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Role of Teacher, Principal, Management in quality management in higher education.

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Teachers are the nation builders. They have the capacity to mold their students for betterment of the nation. M. K. Gandhi said 'the destiny of a nation is shaped in the classroom'. Quality education with accountability and responsibility is the dire need of the today's education system. All the stakeholders in higher education the policy makers, the college management, the principal, the teachers, the students, the alumni plays important role in ensuring the quality in higher education. Of these stakeholders' teachers, principals and management plays crucial role in ensuring the quality education. 'NAAC' is an autonomous body who evaluate and ranks the status of higher education in India. It has laid down certain criterion in assessment and accreditation process. The present paper focus on the role of teacher, principal and management in quality management in higher education. To avoid the repetition of these terms, in many places the word college (consists of Management, Principal and Teacher) is used.

The first criterion where teachers and principals has less scope to make changes in syllabi laid down by the parent university. But they can start short duration certificate or add-on courses such as soil testing, mushroom cultivation, tally course, maintaining of aquarium, soft skill and personality development programs provides training, skill and upgrade the knowledge of the student. After completing these courses student can start their own business and become independent. Teachers should make the provision of co-curricular activities in variety of spheres

aims at self-development and increasing values like tolerance, co-operation, courage, helping attitude, helping for others etc. Teachers and principal organize special lectures on carrier guidance. Also the organize guestlectures on various subjects to enhance their knowledge. Teachers should actively involve in curriculum planning and implementation. Teachers have to participate in workshops on curriculum designing. Besides academic excellence, emphasis should be laid upon shaping students into sensitive and responsible human beings. Strong interdisciplinary approach, student centric teaching methods and student feedback insures quality of education and enhancement of curricular aspects.

Realizing the importance of institutional responsibility in the teaching, learning and evaluation process, the teachers, principal and management gears up adequate intrinsic mechanisms and adopts new pathways in achieving the goals of academic excellence. The college consistently maintains healthy practices in the area of teaching learning and evaluation. College take care of the students every stage of teaching learning and evaluation process till the learners pass out successfully from the institution. Teachers should fallow the academic calendar of the university and should develop the teaching plan for conducting various academic activities in proper time and order. The principal of college should keep constant vigil on the academic process and review the whole things from time to time. The college has to set up well equipped computer lab with internet facilities for the teachers and students. The college has to make provisions of ICT for teaching-learning process. Tests, tutorials, seminars, and group discussions, project works etc are has to be arranged to assess the performance and academic progress of the students.

Research, consultancy and extension are three major extents of higher education. To promote the research activity among the faculty and students, research committee has to be established in the college. The management should keep the positive attitude in encouraging the teachers and students to pursue research. Management should make provisions of providing some seed amount to encourage and cultivate the research culture among the staff and students. Teachers should increase the students to take short research projects on available resources.

Management and principal should avail leaves to teachers for their research work to carry-out. Teachers introduce their students to carry research projects based on the local need and advantage.To develop the research culture among the student management and principal of the college should start consultancy services as well as extension activities. The MOUs can be established between industry and college to have collaborative projects. A lot of extension work is done in the areas of health and environment. As a part of extension service the college can adopt nearby village. Special mention must be made of the activities in the area of community development, health and hygiene awareness, AIDS awareness, medical camps, blood donation, women development, cleanliness drives, tree plantation etc.

To foster academic growth and to meet the globally competitive market, the college has to make provisions to maintain and upgrade its infrastructure. The entire space of the college has to be utilized. The college buildings contains the classroom, laboratories, library, reading room, administrative office, staff room, principal cabin, NSS office, IQAC office, ladies room, conference hall, examination office etc. other facilities like canteen, Gym, health center should be located in the campus. The office has to be well furnished having corporative look, sufficient power backup provided by generator and invertor helps uninterrupted academic activities. The college library should be spacious having good number of reference books,text books and journals and English and national and local newspapers. The college have a fairly good physical facilities for sports. The college should have centralized computer facility with computers, printers, broadband connection. The college have LCD and other technological aids for assisting in teaching. These all facilities has to be developed by college principal and management.

