers of the regular breakfast eaters and skippers was compared and there was extremely small difference.

Table 2: Educational level of mother linked with breakfast consumption pattern of children

Breakfast Consumption Pattern	Educational Level of Mother				
	Post Graduate (%)	Graduate (%)	Upto Pre-university (%)	Upto 10th Standard (%)	Below 10th Standard (%)
Regular Eaters	82.85	70.65	75	63.33	75

Skippers	17.14	29.35	25	36.67	25

Majority of regular breakfast eaters (75.55%) were categorized under the normal BMI range in the age group of 16 to 17 years, while minimal were in the overweight category (6.25%), below 16 years age group. Amongst the skippers also majority (76.47%) of the subjects were categorized under the normal BMI in the age group of 16 to 17 years, while none were in the underweight category and overweight category was found from > 17 years age group and below 16 years age group respectively.

Table 3: BMI of the study subjects

Breakfast Consumption Pattern	**BMI Category**	**Age Group (in years)**		
		<16	**16-17**	**≥17**
Regular Eaters	Under weight (<5th Percentile)	4(25.0)	12(13.33)	8(16.32)
	Normal (5-85th Percentile)	11(68.75)	68(75.55)	37(75.51)
	Over weight (≥85th Percentile)	1(6.25)	10(11.11)	4(8.16)
Skippers	Under weight (<5th Percentile)	3(42.85)	2(5.88)	0
	Normal (5-85th Percentile)	4(57.14)	26(76.47)	14(82.35)
	Over weight (≥85th Percentile)	0	6(17.64)	3(17.64)

With an increase in the age of the study subjects, the calorie intake reduced gradually and did not meet the RDA. The NAR was 0.50, which shows 50% adequacy in the above 16 years regular breakfast eaters and skippers. A statistically significant difference in NAR was seen in the age group of 16- 17 years, where the protein intake was higher in the regular breakfast eaters (0.66) and skippers (0.65) with a significant level of p value = 0.001.

The over-all mean intake of macronutrients by the study subjects did not meet the recommended daily allowances (Table 4.). Mean energy intake was 1250Kcal in less than 16 years regular breakfast eaters and skippers and the nutrient adequacy ratio (NAR) were also found to be similar (0.53).

The mean carbohydrate intake was higher in regular breakfast eaters when compared to skippers in all age groups and the NAR was found to decrease with age in all subjects. A surprisingly high intake of fat was observed which could be attributed to high snack consumption. The mean fat intake in regular breakfast eaters below the age of 16 years was 53.07g per day, which was higher than the skippers (52.68). The energy contribution of breakfast to daily energy intake was on average 15.7% in boys and 14.9% in girls. In girls, the mean EI: BMR Ratio was significantly lower in low quality breakfast consumers than in the subjects identified as good quality breakfast consumers.

Table 4: Dietary adequacy of the study subjects (Mean macronutrient intake)

Nutrients	Age Group (Years)	Recommended Dietary Allowance (NIN, 2010)	Breakfast Consumption Pattern				p value
			Regular Eaters		Skippers		
			Mean intake	*NAR	Mean intake	*NAR	
Energy (Kcal)	<16	2330	1250.9+383.8	0.5369	1250.3+408.12	0.5366	NS
	16-17	2440	1240.4+405.59	0.5083	1225.0+406.14	0.502	NS
	≥17	2440	1230.1+408.72	0.5081	1223.3+409.12	0.5014	NS
Protein (g)	<16	51.9	37.39+22.11	0.7205	37.57+21.59	0.724	NS
	16-17	55.5	36.85+21.32	0.6641	36.45+21.46	0.656	0.001
	≥17	55.5	36.90+21.82	0.665	36.38+21.47	0.655	NS
Carbohydrates	<16	349.5	190.43+57.63	0.5449	188.65+60.34	0.5397	NS

(g)	16-17	366	183.19+59.90	0.5005	179.87+61.05	0.5491	NS
	≥17	366	181.4+60.82	0.4956	179.81+60.44	0.4913	NS
Fat (g)	<16	40	53.07+76.02	1.3269	52.68+67.16	1.317	NS
	16-17	35	51.10+66.25	1.4601	51.39+69.73	1.468	NS
	≥17	35	51.42+68.22	1.4692	51.20+68.99	1.463	NS

*NS: Not Significant *NAR: Nutrient Adequacy Ratio

The overall micronutrient intake of the study subjects was less than that recommended by the NIN for Indians. The NAR for calcium was nearly 0.42 and mean intake was below 50% of the RDA. Mean iron intake of regular eaters (21g) was higher than the skippers (20g), in the below 16 years age category, which reduced with increase in age. The higher intake of iron was due to the higher percentage of non- vegetarians among the study subjects. A low intake of only 10% RDA was observed for Vitamin A in all age groups.

Table 5: Dietary adequacy of the study subjects (Mean micronutrient intake)

Nutrients	**Age group (Years)**	**Recommended Dietary Allowance (NIN, 2010)**	**Breakfast Consumption Pattern**				**p value**
			Regular Eaters		**Skippers**		
			Mean Intake	***NAR**	**Mean Intake**	***NAR**	
Calcium (mg)	<16	800	338.59+232.68	0.4232	337.16+232.93	0.4214	NS
	16-17	800	343.34+232.96	0.4292	341.63+234.78	0.427	NS
	≥17	800	340.53+233.39	0.4297	340.77+236.09	0.426	NS
Iron (mg)	<16	27	21.33+50.27	0.7902	20.91+44.01	0.7748	NS
	16-17	26	19.61+43.40	0.7543	19.90+46.14	0.7657	0.002

	≥17	26	19.71+44.77	0.7582	19.85+45.55	0.7636	0.031
Vitamin A (mcg)	<16	4800	517.69+457.29	0.1079	503.08+437.74	0.1048	NS
	16-17	4800	487.07+434.78	0.1015	511.68+447.69	0.1066	NS
	≥17	4800	500.38+440.39	0.1042	509.38+443.61	0.1061	NS

*NS: Not Significant, *NAR: Nutrient Adequacy Ratio

The low intake of micronutrients was due to the low consumption of milk and milk products, fruits and vegetables. Breakfast skippers in India have been shown to have inadequate intake of key nutrients, which could not be made up at later meals, including macronutrients like energy and protein and micronutrients like Vitamin A, Vitamin C, and Iron[6].

It was evident that 49% regular breakfast eaters consume an adequate breakfast as compared to only 27.6% skippers (Table 6). On the other hand, fewer regular breakfast eaters (51%) consume an inadequate breakfast compared to a larger number of skippers (72.4%). Hence, it was determined that significant difference was found in the regular breakfast eaters who consume adequate breakfast as compared to breakfast skippers (p value 0.005). Several studies have attempted to describe the adequacy of a Breakfast meal. One such study stated that the calorie level of breakfast is between 20% and 35% of the RDA.[7] Adequacy of breakfast was determined by consumption of 25% of RDA from the breakfast meal.

Table 6: Breakfast adequacy

Adequacy	Regular Eater No (%)	Skippers No (%)	Chi-square value	p value
Adequate	76(49.0)	16(27.6)	7.91	0.005
Inadequate	79(51.0)	42(72.4)		

Breakfast adequacy has been classified as per the age of the study subjects (Table - 7). In the less than 16 years age group, it was found that only 37.5% of regular breakfast eaters and 42.9% of skippers consumed an adequate breakfast. This was a surprising fact as a higher percentage of skippers were found to have an adequate breakfast. However, in the 16- 17 years age group 51.1% regular breakfast eaters were consuming adequate breakfast as compared to only nearly half of the breakfast skippers (26.5%) who consumed an adequate breakfast.

Table 7: Age wise distribution of breakfast adequacy

Age Group (years)	Adequacy	Breakfast Consumption Pattern		Chi-square Value	p value
		Regular Eaters No (%)	Skippers No (%)		
15-16	**Adequate**	6(37.5)	3(42.9)	-	NS
	Inadequate	10(62.5)	4(57.1)		
16-17	**Adequate**	46(51.1)	9(26.5)	6.07	0.014
	Inadequate	44(48.9)	25(73.5)		
17-18	**Adequate**	24(49.0)	4(23.5)	3.34	NS
	Inadequate	25(51.0)	13(76.5)		

*NS: Not Significant

The difference observed between regular breakfast eaters and skippers was found significant (p value 0.014). A similar observation was made for the greater than or equal to 17 years age group where more regular breakfast eaters (49%) had an adequate breakfast as compared to skippers (23.5%).

CONCLUSION

The study was conducted to determine the association between breakfast consumption pattern and dietary adequacy. The study subjects were between the age group of 15-17 years college going students. Out of 213 study subjects, 27% of the subjects were breakfast skippers and 73% of them were regular breakfast eaters.It was found that the mother's educational level was directly proportional to breakfast consumption pattern of the study subjects. Majority of regular breakfast eaters (75.55%) were categorized under the normal BMI range. A statistically significant difference in NAR was seen in the age group of 16- 17 years, where the protein intake was higher in the regular breakfast eaters (0.66) and skippers (0.65) with a significance level (p value 0.001). The mean carbohydrate intake was higher in regular breakfast eaters when compared to skippers in all age groups and the NAR was found to decrease with age in all subjects. A surprisingly high intake of fat was observed which could be attributed to high snack consumption. Low intake of micronutrients specifically iron was observed (p-value 0.002) in the age group of 15-16 years and it was also observed in 17 years and above age (p-value0.031)in the subjects, skipping their breakfast. However, the overall finding suggests that the

regular breakfast eaters consume a significantly adequate breakfast as compared to breakfast skippers (p value- 0.005).

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STUDIES ON OPTICAL STRUCTURAL AND DIELECTRIC PROPERTIES OF TiO_2 THIN FILMS PREPARED BY SPRAY PYROLYSIS METHOD

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ABSTRACT

TiO_2 thin films are prepared on different substrates like glass, quartz, metal and silicon wafers by spray pyrolysis method. The precursor solution was Titanium Isopropoxide (TIP) dissolved in Ethanol. Acetyl acetonate was used as a stabilizer. Substrate temperature was varied from 275 ^oC to 450 ^oC. Films are characterized for their optical, structural and dielectric properties. All the films were found to be fairly transparent with an average transmittance of 77% in the visible region, more absorption in the UV region indicating that the TiO_2 thin films can be used as UV sensors. XRD revealed the amorphous nature with just a broad peak at low substrate temperatures and slightly crystalline with growing peaks at higher substrate temperatures. AFM images revealed the porous and nanograin size nature of TiO_2 thin films. MOS capacitor is fabricated using TiO_2 thin film as a dielectric medium. Dielectric properties were studied by analyzing the capacitance-voltage (C-V) and current-voltage (I-V) plots. The dielectric constant(ε_r) of the films was found to increase with increase in the substrate temperature. This behavior is explained with respect to the dependence of porosity of the films on substrate temperature.

Key Words: TiO_2 thin films, Spray Pyrolysis, Optical, structural, Dielectric properties.

INTRODUCTION

Titanium dioxide (TiO_2) also known as titania is one of the most widely used materials in thin film form because of it has numerous applications in solar cells, photocatalysts, gas sensors, optical coatings, and as self-cleaning materials[1,2,3]. TiO_2 is a high band gap semiconductor which can be treated as a good dielectric material when prepared at optimum conditions. It has high refractive index and good insulating property; as a result it is widely used as a protective layer for very large scale integrated circuits. It acts as a catalyst for various organic reactions and as a thin film, it is used as a dielectric medium for thin film capacitors and as an antireflection coating on silicon. In recent years, it has been investigated as an electrode for photo-electrochemical cells and for detectors of H_2O, Oxygen and hydrogen[4-9].

There are many techniques employed to prepare titania films, such as sputtering , pulsed laser deposition (PLD), sol-gel, gel oxidation , anodic oxidation , electro-phoretic deposition, and spray pyrolysis[10- 16]. Spray pyrolysis is an attractive, versatile, and practical method to prepare titania thin films due to its various advantages, such as its low cost, simple operation, simple experimental setup, no need for vacuum, capacity for mass production, ease of doping, reproducibility, and rapid growth rates.

EXPERIMENTAL

Spray pyrolysis technique (SPT) is one of the major techniques employed to deposit a variety of materials in thin film forms. The prime requisite for obtaining good quality thin films is the optimization of preparation conditions such as substrate temperature, spray rate, molarity of the solution etc. In recent years one can find a variety of atomization techniques such as ultrasonic nebulisation, improved spray hydrolysis, corona spray pyrolysis, electrostatic spray pyrolysis and microprocessor based spray pyrolysis [17]. The enhancement in deposition efficiency and improvement in quality of the films can be achieved with atomization techniques such as microprocessor based spray pyrloysis.

The microprocessor based spray pyrolysis unit for thin film deposition is shown in figure 2.1. Present unit is a versatile FY series controller, which are microprocessor based controllers, which have been designed with high accuracy input, various output selection, useful options and good reliability at a competitive price.

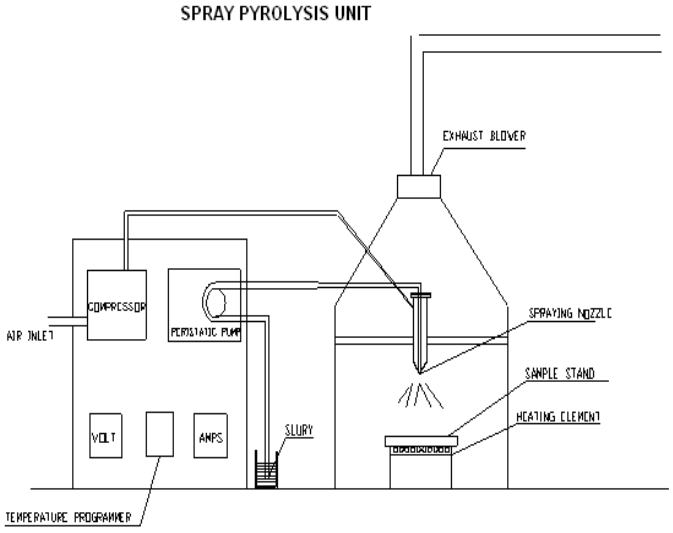

Figure 2.1 Schematic of microprocessor based Spray Pyrolysis Unit



Figure 2.2 Spray Pyrolysis Unit

DEPOSITION OF TiO_2 THIN FILMS

The starting solution was prepared by dissolving Titanium Isopropoxide (TIP) $Ti[OCH(CH_3)_2]_4$ – (98% purity), in a known volume of Ethanol (CH_3CH_2OH) (99.7- 100% purity). Acetyl acetonate was used as a stabilizer .The molarity of the solution was maintained at 0.1 M. This solution was sprayed on to the pre cleaned and heated substrates at various substrate temperatures. The deposition was done with intermittent sprays as to maintain the substrate temperature constant. Each spray time was about 10 seconds.

DEPOSITION PARAMETERS

Substrate temperatures- (275°C, 300°C, 325°C, 375°C, and 450°C)
Substrates -(glass, quartz, aluminum plates and p-type silicon wafers),
Molarity of the solution-0.1M
Number of intermittent sprays – 35 to 40 times.
Thickness - 148nm
The prepared films were characterized for their optical, structural / surface, and dielectric properties. Optical absorption and transmission studies were carried out by using a UV-VIS spectrophotometer (UV-1700 Pharma Spec, SHIMADZU) in the wavelength range 200nm to 1100nm. Surface morphology by AFM, X-Ray diffraction patterns were recorded from 20° to 90° using Cu Kα (λ=1.542 Å) with an accelerating voltage of 40 KV. Data were collected with a counting rate of 1°/min.

Films prepared on p- type silicon substrates are used for fabricating MOS capacitor to study dielectric and humidity sensing properties of TiO_2.Thickness of the films was calculated by optical data and verified by gravimetric method.

FABRICATION OF MOS CAPACITOR

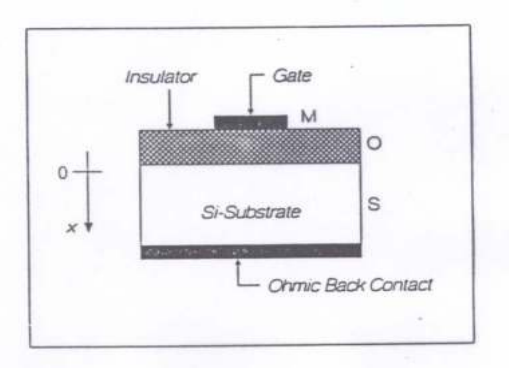

Figure 2.3 Schematic of TiO_2 as MOS capacitor

TiO_2 films were coated on p- type silicon substrates using spray pyrolysis method. Then silver dots of known area were deposited over the film surface by thermal evaporation method by covering the film surface by a metallic mask. Then the back surface of the silicon substrate was fully coated with silver paste. Area of each on the metallic mask dot is 0.2826 $X10^{-6}$ m^2 (0.6 mm diameter). Then the contacts are taken from a dot and the back surface (metal) using thin copper wires and are used as MOS capacitors.

RESULTS AND DISCUSSIONS

OPTICAL PROPERTIES

Transmission versus wavelength plots in the UV- visible region for various TiO_2 thin films prepared at substrate temperatures of 275^oC, 300^oC, 325^oC, 375 ^{o} C and 450^oC are as shown in figures 3.1(a-e) respectively. It is found from the plots that the transmission in the visible region is increasing from 69% -85% with the corresponding increase in the substrate temperature from 275 ^oC to 450 ^oC. Hence substrate temperature plays an important role in enhancing the transmission of oxide films in the visible region. Absorption is maximum in the ultraviolet (UV) region (300nm-350nm) indicating that TiO2 thin films can be used as UV sensors [18].

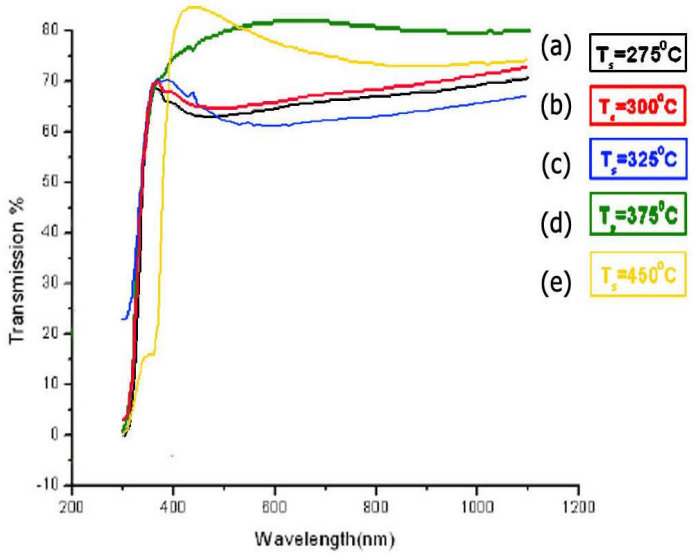

Figure 3.1 Transmission versus wavelength

STRUCTURAL PROPERTIES

XRD patterns for the films prepared at 300° C, 325°C and 350° C are as shown in the figures 3.21, 3.2.2 and 3.2.3 respectively. It is observed from these plots that the films are amorphous in nature at lower temperature with a broad peak but the film prepared at 350° C has shown some growing peaks. Similar observation were made earlier[16].