Educational institution, with its mechanism of student support and progression not only educates the students but also grooms them into well rounded personalities. The college publish its handbook/prospectus annually providing all the information about the college and courses to make aware of the strength of the college. The college provides the supports to its students belonging to SC/ST, OBC, physical challenged and economically backward students. The college attracts students to participate in various co-curricular and extracurricular activities like

NSS, NCC, cultural and sport etc. providing necessary facilities, adequate funds and special guidance and so on. The college should have a carrier counseling and guidance cell to guide the student in choosing career and various psycho-social matters of the students, The college constitute anti-woman harassment cell to ensure the safety and dignity of female students along with gender sensitization programs. The institution take necessary steps if incident pertaining to mental and sexual harassment take place. The teachers in the college provide financial assistance to the needy students. College also assists the economically backward students through earn and learn scheme. College can boast of providing all the essential assistance to the needy students.

The institute management consists of president, vice-president, secretary and treasurer along with the members the board of management looks after the overall policy decisions and financial matters of the college. According to academic requirements of the college principals forms several committee. According to areas of interest and individual strength of members, responsibilities are assigned. The leaders take innovative decisions to start various value based self-finance courses which makes the student self-employable. Academic progress is impossible without administrative advancement. The college should arrange meetings to interact with the stakeholders at various occasions. The college welcomes suggestions and make improvements wherever required. For capturing the recent developments in the field of education and research teaching and non-teaching staff members are to be encouraged to attend various programs. The IQAC of the college should be very keen to observe the changes which are taking place globally. IQAC should conduct meetings of alumni and parent teacher interaction regularly which helps the college to receive feedback from society as well as from students for further improvements

In the various functions of the college, the core values of NAAC has to be reflected for realizing the vision of making quality assurance an integral part of the functioning of an institution of higher education. It also collaborates with the stakeholders for assurance and sustenance of quality in higher education. All the five core values of NAAC i.e. national development, fostering global competencies among students inculcating a healthy value system,

promoting the use of technology and quest for excellence are sought to be promoted by the various functions of the college.

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"नॅक मुल्याकनात विदयार्थ्यांची भुमिका"

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राष्ट्रीय शैक्षणिक धोरण व कृती कार्यक्रम 1986 च्या निर्देशानुसार व सर्वोच्च न्यायालयाच्या आदेशानुसार नॅक या संस्थेची स्थापना करण्यात आली नॅक हे राष्ट्रीय मुल्यांकन अधिमान्यता समिती असे पुर्ण रुप आहे.संस्थेची स्थापना 16 सप्टेंबर 1994 रोजी विदयापीठ अनुदान आयोगाने केली असुन ही एक सवायत संस्था आहे विविध शैक्षणिक संस्थामधील महाविदयालये व विदयापीठे यांच्या गुणवत्तेची सत्य पडताळणी करुन त्यांचे यथायोग्य मुल्यमापन करणे त्याचप्रमाणे त्या संस्थेला योग्य तो दर्जा प्रदान करणे हे नॅक चे मुख्य उदिष्ट आहे विदयापीठ अनुदान आयोग (UGC) व अखिल भारतीय तंत्रशिक्षण मंडळ (AICTE) या संस्था च्या अंतर्गत येणा-या महाविदयालयांनी स्वतःचे नॅक द्वारे मुल्यमापण करुन किमान दर्जा मिळवणे आवश्यक आहे शैक्षणिक संस्थांचे मुल्यमापन करताना नॅक खालील बाबीवर भर देते.

1) अभ्यासक्रम विषयक बाबी
2) अध्यापन व अध्ययन मुल्यमापन
3) संशोधन सल्लामसलत व विस्तार
4) पायाभुत सुविधा व अध्ययन संसाधने
5) विदयार्थी मदत व त्यांची प्रगती
6) संघटन व्यवस्थापन व नेतृत्व
7) पोषक प्रघाती

या सर्व शैक्षणीक घटकांचे मुल्यमापन नॅक करते या मुल्यांकनामध्ये विदयापीठ, स्वायलत महाविदयालये व सलग्नीत महाविदयालये या सर्वांना 1000 गुणाचे मुल्याकण वरील 07 घटकांच्या अधारे केले जाते ज्यामध्ये महाविदयालयांना गुणानुक्रमे खालील दर्जा प्राप्त होतो

CGPA	Grade
3.51-4.00	A++
3.26-3.50	A+
3.01-3.25	A
2.76-3.00	B++
2.51-275	B+
2.01-2.50	B
1.51-2.00	C
1.50 पेक्षा कमी	D

मुल्यांकित महाविदयालयाला 1.50 पेक्षा कमी CGPA असेल तर ते महाविदयालय मुल्यांकीत महाविदयालय राहणार नाही. सुधारीत मुल्यांकन पदधती जुलै 2017 नुसार नॅक चे मुल्यांकण पारदर्शक व डिजीटल पद्धतीने केले जाणार असुन या मध्ये महाविदयालयाशी संबंधीत विदयार्थी, माजी विदयार्थी संबंधीत व्यक्ती यांच्याकडुन ऑनलाईन पद्धतीने माहिती जमा केली जाणार आहे ज्याला 70 टक्के भर असणार आहे तर नॅक मुल्यांकणावेळी येणाऱ्या सदस्याकडुन 30टक्के गुण दिले जाणार आहेत यामुळे नॅक चे मुल्यांकण हे अत्यंत पारदर्षक होण्यास मदत होईल.

नॅक व विदयार्थी

सध्य स्थीथीत असणारे नॅक मुल्यांकण हे विदयार्थी विमुख आहे कारण 70 टक्के गुण हे विदयार्थी समाधान सर्वेक्षणातील माहितीवर अधारीत आहे यामुळे नॅक च्या विविध 07 घटकातील सर्वच निर्देष विदयार्थी दृष्टीने आहेत. ज्यावेळी स्व.अध्ययन अहवाल (SSR) दिला जातो त्यावेळी बरीच माहिती ही प्रत्यक्ष विदयार्थीला जोडणारी व अप्रत्यक्षरित्या विदयार्थी केंद्रीभुत आहे यामुळे प्राचार्य कॉलेज व्यवस्थापन या घटकापेक्षा नॅक ने विदयार्थी हाच शिक्षणाचा केंद्रबिंदु केल्याचे दिसुन येते.

विदयार्थी संख्या, विषय विविधता, विषय निवडीत पर्याय, विदयार्थी गळती, अध्यापन व अध्ययन पद्धती, अध्यापनात दृक–श्राव्य माध्यमाचा वापर , मुल्यमापन पद्धती, विद्यार्थी उत्तीर्ण प्रमाण व शिक्षा– सांफल्य व विदयार्थी समाधान सर्वेक्षण या सर्व घटकांचा समावेश नॅक ने आपल्या दुसऱ्या घटकात केला आहे ज्यासाठी 1000 पैकी 350 गुण सलग्नीत महाविदयालयास तर 300 गुण

स्वायत्त महाविदयालयास मिळणार आहे त्यामुळे सलग्नीत महाविदयालयाला 35टक्के गुण या घटकाअधारे प्राप्त करता येऊ शकतात तर नॅकच्या 5 व्या घटकांत विदयार्थी सहाय्यता व विदयार्थी प्रगती हा घटक समाविष्ठ आहे या घटकासाठी सलग्नीत महाविदयालयाला 130 गुण मिळणार आहे. ज्यामध्ये विदयार्थी सहाय्यता, विदयार्थी विकास, विदयार्थचा सहभाग व माजी विदयार्थी संघटन हे घटक समाविष्ठ आहेत एकंदरीत दुसऱ्या व पाचव्या विदयार्थी घटकासाठी 480 गुण सलग्नीत महाविदयालयास भेटतात.

विदयार्थीशी सबंधीत या घटकांसाठी महाविदयालयातील प्रत्येक विभागाने

1) विदयार्थी यादी (पुर्ण माहितीसह)
2) विदयार्थी निकाल (टक्केवारीसह)
3) विदयार्थ्यांची अंतर्गत परिक्षा पद्धत व मुल्यमापन
4) शैक्षणीक व औदयोगीक सहल
5) विदयार्थी दत्तक योजना
6) विदयार्थी मंडळ व त्या अंतर्गत कार्यक्रम
7) विदयार्थी प्रकल्प अहवाल व संशोधन अहवाल
8) माजी विदयार्थी व त्यांची सध्य स्थीती
9) वार्षिक नियोजन व वेळापत्रक
10) विदयार्थ्यांना विषय निवडीचे पर्याय

अशा भागामध्ये विभागणी करुन अदययावत नोंदी ठेवाव्यात एकंदरीत विदयार्थी हा अध्यापनाचा केंद्रबिंदु असल्याने केवळ उच्च शिक्षण देणे इतकाच उद्देश नॅक ने आपल्यासमोर ठेवला नसुन विदयार्थ्यांचे उज्जवल भविष्य घडवणे विदयार्थ्यांना स्वयंरोजगार, उदयोग याकडे वळवणे यामुळे एक सशक्त राष्ट्र उभारणी होण्यास मदत होईल या दृष्टीने विदयार्थी केंद्रीत नॅक ची रचना करण्यात आली आहे.