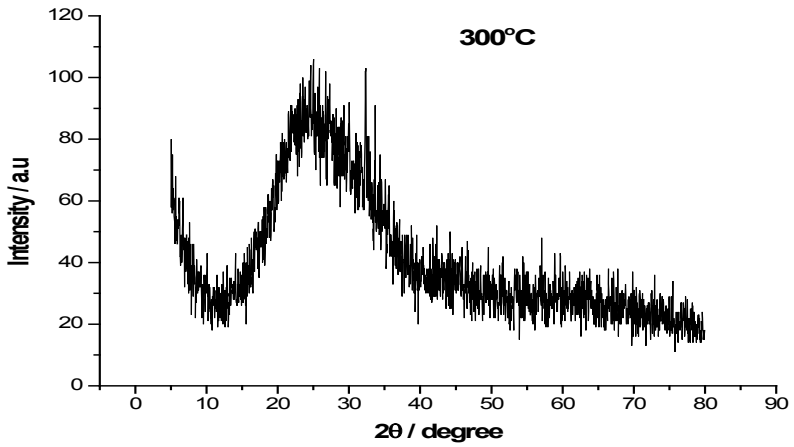

Figure 3.2.1 XRD of the film prepared at T_s=300°C

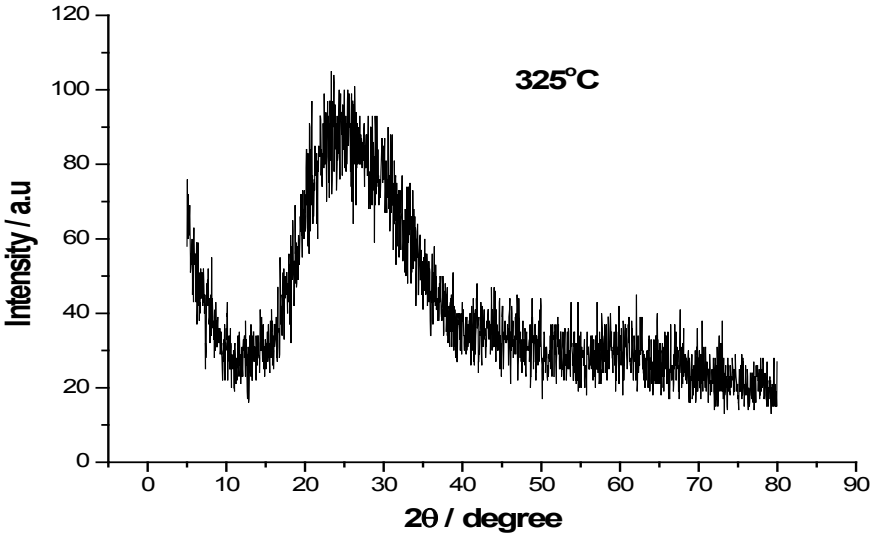

Figure 3.2.2 XRD of the film prepared at T_s=325°C

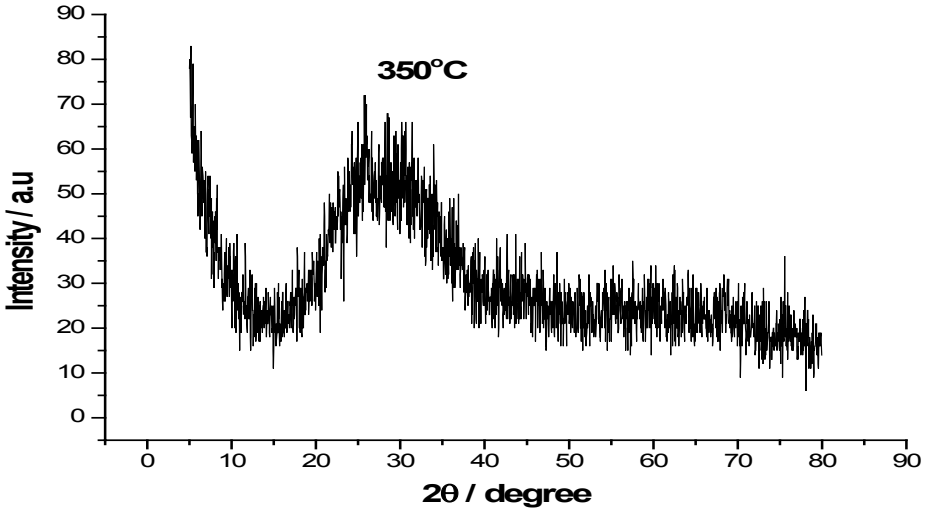

Figure 3.2.3 XRD of the film prepared at T_s=350°C

AFM images of the films prepared at 300°C and 375°C are shown in figures 3.2.4 and 3.2.5 respectively. The images reveal the porous nature of the films with nano-grain sized structure. The film prepared at a substrate temperature of 300°C is more porous compared to that

of a film prepared at 375°C. Hence the film prepared at 375°C is more uniform and exhibited more dielectric constant which will be discussed later. Porous and flower like morphology at a lower substrate temperature have reported[19].

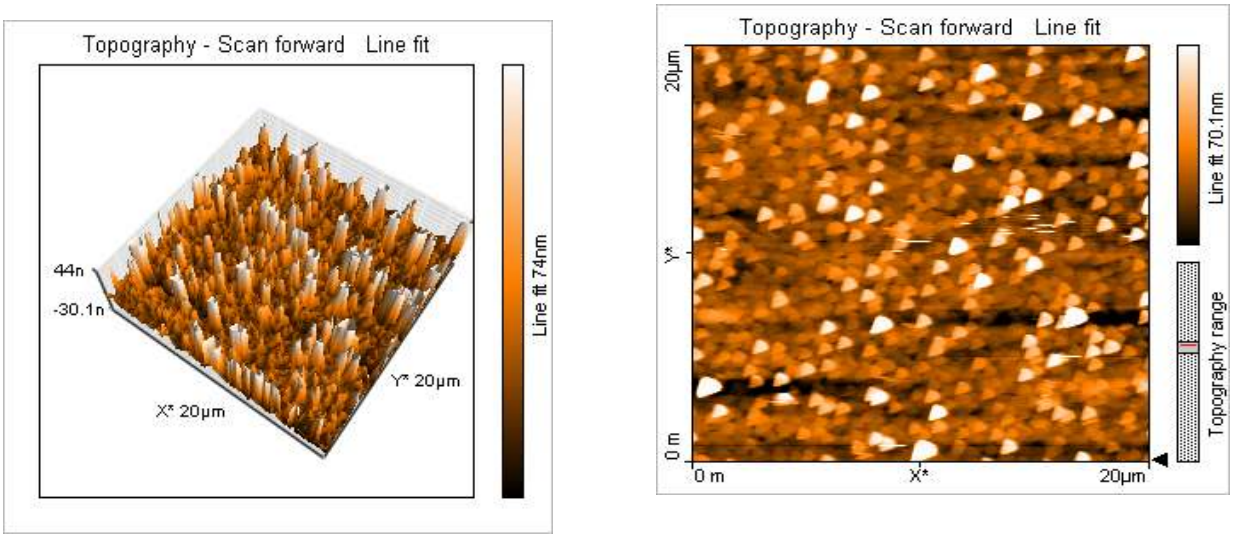

Figure 3.2.4 AFM image of the film prepared at T_s=300°C

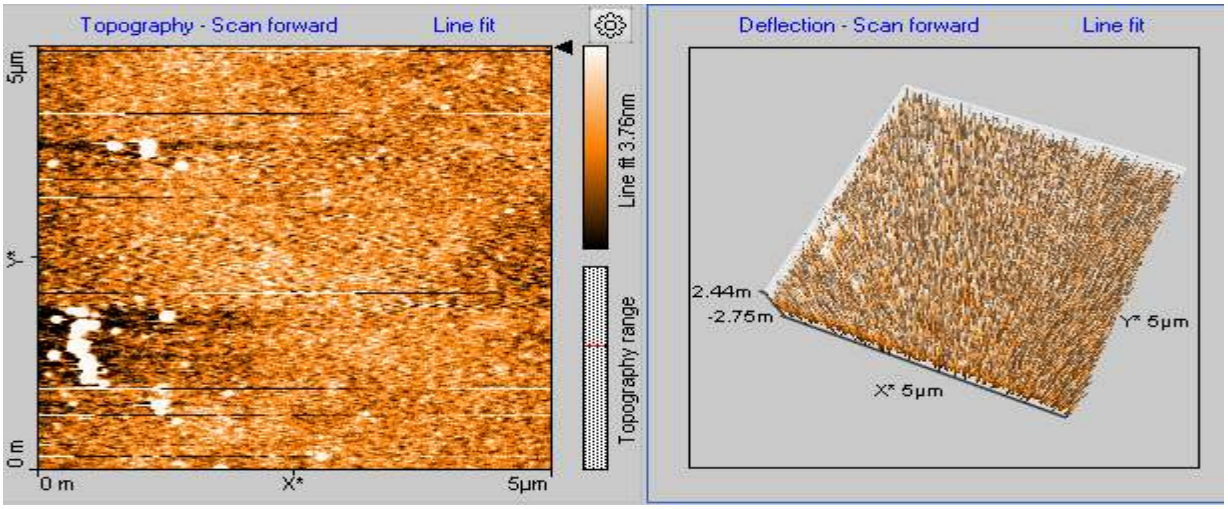

Figure 3.2.5 AFM image of the film prepared at T_s=375°C

DIELECTRIC PROPERTIES

Capacitance –Voltage (C-V) plots are shown in figures 3.3.1 to 3.3.4 for TiO_2 MOS capacitors prepared at substrate temperatures of 300°C- 450 ^{o}C respectively. It is observed from the figures that the plots clearly indicate the accumulation, depletion and inversion regions, which are the characteristics of any dielectric thin film, in the form of MOS capacitor.Dielectric constant values for these films are calculated using the formula (1) and the data is given in table 3.3.