संदर्भ

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Effect of Wheatgrass Powder on the Performance of 3000 Meter Runner Junior College Level Boys from Pune

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ABSTRACT-

Wheatgrass has many benefits such, as the wheatgrass have many types of vitamins, minerals, amino acid and enzymes presents in it. It helps in the metabolism of the human dietary system as per experiment the 3000 metr. Runner required lot of nutritionalrequirement. This can be replaced through wheatgrass powder. The object study of comparison 50 metr.dash, bleep test, 3000 metr. running between experimental group and control group.The hypothesis done where not significantly improve the performance of 50 meters dash, bleep test and 3000 metr.running test. The method use experimental methodology.in this study the two groups where in use this are experimental group and control group. In which the pretest and posttest where taken. By using this purposive sampling technique 30 students were selected 3000m boy's athletes from Azam Campus Pune. In the study the three test where in use 50 metr. dash, bleep test, 3000 metr. Running.The subject's score of the tests is analyzed using different statistical technique such as mean, median, Standard Deviation, and two- tailed independent samples t-test to examine the difference between the scores of experimental group and control group. After concluding the entire test the result found was negative the researcher concluded the study stating that there will be no effect of consumption of wheatgrass powder on the performance of athletes from Pune city.

Keywords: -Wheatgrass, Performance, 3000 Meter Runner

Introduction -

In India name of wheat grass is not much popular, but the country like United States of America, Canada, Germany and many European countries are using it since 1940. The

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consumption of wheatgrass in the western world began in the 1930's as a result of experiments by Charles F. Schnabel and his attempts to popularize the plant. He was an agricultural chemist and conducted many experiment on it. He did his research at outdoor grown of experiments on it. He did his research at outdoor grown of wheatgrass in Kansas (U.S) and made it popular in 1940.

Wheatgrass is naturally rich source of vitamin, minerals, Amino acids, Enzymes, chlorophyll and dietary fiber. Wheat grass is said to contain more than 90 different nutrition substances and 19 amino acids including 9EAA (essential amino acids) Wheatgrass powder is highly in dietary fiber and thus helps to maintain blood sugar level, Cholesterol level, prevents constipation and cancer. Helps to strengthen natural immune (resistance) system. Helps in detoxification and thus reduces stress, tension, foul odors of breath and sweat. Supplements intake of dietary fibers which helps control blood sugar, cholesterol level and prevent constipation. Only 1 kg of wheatgrass can supply nourishment equal to the obtained from 23 kg of carefully selected vegetable.' Wheatgrass is obtained by allowing the sprouted organic wheat grains to grow up to a height of about 6 inches till the green leaf begins to form stem. Wheatgrass powder contain different variety of nutrients such as, vitamin like A,B,C,E. Enzymes (catalyst), Chlorophyll, Dietary fiber, proteins and Amino acids, minerals like Calcium, iron, sodium, potassium, magnesium, Zinc, phosphorus, selenium, etc.

3000 meter run requires lot of cardiovascular endurance, good level of body metabolism, water balance in body and intake of good vitamins and nutrition. Researcher conducted study on 3000 meter runner as this event requires lot of nutritional requirement which can be replaced through wheatgrass powder.

Objectives of the study

1. To determine the effect of wheatgrass powder on the performance of 3000 meter run on Experimental group.
2. To compare the performance of 50 meter dash between experimental group and control group.

.Research methodology

Experimentalmethodology adopted is given. On the basis of the objective of the study and as per the formulated hypothesis, research design adopted by the researcher, data collection procedures is provided in details in the following sections.

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Design of the study

Pretest – posttest equivalent group design (Quasi experimental) was employed to conduct the present intervention.The study consisted of one control group and one experimental group. The experimental group is given a nutritional treatment of wheat grass powder as well as training. Whereas, the control group was given training without any nutritional treatment of Wheatgrass powder. The research design is as follow:

R: O1-X-O3

R: O2-C-O4

R - is a Randomization

X - is a treatment given to the experimental group

C - is a control group

O1: is a pre-test conducted on experimental group

O2: is a pre-test conducted on control group

O3: is a post test conducted on experimental group

O4: is a post test conducted on control group.

Population

Boys Athletes from Pune city are considered as the population for this study.

Out of this population, the study is delimited to3000m athletes only.

Sample

The 3000m boy's athletes from Azam Campus Pune are considered as sample for this study. The purposive sampling technique is used for selecting the sample. Thirty 3000m boys' athletes from Azam Campus Pune are selected as the sample.

Variables

The following dependent and independent variables were chosen to collect the data during pre-test and post-test.

- **Dependent variables**

  In the present study, the 3000m boy's athletes from Azam Campus Pune are considered as dependent variable.

- **Independent variables**

  In this present study, nutritional wheatgrass powder given to the 3000m boys athletes fromAzam Campus Pune are considered as independent variables.

Data collection tool

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In this present study, the researcher intends to conduct below mentioned tests to examine the nutritional effect of the wheatgrass powder on the performance of 3000m boy's athletes from Azam Campus Pune.

Sr.No.	Name of the Test	Recommended measures
1	3000 meter run	To measure the cardio- respiratory fitness.
2	Bleep test	To measure aerobic fitness or VO2 max.
3	50 meter Dash	To measure the maximum speed.

Statistical tools

The subject's score of the tests is analyzed using different statistical technique such as mean, median, Standard Deviation, and two- tailed independent samples t-test to examine the difference between the scores of experimental group and control group.

Analysis

14.1 Descriptive Statistics for Pretest on Experimental & Control group

Measures	50 m dash		Bleep test		3000 m Run	
N= 15 each	Ex Gr	Control Gr	Ex Gr	Control Gr	Ex Gr	Control Gr
Mean	8.78	7.14	43.07	57.13	20.35	20.42
SD	0.76	0.43	11.17	14.98	1.41	2.01
Skewness	0.14	1.99	0.01	0.43	0.08	0.50
Kurtosis	1.33	6.75	1.33	0.06	0.90	0.48
Minimum	7.62	6.72	25	28	17.1	17.6
Maximum	7.62	8.72	61	84	23.28	24.24

14.2 Descriptive Statistics for posttest on Experimental & Control groups

Measures	50 m dash		Bleep test		3000 m Run	
N= 15 each	Ex Gr	Control Gr	Ex Gr	Control Gr	Ex Gr	Control Gr
Mean	8.69	7.27	46.03	57.6	19.42	20.46
SD	0.79	0.44	11.22	12.11	1.61	1.41
Skewness	6.07	1.47	0.21	1.06	1.41	0.31
Kurtosis	1.12	4.66	1.12	0.43	1.12	1.08
Minimum	7.4	6.66	29	30	17.1	17.21
Maximum	10.0	8.56	65	70	23.28	22.86

14.3 Difference in the 50 m Dash performance

	T-Test For Equality Of Means				
50 Meter Dash test	T	df	Sig. (2-tailed)	Mean Difference	SEM
Equal variances assumed	0.78	28.00	0.44	0.05	0.07
Equal variances Not assumed	0.78	26.89	0.44	0.05	0.07

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The table 4.2 shows the difference in 50 meter dash performance of control and experimental groups at the end of the intervention. The T value .782 for degree of freedom 28 is not significant at 0.05 levels. Hence it is said that consumption of wheat grass does not have any significant effect on performance of 50 meter dash.

Difference in the Bleep test performance

	T-Test For Equality Of Means				
Bleep Test	**T**	**Df**	**Sig.(2-tailed)**	**MeanDifference**	**SEM**
Equal variances assumed	1.73	28.00	0.09	2.53	1.46
Equal variances not assumed	1.73	19.47	0.10	2.53	1.46

The table 4.3 shows the difference in Bleep test performance at the end of the intervention. The T value 1.731 for degree of freedom 28 is not significant at 0.05 levels. Hence it is said that consumption of wheat grass does not have any significant effect on performance of bleep test.

Difference in the 3000 meter performance

	T-Test For Equality Of Means				
3000 m	**T**	**df**	**Sig. (2- tailed)**	**Mean Difference**	**SEM**
Equal variances assumed	2.15	28.00	0.14	0.99	0.46
Equal variances not assumed	2.15	22.22	0.14	0.99	0.46

The table 4.5 shows the difference in 3000 meter performance at the end of the intervention. The T- value 2.150 for degree of freedom 28 is not significant at 0.05 level. Hence it is said that consumption of wheat grass does not have any significant effect on performance of 3000 meter test.

1. Conclusion

Since the findings for consumption of wheatgrass powder on the performance of 3000m male runners from Azam Campus aging between 16-18 years is negative, the researcher concluded the study stating that there will be no effect of consumption of wheatgrass powder on the performance of athletes from Pune city.