It is seen from the data that the dielectric constant (ε_r)of the films increases with increase in the substrate temperature except for the film prepared at 450° C. This increase could be due to the fact that at higher temperatures, the porosity decreases , film density increases and in turn the dielectic constant increases.The film prepared at 450° C has showed a less value of ε_r, may be due to improper contact at the gate electrode.

$$\varepsilon_r = (c_{ox} \text{ x } d)/ \varepsilon_o \text{ A} \qquad (1)$$

where c_{ox} is the max capacitance in the accumulation region

d is the thickness of the film (nm)

ε_o is the permitivity of free space and A is the area of the gate electrode in m^2

TABLE 3.3 Data for Dielectric constants

Substrate temperature T_s	Capacitance(C_{ox}) Pf	Dielectric constant ε_r	Thickness (nm)
300°C	81	4.7	148nm
325°C	219	13,0	148nm
375°C	230	13.6	148nm
450° c	31	1.89	148nm

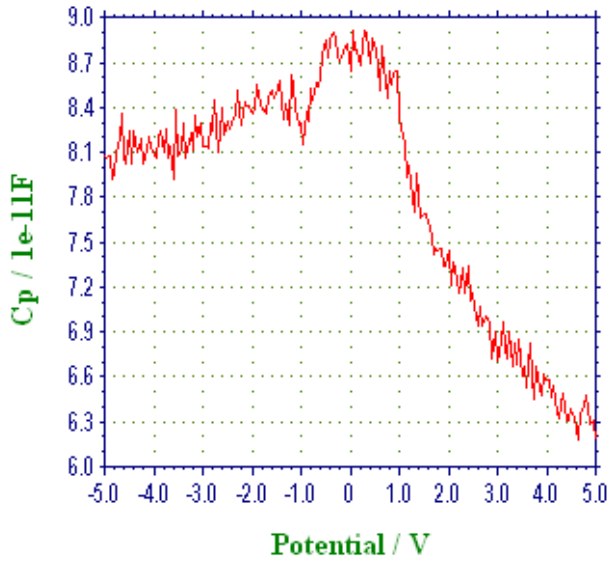

Figure 3.3.1 C-V plot for a film prepared at T_s=300°C

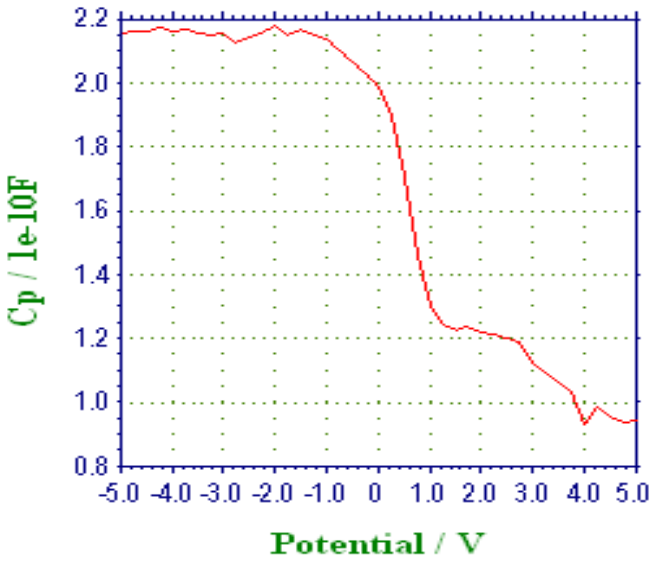

Figure 3.3.2. C-V plot for a film prepared at T_s=325°C

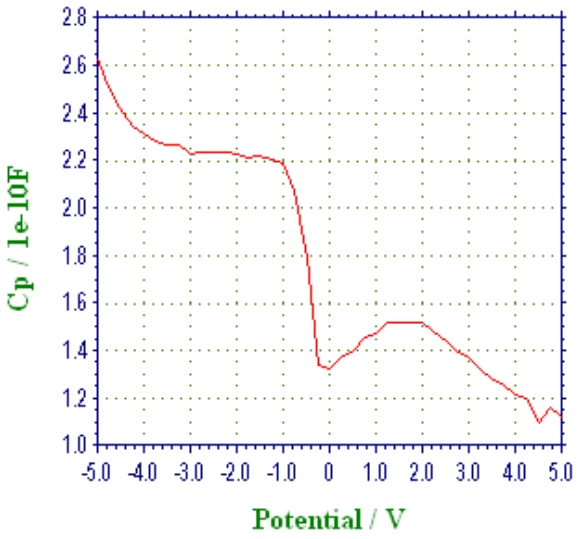

Figure 3.3.3 C-V plot for a film prepared at T_s=375°C

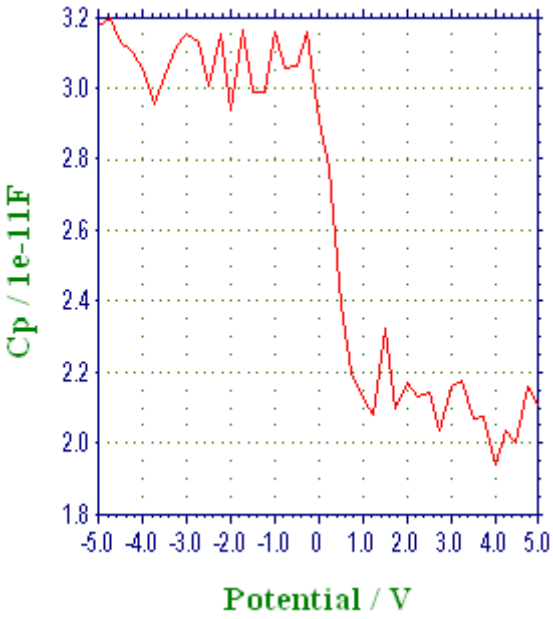

Figure 3.3.4 C-V plot for a film prepared at T_s=450°C

SUMMARY AND CONCLUSION

TiO_2 thin films were prepared on different substrates like glass, quartz, and silicon wafers by spray pyrolysis method. The starting solution was Titanium Isopropoxide (TIP) dissolved in Ethanol. Acetyl acetonate was added as a stabilizer into the solution. The substrate temperature was varied from 275 ^{O}C to 450 ^{o}C (in steps of 275 ^{o}C, 300 ^{o}C, 325°C, 350 ^{o}C, 375 ^{o}C,450 ^{o}C). The prepared films were characterized for their optical, structural and dielectric properties. All the films were found to be fairly transparent with a transmittance of an average 77% in the visible region, more absorption in the UV region indicating that TiO2 thin film can be used as a UV sensor. XRD of the films revealed that the TiO_2 thin films were amorphous in nature with just a broad peak at low substrate temperatures and slightly crystalline with growing peaks at higher substrate temperatures. Dielectric properties were studied by analyzing the capacitance-voltage (C-V) plots of TiO_2 MOS capacitor. AFM images revealed the porous nature of the films prepared at a lower substrate temperature. Porosity of the films prepared at higher substrate temperature decreases and hence the dielectric constant increases with increase in the substrate temperature. TiO_2 films on metal substrates were not uniform and hence optimization is required for better adherence of TiO_2 film on metal.

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ATTITUDES OF LECTURERS ON INFORMATION COMMUNICATION TECHNOLOGY

A REVIEW

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Abstract: This paper presents the studies carried out by different researchers globally on the attitude of lecturers towards the advent of information technology and e-learning. An effort has been made in this paper to study the various trends presented by researchers to draw some general conclusions. These studies highlight on gender of the teachers, age and educational background that reflect on their attitude towards the e-learning.

Key words: Attitudes, information, communication, technology, lecturers

INTRODUCTION

Science and technology plays an important role in the new millennium. The tremendous explosion of knowledge in science and technology has changed the life style of people and it has made them totally dependent on it to progress in their lives. Information Communication Technology (ICT) / Electronic or e-learning is a step towards the changing life style especially in the educational field.

Technological tools, which meet the needs of the society, have become more addictive for people with the rapid development of technology. These tools have also been used in the field of education and improved through the usage of the Internet, where there is a continuous bi-directional flow of information. This paper presents various such studies carried out by researchers and draws some indigenous inherent conclusions from the studies, which may benefit both the students and teachers.

ICT is an all-encompassing term generally used to refer computer enhanced e-learning, which is the use of web-based teaching materials and hypermedia. In general, multimedia, CD-ROMs or websites, discussion boards, collaborative software, e-mail, blogs, WIFI, text chat, computer aided assessment, educational animation, simulations, games,

learning management software, with possibly a combination of different methods are being used.

The researchers all around have employed varying techniques/tools in an attempt to understand the role of ICT in education. ICT offers a solution to many problems of the modern educational system. It is increasingly becoming part of the educational environment and its integration is a relatively recent demand. E-learning is naturally suited to distance learning and flexible learning, but can also be used in conjunction with face to face teaching, commonly called *blended learning*. Educational processes have undergone many changes during the last century. From printed learning materials mailed to student's homes to educational radio broadcasts; to educational television programming, and to recent forays in interactive Web-based e-learning, ongoing technological changes have been reflected in the evolving role of teachers and students in the learning equation. Technological changes – particularly Web-based e-learning technologies have resulted in new curriculum design and teaching strategies. New and emerging organizational structures have even transformed learning, whether or not teachers or students are ready for this inevitable change[1].