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POST-MODERN APPROACH OF NAYANTARA SAHGAL: A FEMINISTIC STUDY

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ABSTRACT

Nayantara Sahgal is one of the great Indian women novelists writing in English. She began writing since her childhood and became a professional writer in the post-Independence years. Her novels deal with men and women, especially women struggling against oppression and injustice heaped upon them in the name of tradition and culture. Nayantara Sahgal believes that it is not a serious moral offence in a woman to break away from the "sacred" marriage bond, if she finds the shackles too oppressive to the growth of her inner self. She finds that a woman's duty to be sincere to her inner self is far greater and urgent than to be for her family and society. Nayantara portrays the inalienable right of freedom in women in many of the characters in her novels, such as Simrit in Storm in Chandigarh, Saroj in The Day in Shadow and Rashmi in Rich Like Us. Sahgal has introduced a considerable number of autobiographical elements in her novels. Her work ranges from factual and emotional autobiography to fictionalized autobiography. Sahgal is a reformist. Her image of the New Indian Woman is an amalgamation of the best of the old and the best of the new dispensations. She has called her heroines 'modern Sitas'. Perhaps what she implies is that the modern Indian woman, while asserting her new social self, must draw her strength from within as Mata Sita did to face without fear the advances of Ravana. As a writer with feminist concerns, Nayantara Sahgal is a progeny of the tradition where in power it is defined as goddess 'Saki' a female symbol. Her fictional world is busy by political leaders, business tycoons, foreign advisors, upper class people, journalists and highly qualified persons like ambassadors and ministers.

Nayantara Sahgal is one of the great Indian women novelists writing in English. She began writing since her childhood and became a professional writer in the post-Independence years. Her novels deal with men and women, especially women struggling against oppression and injustice heaped upon them in the name of tradition and culture. Nayantara Sahgal believes that it is not a serious moral offence in a woman to break away from the "sacred" marriage bond, if she finds the shackles too oppressive to the growth of her inner self. She finds that a woman's duty to be sincere to her inner self is far greater and urgent than to be for her family and society. Nayantara portrays the inalienable right of freedom in women in many of the characters in her novels, such as Simrit in *Storm in Chandigarh*, Saroj in *The Day in Shadow* and Rashmi in *Rich Like Us*. Sahgal has introduced a considerable number of

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autobiographical elements in her novels. Her work ranges from factual and emotional autobiography to fictionalized autobiography.

Though she works on various themes, here concerns are the pathetic condition of women in the patriarchal society. Nayantara Sahgal's leanings towards feminism even though mild, are quite marked in her novels *Storm in Chandigarh* and *A Situation in New Delhi*. Sahgal has a central woman character that gradually moves towards an awareness of her emotional needs. Sahgal's novel reads like commentaries on the political and social turmoil that India has been facing since independence. Sahgal's feelings for politics and her command over English are rather more impressive than her art as a novelist. She is a novelist as well as a successful political columnist for different newspapers. Her writing is generally characterized by simplicity and boldness. Her writing abounds the latest political ups and downs with a tinge of western liberalism. Her novels portray the contemporary incidents and political realities saturated with artistic and objectivity. All her major characters of the novel are drawn towards the vortex of politics. Besides politics, her fiction also focuses attention on Indian woman's search for sexual freedom and self-realization. As a women novelist, Sahgal recognizes that her primary obligation is that of advocating the emancipation of women. She has probed deep into the female psyche in her novels. She describes in her novel how women exploited even during the modern times by both the individuals and the society.

Among the women novelists of Indian Writing in English, Nayantara Sahgal emerges as a powerful voice to challenge and question the 'received' versions of history. She not only calls the officially-ordered 'histories' into question but also exposes the male-dominated and patriarchal power-structures behind them. In all her works, there is juxtaposition of two worlds: the personal world of man-woman relationship and the impersonal world of politics. She dwells upon contemporary events in her novels like *Storm in Chandigarh, Rich Like Us* and *A Situation in New Delhi*. Her novels *Plans for Departure* and *Mistaken Identity* were a creative vision towards the happenings of India before Independence. The influence of Pandit Nehru and Mahatma Gandhi on Nayantara Sahgal is clear. She has offered a fresh insight into Gandhism, Nehruism and their impact on the evolution and progress of India.

In the novel *Storm in Chandigarh*, Sahgal narrates how the attitude of dictatorship destroys harmony of marital status. Marriage which strongly needs love and faith of both the partners, can breakdown also in presence of doubt and frustration. Nayantara Sahgal's fiction also centers on the political history of India and how it has affected the perceptions of ordinary men and women. Her main interest remains to raise the questions of women. So the basic purpose of envisioning India's history in her fiction rests on her concerns with the social and individual problems of women and their search for identity. Sahgal herself has overcome her problem of identity-crisis through her writing. Husband-wife alienation resulting from lack of communication, East-West encounter, extra-marital relationship, existentialist problems and temperamental incompatibility form the major themes in Sahgal's novels. In most of her novels, Sahgal portrays women who herald a new morality — a morality not confined to physical chastity. It demands accommodation of individual longings for self-fulfillment. It seeks consideration not for just the deed but for the heart and feeling.

Nayantara Sahgal shows women suffering in marriage-life and then deciding to come out of the suffocating bondage by preferring for divorce. She depicts her women deciding to prefer for divorce rather than live a stifling life of injustice and agony. Her women like Saroj, Simrit,

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Rashmi and Anna all leave their husbands or break the marriage which does not allow them to be free and to live life in their own way. Women who feel frustrated either because of marital disharmony or loneliness in life is shown to indulge in social or religious activities. For example, Maya in Sahgal's *A Time to be Happy* is a woman who tries to submerge her unhappiness and dissatisfaction in social work and religion. Sahgal is deeply concerned with the failure of marital relationships and the loneliness of living. Hence, most of her women remarry. Most of her couples seem to be happy and contented. But they often experience loneliness and complain of silences in marriage. *A Time to be Happy* explores women's search for individuality both within marriage as equal partners and without it as individual. Maya is represented in contrast to the traditional ideal women. The narrator's mother supports her husband in all his views and enterprises. Like any true Hindu woman, she believes that 'his concern was with God and hers with God in him'. Lakshmi, Govind Narayan's wife, also represents herself as a Hindu woman.

Sahgal has been accused of relating her 'personal problems' in her works. The word 'autobiographical' is often applied to her works by way of adverse criticism. No doubt, there are shadows of real life characters and incidents in her novels. For example, *The Day in Shadow* deals, as she herself says in an interview, with her 'own life's experience'. She asserts that everything, which happens in a writer's life, is bound to colour her fictional works. Her work ranges from factual and emotional autobiography to fictionalized autobiography. Her own life and circumstances are relevant material in a consideration of her novels. She excels in delineating political, psychological and personal turmoils and studies them with keen perception and deep insight. Her concern with political themes and issues of current importance has been readily recognized. Her novels present a chronological account of Indian politics from the last phase of the freedom struggle to the breakdown of democracy in mid-seventies when the Emergency broke out.

Her first novel, *A Time to be Happy* (1958) is a political novel, a chronicle of the Indian National Movement, covering a span of sixteen years from 1932 to 1948. The narrative in its meandering course creates a society marked by segregation of communities (p.50), discrimination against Indians (p. 55), servility among the rich and well-set people (p.161). *This Time of Morning* (1965) is set in post-Independence India and it sets out to catch the dilemma of a country passing through the birth pangs of evolution. It describes the tension between tradition and modernity. *Storm in Chandigarh* (1968) traces the growth of abrasive political culture percolating upwards from the states to the centre. The reference to "the Congress cracking up" (p.24), "the clash of personalities" (p.24) with "no issues left, only squabbles" (p.24) gives the novel a firm grounding in the post-Nehru phase. *The Day in Shadow* (1971) brings a more complete picture of the political scenario of the late sixties. It depicts the post-Nehru scene with "more fever than calm" (p. 149) in Delhi, "the belligerent new politicians" (p.3) coming to the fore, the bureaucracy shedding its anonymity to assume a vague unobtrusiveness.

A Situation in New Delhi (1977) is set ostensibly in the sixties. But in its capturing of the desperation and the urgency of the situation, it suggests the immediate pre-and post-Emergency political scene. *Rich Like Us* (1983) takes the story farther in the same setting. Here it is one month after the declaration of the Emergency. Sahgal in this novel uses as the

backdrop Mrs. Indira Gandhi's imposition of Emergency on the nation as a culmination of the arbitrary political supremacy enjoyed by certain groups in contemporary India where corruption, sycophancy, injustice and unethical entrepreneurship thrived.

Through her novels, Nayantara Sahgal tries successfully to inculcate an awareness of the problem they are confronted with. In her novels, the women protagonists try their level best to achieve that freedom within their limited world of patriarchy, howsoever pulled they are at times by the cords of traditional values. They are never at ease in the male dominated world. In their outlook they are egalitarians asserting equality of mankind. Her vision is a kind of liberal humanism based on the principles of egalitarianism.

Sahgal treats woman as man's equal. She is all for emancipation of women from traditional shackles of slavery, confined within the forewalls of their homes. Her fictional women assert their individual identity, striving towards freedom, towards social justice against all kinds of torture, towards taking self-decision in exercising their free-will. Her fictional world creates the awareness among the Indian reading public about the various strictures which suppress the Indian woman. As a feminist, she, thus, has given a new dimension to the function of fiction in society.