The present paper will answer many queries put forward as below and will be assessing the attitudes of college lecturers under the following heads:-

- **Acceptance of lecturers on eLearning in relation to their age and gender**
- **Attitudes towards technology use**
- **Frame of mind of teachers regarding the use of computer curriculum**
- **Importance or benefits of ICT in education**
- **The ideal attitude of teachers for betterment of eLearning**
- **Management of attitude of lecturers towards e-learning**

In order to examine ICT usage, the investigation of the attitude of teachers towards ICT for teaching was thought to be vital. In fact, studies in Greece and elsewhere have pointed to the fact that positive attitude towards ICT appears to be generally a good predictor of whether teachers will eventually use these new technologies or not [2,3,4]. It is important to know the interest in technology, affective features towards technology to put the technology to its maximum utility benefiting the students as well as teachers.

Acceptance of lecturers on e-learning in relation to age and gender

The age plays a significant role in individual's life and it is directly related to the developmental tasks in each stage of life. Researchers have studied acceptance level of lecturers on ICT belonging to different age groups[5]. It was found that teachers with seniority of ten years and under have more positive attitudes [6]. There is an indication that male teachers have more positive attitude than their female counterparts. It is reported that male teachers tend to be more favourable towards computer use than the females[7]. Contrary to this it is opined by some that when computer skills are acquired in a carefully structured learning experience, gender difference was not significant.

Some of the studies carried out on e-learning process, have changed significantly over the past two decades as computers have become omnipresent; for instance, there is no longer a difference between genders in general attitudes towards computers[8].

There appears a change and readiness to become active partners which can be a critical success factor[9-12]. Similarly, resistance to change is considered one of the main reasons for failure of processes that involve change in organizations in general and in the educational systems in particular[13,14]. Teaching in a technological environment faces teachers with a wide range of pedagogical, cognitive and ergonomic challenges [15,16].

Attitudes towards the technology

The use of technology has brought up a broad change in the educational sector, and in the field of information and communication technology. Researchers have studied the different attitudes of lecturers towards technological use.

The technology would transform the act of teaching, whether or not teachers or students are ready for this inevitable change[1].For e-learning to take root and grow, a robust technical infrastructure must also be in place to support all the technical aspects necessary for the production of course materials, delivery of e-learning courses and also for teacher and student support[17]. Among the factors that affect the successful use of computers in the classroom depends on how teachers look at them and the approach constitutes various dimensions[2].

These refer to perceive usefulness, confidence to operate, exposure to component, gender and finally to develop liking for the concept[3]. In support of the importance of computer use, the available evidence suggests that the mental makeup of teacher is directly related to its use in the classroom[18,19] .

Teachers often view the computer as a tool to accomplish housekeeping tasks, management of students more efficiently and to have easy interaction with parents[14].The success of student learning with computer technology will depend largely on the confidence of teachers, and their willingness to embrace the technology[20].

Frame of mind of teachers regarding the use of computer curriculum

Even teachers report a high degree of comfort with technology and tend to use it in fairly rigid ways, such as searching for activities to use with students, communicating with other teachers, and word processing[21].

A study was conducted to demonstrate the self-efficacy that influences student's activity and the effort to develop an environment towards e-learning [22]. ICT related skills for enhancing the presentation of classroom work, teaching/learning repetitive tasks, teaching/learning intellectual, thinking and problem solving skills, stimulating creativity and imagination; for research by teachers and students and as communication tool by teachers and students should be taught[23-25].

Importance or benefits of ICT in Education

Educational processes have undergone many changes during the last century. From print learning materials mailed to student's homes, to educational radio broadcasts, to educational television programming, to recent forays in interactive Web-based e-learning, ongoing technological changes have been reflected in the evolving role of teachers and students in the learning equation. Technological changes – particularly Web-based e-learning technologies – have resulted in new curriculum design and teaching strategies, new and emerging organizational structures, and it has even transformed learning itself.

The implications of e-learning on lecturers and students are extensive; and the e-learning can help deliver supporting innovations in teaching and learning and developing the work force[7].

One of the studies has shown that the lecturers were positive and proactive in their attitude towards the role of e-learning in supporting their teaching practice[26]. The instructors were found to be very positive towards using e-learning as a teaching assisted tool [22]. However, attempts to enhance and reform the education sector through eLearning were found to be negatively affected by factors such as unreliable and inadequate ICT infrastructure and

services. Low levels of ICT literacy, lack of pedagogy in their curricula and lack of lecturer and management support to drive the eLearning initiatives was experienced by a few in their studies [27].

Ideal attitude of teachers for betterment of eLearning

Among the factors that affect the successful use of computers in the classroom are teachers' attitudes towards computers[2]. Attitude, in turn, constitutes various dimensions. Some examples of these are perceived usefulness; computer confidence training gender knowledge about computers anxiety, confidence, and liking [28]. A major reason for studying teachers' attitude towards computer use is that it is a major predictor for future computer use in the classroom [29].

E-learning is the process of learning via computers over the Internet and Intranets. The literature examines the importance and benefits of e-learning as an educational tool [3].The literature also shows that educators are concerned with increasing student access to educational resources and communication processes [30].

The important role that e-learning is in accessing, collecting, analyzing and transferring of information and knowledge. The vital contribution to the progress of academic staff and students lies in the improvements in the quality of teaching methods and learning management system. These have resulted in increasing the popularity of e-learning in different educational institutions and organizations [31].

Management of attitude of lecturers towards eLearning

The lack of confidence leads to reluctance to use computers by the teachers [32]. Attitude of pre-service and in-service teachers towards computer and technology skills can be improved by integrating technology into managerial sector and education[33]. Findings have revealed that a significant relationship exist between computer attitude and its use in institutions for pre-service teachers and also for serving teachers in the affective attitude, general usefulness, behavioural control, and pedagogical use[34].

Attitude is a major predictor of future computer use. One of the studies indicated the importance of appropriate responses to the trainee's feelings about using ICT as one of the factors critical to success [35].Thus, there is the need to take care of the emotional needs of student teachers as attitude is a major predictor of future ICT use. Student teachers have

positive attitude and are highly enthusiastic about interactive whiteboards as an important feature of teaching and learning, and this motivated them to practice using the technology [36] .

CONCLUSION

The final key learning can be studied in this article as

- Studying teachers' attitude towards computer use is a major predictor for future computer use in the classroom.
- The attitudes towards information communication technology in terms of gender have a significant impact in educational sector, wherein males are more convenient in using than females.
- There is a lot of reluctance especially among middle aged teachers than the Younger ones.
- It is also clear that if emotional needs of student teachers are taken care, ICT can have a lot of positive attitude on the educational field
- So, we can say that effective use of ICT can help deliver supporting innovations in teaching and learning and can help in developing the work force.

As a consequence of integrating Information and Communication Technology in education a change is expected to occur in the style of teaching and learning.

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GROWTH OF CORE / SHELL HETEROSTRUCTURE NANOWIRE

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ABSTRACT

Owing to their different properties other than their bulk property tremendous research is in progress on the nanostructural materials. Recently core / shell nanowire has received considerable attention due to its exceptional tunable properties. This article focuses on the different synthesis of shell nanowire. To begin with, overview of different structures of nanowire and its synthesis have been explained and further precise concentration is laid on the shell layer formation and its mechanism. Finally the review concludes with issues of shell layer formation and its importance.

Keywords- heterostructure, syntheses, nanowire

INTRODUCTION

One-dimensional (1D) nanowires have attracted much attention as a result of their exceptional properties. 1D nanowires are used in applications as sensors, solar cells, transistors, and conductive thin film[1-4]. Recently, core - shell nanowires have attracted much attention because of the possibility to tune the properties of core nanowires with addition of the shell layer. By choosing appropriate core and shell materials with tuned properties it can be used in many applications such as photovoltaic cells, flexible capacitors and photo detectors[5- 9]. The paper provides a brief overview of core / shell Hetero structure nanowires as the central component and its types. The first section briefly introduces the synthesis strategy of nanowires growth, in that focus is on the bottom up synthesis; the second section specifically introduces the radial Hetero

structure synthesis. Shell layer formation has been explained for both top down and bottom up synthesis. A lot of literature survey reveals the nanowire growth but not shell layer formation.

TYPES OF HETROSTRCTURE NANOWIRES

Hetero structure nanowires are prepared by growth of dissimilar materials on or within nanowires. The interaction of the two different materials exhibits the remarkable physical and chemical properties.

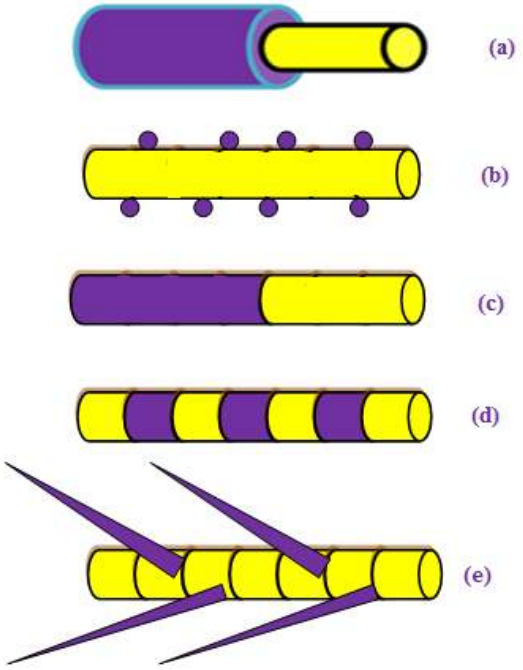

Fig 1: Different types of Heterostructures Nanowires. Two different colors represent two different materials

(a) Radial or core/ shell Heterostructures, dense core wire with conformal shell material (b) Seed Heterostructures nanowires – nanoparticle as a shell layer (c) axial Heterostructures- two different material arranged on a single wire one on bottom and another one on top
(d) Segmented axial Heterostructures Nanowire- two different material alternatively arranged on single wire (e) Dendrite nanowire- wings kind of shell layer. Additionally some more complex nanowire structures are there which are core/composite shell layer, composite core/shell layer, composite core/ composite shell layer and Core/ multishell layers.

SYNTHESIS OF CORE NANOWIRE

Growth of metal oxide nanowires or Nano-whiskers during the heating process of metals has been observed since 1950[11]. The most synthesized nanowires are CuO, ZnO, Fe_2O_3, and there are a few reports on the growth of NiO, SiOx, MgO**,** Al_2O_3, SiO_2 [12-19]. The growth mechanisms for most of the nanowires include vapor-liquid-solid (VLS) and solution phase synthesis.

Vapors –Liquid-Solid growth (VLS)

Among the various mechanisms for the growth of nanowires, VLS mechanism (bottom-up approach) is the well established and is the most widely accepted model[20]. For VLS growth, catalyst plays a very important role. Majority of the reports say that the catalyst is a gold thin film which is deposited by physical vapor deposition technique. A suitable temperature is given to the catalyst to form a liquid, then the source gas enters into the chamber, the source gas and the catalyst particle when mixed, nucleation starts and continuous supply of precursor helps to grow nanowires until the catalyst saturates. A VLS growth can be achieved using any of the following techniques; chemical vapor deposition, atomic layer deposition, pulsed laser deposition and physical vapor deposition.

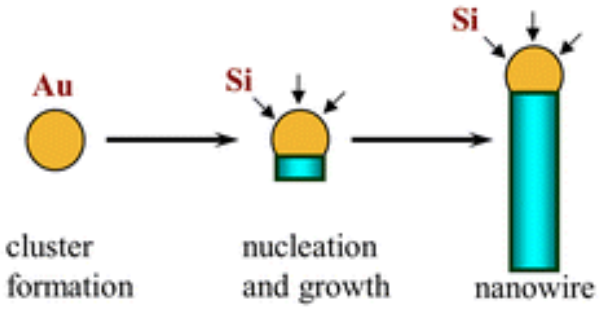

Fig: 3 Schematic Illustration of VLS growth mechanism[21]

Solution Phase Synthesis

In this technique nanowire is prepared by using a solution. Mixture of two solutions at a particular concentration, temperature and pressure helps the formation of nanowires. A few examples of this technique are Hydrothermal, Solvothermal and wet chemical methods.

SHELL LAYER FORMATION AND MECHANISM

Core –shell nanowire heterostructures are composed of a nanowire as core material and a shell layer which is distinct from core material. The shell layer formation is done by different techniques (Fig 1).

Surface oxidation

The shell layer formation occurs by oxidizing the core nanowire. The prepared nanowire is exposed to oxygen precursor at a high temperature. The oxygen molecules form an oxide layer on core material, in this case the core nanowire acts as a substrate.

As an example, SiNWs are treated with oxygen plasma for five minutes to produce a thin layer of SiO_2 on the SiNWs[22].

In another method, the shell material is deposited as a thin film on the core nanowire and then the shell material can be thermally oxidized by subsequent temperature treatments. As a result, an oxide shell layer is formed on the core nanowire.

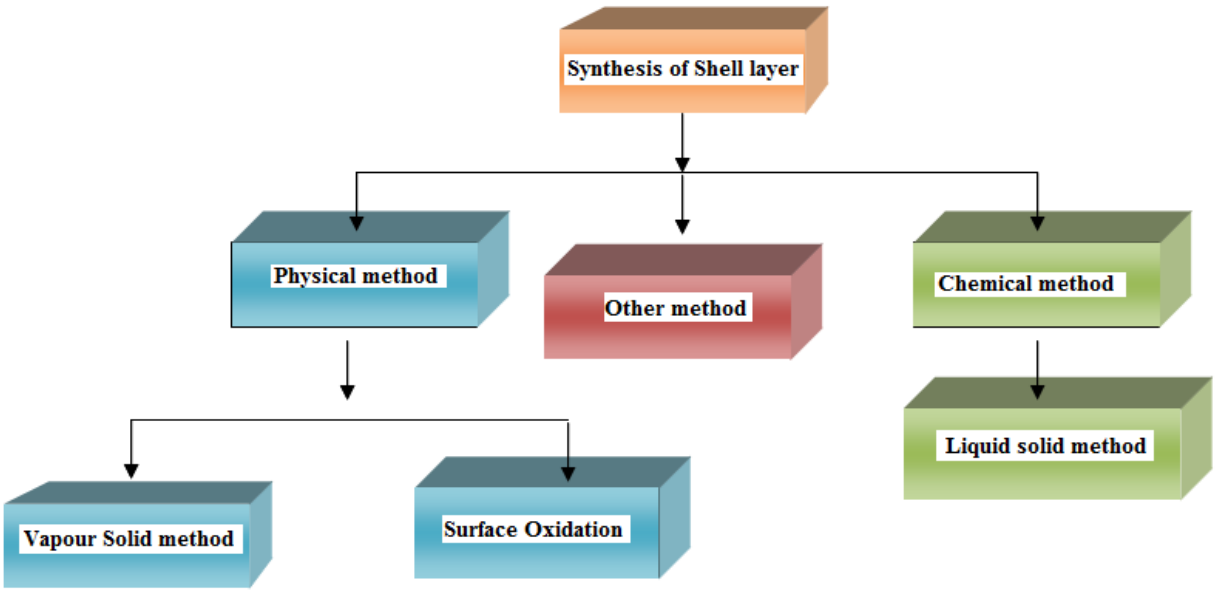

Fig: 4 Shell layer formation techniques

Other report states that the formed ZnO nanowire arrays are sputter -coated with 20nm Cu nanofilm, forming ZnO/Cu core -shell nanowire arrays. The desired ZnO/Cu_xO core-shell nanowire arrays are formed by annealing the Cu-ZnO nanowire arrays with and without oxygen flow[23]. In another method, the shell material is deposited as a thin film and then the film is exposed to oxygen with required temperature to form shell layer. The core In_2O_3 nanowires are sputter-deposited with the Ag shell layer, which turns out to be composed of cubic Ag particles. Subsequent thermal annealing changes the Ag nanoparticle to cubic nanoparticle with a cubic Ag_2O phase[24].

Vapor –Solid Method

In Vapor- Solid (VS) method, a second material in the form of vapor, deposits over the prepared nanowire and form a shell layer by Physical or chemical vapor deposition method.

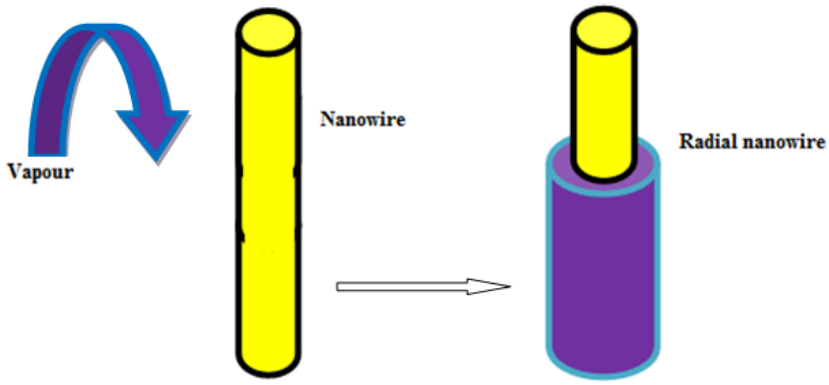

Fig: 5 Vapor –Solid (VS) formation of shell layer

Atomic layer deposition

The shell formation is achieved by atomic layer deposition of a particular precursor inside the chamber which has nanowire grown in it. Report is available on the coating of Al_2O_3 shell layer on ZnO nanowire by using *trimethyl aluminum* gas with distilled water[25]. Titanium tetrakis (isopropoxide) and hydrogen peroxide (H_2O_2) are chosen as precursors and alternatively dosed into the hot-wall reactor to fabricate TiO_2/SnO_2 core–shell heterostructure [26].

LIQUID –SOLID METHODS

The nanowires are treated with chemical solution and subsequently heated to obtain conformal growth of shell layer. Formation of shell layer or seeded layer is based on the molarities of solution and preparation process.

Spray coating Technique

The synthesized nanowire is kept on the spray furnace chamber and the shell layer is deposited by the form of solution from the spray nozzle due to pyrolysis. Dang Thi Thanh le *et. al* reported that the core SnO_2 NWs were coated with the beadlike ZnO shell layer via spray technique. In this technique, a solution of Zn $(CH_2COO)_2$ was sprayed onto the SnO_2 NW wafer [27].

Spin coating technique

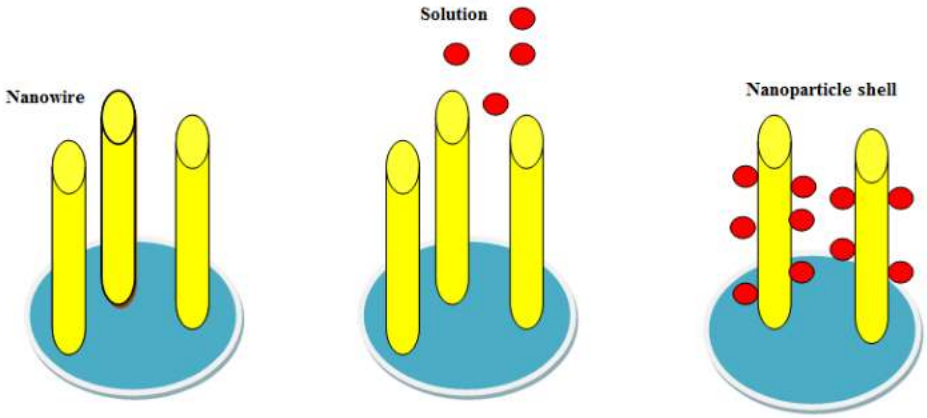

Fig: 6 nanoparticle shell formation on the core nanowire

Figure 6 shows the nanoparticle shell formation on core nanowires.

On the prepared nanowires few drops of shell material in the form of liquid is dropped and spanned, annealed to get shell layer formation. Lung-Chuan Chen *et. al*. have reported that one drop of As-prepared indium hydroxide milky suspension was injected by syringe onto the surface of the CuO nanowire. Then, these coated CuO nanowires were placed in oven. After drying and subsequent heating at 600ºC for 5 hours, CuO-In_2O_3 core shell nanowires were obtained[28].

ELECTRODEPOSITION TECHNIQUES

Electrodepositing is a unique technique in which, a nanotube is first synthesized and then this nanotube is filled with the core material. In Ag core - TiO_2 Shell formation, TiO2 nanotubes are prepared by template method. These nanotubes are successfully filled with Ag core using an electro deposition technique [29].

CONCLUSION

Lot of information is available on the synthesis of core / Shell nanowire in recent years. The paper highlights the types of Heterostructure nanowires and fundamental growth in the shell layer formation. The four different types of their formation with examples are provided in this paper. This reflective essay brings out a new technique to fabricate core/ shell nanowire by electro deposition technique.

Even though various techniques for the fabrication of nanowire have been discussed and experimented, still the shell nanowire faces challenges such as of lack of thickness uniformity, low yield, poor quality and doped shell layer. These issues need to be solved that will lead in achieving important applications of the core / shell nanowire in industry.

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Mass production of grape mealybug destroyer *Cryptolaemus montrouzieri* in laboratory

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The commercial grape varieties Thompson Seedless, Anab-e-Shahi and Gulabi are found severely damaged by the grape mealybugs & yield loss ranges from 50 to 100 percent in the field. Among the different insect pests attacking grapes, mealy bug, *Maconellicoccus hirsutus* (Green) is one of the most serious pests of grape. Almost 50-100 per cent yield loss in the yield was reported. Disadvantages of unilateral approach of controlling crop pests with synthetic chemicals have dictated the need for developing cost effective, eco-friendly and safe pest control strategies.

Fortunately biocontrol agent, predator – *Cryptolaemus mountrozeire* Mulsant is well known to control the mealybugs effectively and their use will go long way in the mealybugs management. *C. mountrozeire* can be mass multiplied easily in laboratory on mealybugs. This technology is farmers-consumer and environment friendly.

Studies have indicated that mealybugs control can be achieved within 3-4 months of release of *C. mountrozeire* at the rate of 5000 beetles or larvae/ha. The predators can be obtained from commercial insectaries in Karnataka, Maharashtra and Tamil Nadu and also in **Mount Carmel College Research Laboratory, Bengaluru** by booking well in advance on payment.

1



1. The activity of this mealybug is more pronounced during fruiting phase. In addition to direct damage, the excretion of ample amounts of honeydew encourages the growth of sooty mould on leaves and grape berries, thus inhibiting photosynthesis, making the grape berries difficult to process. The natural waxy coating and its ability to hide in cracks and crevices is probably the most important means by which it protects itself from pesticides.



2. *C. mountrozeire* are dark brownish black with reddish head. It lays pale yellow eggs among the colony of the mealybugs. A beetle can lay 200 to 300 eggs which hatch in 5 to 10 days. The larva is gray in colour but is covered with white waxy filaments. The grub has four instars which are completed in 20 - 30 days and pupal period lasts for around 8-12 days. The resulting adults can survive for 50 to 60 days. Male to female ratio is 1:1. Both the larvae and adults feeds on mealybugs.



3. *Maconellicoccus hirsutus* Green species of mealybugs were produced on ripe pumpkins (*Cucurbita moschata*). The pumpkins were selected with ridges and groves with a small stalk which makes the handling easy. Pumpkin was infested with ovisacs of *M. hirsutus*.



4. Infested pumpkins were kept inside the custom made cage on a round stainless steel tri-pod stand and all the sides of the cage were covered by white nylon mesh for ventilation. Such pumpkins were covered with mealybugs in 20 days and the mealybugs matured in 12-15 days. A sequence of pumpkin infestation cycle by mealybugs was maintained to ensure availability of right stage of mealy bugs for culturing predators.



7. For facilitating the pupation of grubs pieces of papers and guava leaves were kept at the base and inside sides of the cages. Fresh batches of beetles were collected on 30th day of exposure to *C. montrouzieri* adults.



8. The beetles were also fed on diet containing agar powder (1gm), sugar (20), honey (40 ml) and water (100ml). Hot liquid diet was kept on small thick white paper cards in the form of droplets which get solidified on cooling. Such cards containing adult diet were fed to C. *montrouzieri* adults till field release.



5. On 25 days after infestation of pumpkins with *M. hirtus*, 20 adults of ten days old beetles were released per pumpkin. The beetles during the period of exposure fed on mealybugs as well as deposit their eggs singly or in groups of 4-12.



6. The grubs/larvae were visible within a week of exposure to beetles. As they grow they become voracious and feed on all stages of mealybugs.

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Abstracts of Post Graduate Students' Research

Department of Nutrition and Dietetics
Project Guide: Dr.Geetha Santhosh

INFLUENCE OF ADVERTISEMENTS ON ADOLESCENT'S FOOD CHOICES & PARENTAL PERCEPTION

Ayesha Kauser

Abstract: The growing epidemic of obesity is a major concern for public health and food advertising is thought to be a contributing factor for obesity. The study was conducted to assess the impact of food advertising on food preferences and eating behaviors among adolescents, to explore the relationship between the ability to recognize brand logos featured in promotional campaigns of the food industry and to assess parent's attitude about food marketing and perception of possible environmental influences on eating habits of children. The study population consisted of 100 adolescent (girls) - parent pairs recruited from Wisdom International School, Bangalore. A predesigned and pretested children's interview schedule to obtain information on general profile, anthropometric details, diet history and impact of food advertising, food preferences and questionnaire on parental perception about food advertising was used. Brand logo test was conducted to assess the measure of exposure to marketing activities among the adolescents. The current study reveals that 31% of adolescent girls had normal BMI and also had a good WHR range. Seventy nine per cent of the study population were sometimes influenced by the advertisements and 39% of students rarely opt for healthy food products, the reason was found be due to excessive exposure to advertised products. The students demonstrated high brand logo recognition ability with 51% recognizing at least 14 out of 15 brand logos. Significant difference ($p<0.05$) was seen between logo recognition and watching advertisements. Parents (37%) agreed that advertisements influence the children and they are pestered to buy the demanded food product. Significant difference ($p < 0.1$) existed between the type of marketing and their purchasing attitudes. These findings suggested numerous opportunities for the public health community and food and media companies to take action to improve the unhealthy food environment and to create awareness among adolescents about well-balanced diet, nutrition labeling to help them distinguish between healthy and unhealthy food products.

Abstracts of Post Graduate Students' Research

Department of Nutrition and Dietetics
Project Guide: Dr. Sangeeta Pandey

BREAKFAST CONSUMPTION PATTERN AND ITS RELATION TO NUTRITIONAL STATUS, RISK OF EATING DISORDER, BODY IMAGE AND SELF CONCEPT AMONG COLLEGE GOING GIRLS (15-17 YEARS)

Bandini. J. Patel

Abstract: The relationship between weight control behaviors such as skipping breakfast and self perception, particularly in children and young adults has important implications for physical, nutritional and psychosocial health and well-being. The aim of the study was to assess the breakfast consumption pattern and its relation to nutritional status, risk of eating disorder, body image and self concept among college going girls (15-17 years). A cross sectional study was carried out on 213 female students from three pre university colleges of Bangalore, India. Data was collected using questionnaire and interview method was used to assess the breakfast consumption pattern, snacking habits. Anthropometric measurements such as height, weight were recorded and BMI was calculated. Dietary intake was assessed using 24-hour recall method. Standardized tools were used to assess the eating disorder (EAT26 Test) and body image perception (SCQ-R.K.Saraswat). SPSS software was used for statistical analysis. Out of 213 subjects, 27% were breakfast skippers and 73% were regular breakfast eaters. There was no significant difference in the mean height and weight of the study subjects. With increase in socioeconomic status, breakfast consumption decreased. Regular breakfast eaters made better food choices. Skippers consumed fried and bakery products more often than fresh fruits and vegetables (P value<0.05). Overall, the breakfast eaters were nutritionally more adequate than skippers for breakfast (p value<0.05) and at other meals of the day. The risk of eating disorder was significantly higher in breakfast skippers (p value<0.05). Regular breakfast consumption had higher self concept compared to skippers and were more satisfied with their physical appearance.

Abstracts of Post Graduate Students' Research

Department of Nutrition and Dietetics

Project Guide: Dr. Shantha Maria

DEVELOPING A NUTRIENT DENSE PRODUCT FOR THE CHILDREN WITH CEREBRAL PALSY

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Abstract: Cerebral Palsy is a common neurologic condition that originates in early childhood but affects individuals throughout their life span. Since malnutrition was commonly seen in children with Cerebral Palsy, it was learnt that an intervention could combat malnutrition among these children. Therefore, a nutrient dense product was formulated which provided all the essential nutrients, was cost effective and easy for the care taker to prepare and feed.Three different samples were formulated using nutrient rich ingredients which were analyzed for their proximate nutrient contents. Sample 1 had the highest proximate analysis score of 17 which was followed by Sample 2 with a score of 14 and sample 3 with a score of 11 respectively.Sensory evaluation carried out analyzed the samples based on their appearance, texture, taste, aroma, color and consistency. It was observed that sample 3 ranked the highest in terms of appearance and texture (3.83 ± 1.72, 3.83 ± 0.75), sample 2 ranked the highest in terms of taste and aroma (6.17 ± 1.72, 4.83 ± 1.60), whereas color and consistency was seen the best in sample 1 (4.00 ± 1.41, 3.67 ± 2.34).Hence, sample 1 could be used to conduct an interventional study to combat malnutrition in children with Cerebral Palsy.

Abstracts of Post Graduate Students' Research

Department of Nutrition and Dietetics

Project Guide: Dr. **G. Kavitha Singh[2], Myrene R. D'souza[3]**

EFFECT OF TRADITIONAL PROCESSING METHODS ON THE NUTRITIONAL AND ANTI-NUTRITIONAL QUALITIES OF SELECTED LEGUMES: BLACK-EYED PEA (*VIGNA UNGUICULATA UNGUICULATA)* AND RED LOBIA (*VIGNA UNGUICULATA)*

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Abstract: Legumes are a major source of complex carbohydrates, dietary fibers, proteins, vitamins, minerals and variety of phytochemicals and are also low in saturated fat. They contain several components that are considered to have anti-nutritional properties such as trypsin inhibitors, phytates (inositol hexophosphate), tannins, oligosaccharides and saponins that tend to hinder the absorption of essential nutrients. This study has been undertaken to analyze the effects of different processing methods on the legumes Black-Eyed Pea (*Vigna unguiculata unguiculata*) and Red Lobia (*Vigna unguiculata*) and its effect on the antinutrients. The legumes were subjected to soaking, cooking, autoclaving, microwaving, roasting and germination. The samples were analyzed for their biochemical, nutritional and anti-nutritional parameters such as phytic acid, tannins and amylase inhibitor activity. A decrease in the anti-nutritional factor were observed in certain processing methods, whereas, the others demonstrated an increase in the anti-nutritional composition of the legumes.

Keywords: Soaking, autoclaving, cooking, microwaving, roasting, germination, phytic acid, tannins, amylase inhibitor activity.

Abstracts of Post Graduate Students' Research

Department of Nutrition and Dietetics
Project Guide: Dr. **Geetha Santhosh**

PREVALENCE OF OBESITY AND ITS CORRELATION BETWEEN EATING PATTERNS, PHYSICAL ACTIVITY AND LIFESTYLE AMONG ADOLESCENT GIRLS

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Abstract: The prevalence of obesity among adolescents has increased worldwide in all segments of the population due to increased industrialization, urbanization, mechanization and associated changes in diet and especially lifestyles. Its control and prevention is one of the major concerns for all developing nations. Hence a study was conducted to understand the prevalence of obesity among adolescent girls and to study factors influencing obesity - eating pattern, snacking, physical activity and lifestyle. Purposive random sampling was employed on 200 adolescent girls in the age group of 12 to 16 years. A pre designed, pre tested interview schedule was used to elicit information on nutritional status, eating and snacking patterns, physical activity and nutritional knowledge of the adolescents; the responses were statistically analyzed. Prevalence of overweight and obese students was seen in 7.5% of 8th grade students, age range 12 and 13 years and 2.5% students, age range 15 and 16 years respectively. A high correlation was seen between the mother's weight and the student's weight and a moderate correlation between the student's BMI and mother's weight. A clear correlation was seen in type of family, eating habits, visit to fast food chains, eating behavior on the BMI of the respondents. The average nutrient intake was below the recommended dietary allowance for energy, calcium and iron, however it was high for protein and fat. There was no significant association seen between the BMI of the respondents and their sleep patterns. Sedentary lifestyle with decreased physical activity due to lack of infrastructure and proper facilities was alarming. Lack of knowledge and awareness about

obesity, balanced diet, influence of eating habits and importance of physical activity was a clear indication that there is a strong need for continuous nutrition education program.

Abstracts of Post Graduate Students' Research

Department of Nutrition and Dietetics
Project Guide: Dr. **Chaman Farzana**

EFFECT OF CONSUMPTION OF COMMERCIAL PROTEIN SUPPLEMENTS ON ENERGY BALANCE AND ENDURANCE LEVEL OF YOUNG MEN(21 – 29 YEARS) INVOLVED IN REGULAR BODY BUILDING ACTIVITIES

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Abstract: Intermittent bouts of high intensity exercise results in diminished stores of energy substrates, followed by an accumulation of metabolites, promoting chronic physiological adaptations. Due to which gym goers often tend to take excessive quantities of protein supplements to build more muscles quickly and get an appealing physique. The effects of protein supplements on men's endurance have contradicting views. Therefore a study was conducted to see if consumption of these supplements would enhance their endurance performance or not. One hundred control and 39 respondents from experimental group were selected based on the consumption of protein supplements. Anthropometric parameters, nutrient consumption was assessed by using standardized methods. Endurance level and energy expenditure were assessed. The energy expenditure for the different endurance tests was assessed by the use of heart rate monitor. Energy intake of the young men who were using the gym was found to be energy deficient by 26.8 percent as compared to their energy expenditure. The performances in endurance exercises were found to be better among the experimental group. Mean energy expended for pushups, bench press, free squats, plank and muscle grip dynamometry was found to be 3.08, 3.04, 3.22, 2.89 and 2.06kcal respectively. Hence the study implies that protein supplementation has an impact on the upper body and core endurance level of the young adults who were regular users of gym.

Abstracts of Post Graduate Students' Research

Department of Nutrition and Dietetics
Project Guide: Dr. **Sangeeta Pandey**

EFFECT OF BREAKFAST CONSUMPTION PATTERN ON WEIGHT STATUS, DIETARY ADEQUACY AND EMOTIONAL MATURITY IN COLLEGE GOING GIRLS (15-17YEARS)

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Abstract: Breakfast is often linked with nutrient adequacy and weight status. Most studies conducted in developed countries show that regular breakfast consumption is inversely associated with excess weight and directly associated with better dietary and improved physical activity. The main objective of the present study was to see the breakfast consumption pattern among adolescent girls (15-16 years of age) and assess its relation with weight status, other dietary practices, physical activity and mental health. A cross sectional study was carried out on 213 female students from three pre university colleges of Bangalore, India. Data was collected using questionnaire and interview method. Standardized tools such as PAQ adolescent, Perceived Stress and EMS (M. Bhargava) was used to assess mental health. Dietary habits and intake was measured using 3 day 24 hour recall and Snacking habit frequency questionnaire. Height and weight were recorded to calculate BMI. Data analysis was done using SPPS software. The number of regular breakfast consumers (155) was more compared to skippers (58). The rate of breakfast consumption decreased with in socio economic status. Of the study subjects only 15.5% of skippers were overweight which was slightly higher than that of regular eaters but no significant difference was observed. Physical activity was found to be low in both the groups. Snacking frequency was high among skippers. Breakfast adequacy and quality was high among regular eaters of 16-17 year age group ($p=0.014$). Lack of time was the most common reason cited by both the groups for skipping breakfast. Overall macronutrient intake decreased with increase in age and a very small percent of them consumed adequate diets. Protein intake was significantly higher among regular eaters ($p=0.001$). Vitamin A intake was observed to be low in both the groups of people. It was observed that emotional maturity was higher among regular eaters (23.2%) as compared to skippers (15.5%). The stress levels were also high among skippers.

Abstracts of Post Graduate Students' Research

Department of Nutrition and Dietetics
Project Guide: Dr. **Kavitha G. Singh, Myrene D'souza**

EFFECT OF TRADITIONAL PROCESSING METHODS ON THE NUTRITIONAL AND ANTI-NUTRITIONAL QUALITIES OF MUNG BEAN AND HYACINTH BEAN

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Abstract : Legumes are the seeds of the pod bearing plants belonging to the order *leguminosae.* Food legumes are an important part of average human diet as they are one of the major sources of protein, carbohydrate, dietary fibres, vitamins and minerals. In spite of high nutritive values; legumes also contain greater amount of toxic constituents or anti nutritional factors namely tannins, phytic acid, and amylase inhibitors etc which could deplete the bioavailability of the nutrients in them and also cause health problems to the human body. Hence, for human consumption the legumes should be processed by various methods which include soaking, cooking, autoclaving, microwaving, roasting and germination depending upon tradition and taste preferences. Owing to their high beneficiaries and the various health benefits Mung bean **(*Vigna radiate)*** and Hyacinth bean **(*Lablab purpureus)*** were selected and subjected to the processing methods. Nutrient content with regard to ash, moisture, fiber, lipid, protein, carbohydrate and anti nutritional factors such as phytic acid, tannins and α-amylase activity of raw (control) and processed samples were determined using extraction and estimation methods. Best processing method that retains the nutrient content and significantly ($p<0.05$) decreases the ANF in seeds would help to increase the bio availabilty and the food security of the community.

Keywords: Legumes, mungbean, hyacinth bean, processing methods, nutrient content, anti nutritional factors, phytic acid, tannins, α-amylase inhibitors.