As the title of the third novel, *Storm in Chandigarh* (1969) suggests, the macrocosmic political storm in Chandigarh reflects the microcosmic storm or conflicts of individuals in their marital relationships. Saroj becomes a victim of male tyranny. Inder belongs to the "he-man school" (p.166). The fourth novel *The Day in Shadow* (1971) unravels the plight of an Indian woman Simrit. She is used as a convenience for tax purposes by her husband even after he has divorced her. It reflects the inner crisis of the Indian woman who is a journalist. She desires to be understood in her marital relationship but she is unable to receive such an understanding from domineering and insensitive husband Som who hankers after money, power and pelf. It is this desire which is responsible for making her "separate, excluded, rebellious" (p. 90) when Som compels her with sexual urgency.

In *A Situation in New Delhi* (1977), Priya Jaipal, nicknamed as Skinny, is the New Woman who is aware of herself. A believer in the concept of involvement, Skinny participates whole-heartedly in whatever she undertakes. In counter to Priya Jaipal who is committed to the act of living, Devi Rishad's mother is conventional. The treatment of the theme of the New Woman in this novel is necessarily scanty because the author is more interested in the political situation in New Delhi during the period of the Naxalite movement.

In her sixth novel, *Rich Like Us* (1983), Sahgal uses as the backdrop Mrs. Indira Gandhi's imposition of Emergency on the nation as a culmination of the arbitrary political supremacy enjoyed by certain groups in contemporary India where corruption, sycophancy and unethical entrepreneurship thrived. It is actually the story of two women—Rose, a cockney memsahib, and Sonali, a civil servant-each in her own way representing the New Woman. In the later novels of Nayantara Sahgal, there is an increasing political awareness among the women characters. *Plans for Departure* (1986) presents Stella who deserts Henry because of her anti-imperialist stance. *Mistaken Identity* (1988) enacts a transformation of cultural identity through the story of Bhushan. In negotiating through the labyrinth of memory, of silence, of

familial and national histories, *Mistaken Identity* demonstrates the immanence of the secular and feminist vision that is its subject and its goal.

Women in the novels of Nayantara Sahgal are liberal and unconventional. The chief protagonist is a thinking woman striving for an individual, independent personality. Her fictional world consists of two types of women characters. The first group consists of women who are happy in the confines of Hindu orthodoxy, and the other of those with a strong sense of individual freedom gifted with an analytical mind but shuttling between traditional and modern values. In the first group fall women like Lakshmi, Devika and the narrator's mother in *A Time to be Happy*. Mira of *This Time of Morning*, and Gauri (apart from her sexual freedom) in *Storm in Chandigarh*. Mona in *Rich Like Us* and Prabha in *A Time to be Happy* are victims of bigamy, but still they conform to the ideals of subdued womanhood.

In the second group, fall Rashrni of *This Time of Morning*. Saroj of *Storm in Chandigarh*, and Simrit of *The Day in Shadow* who are examples of 'New Women', though the process of awakening in them is quite slow and the revolt comes after much retrospection. Saroj in *Storm in Chandigarh* refuses to succumb to socially acceptable norms of feminine behaviour and craves to establish her individual identity.

Sahgal is a reformist. Her image of the New Indian Woman is an amalgamation of the best of the old and the best of the new dispensations. She has called her heroines 'modern Sitas'. Perhaps what she implies is that the modern Indian woman, while asserting her new social self, must draw her strength from within as Mata Sita did to face without fear the advances of Ravana. As a writer with feminist concerns, Nayantara Sahgal is a progeny of the tradition where in power it is defined as goddess 'Saki' a female symbol. Her fictional world is busy by political leaders, business tycoons, foreign advisors, upper class people, journalists and highly qualified persons like ambassadors and ministers.

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HPTLC METHODSFOR SIMULTANEOUS ESTIMATION OF RILPIVIRIN

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Abstract : A chromatographic method based on the HPTLC with low standard deviation and % RSD with high degree of accuracy and precision, for the estimation of Rilpivirin has been developed. Recovery studies of the Rilpivirin drug have been performed on samples with an extra 80, 100, and 120% of the drugs from standard solutions of Rilpivirin. Acid, base and hydrogen peroxide-induced degradation studies have been carried out on Rilpivirin to ensure the stability of the proposed chromatographic method. It has been demonstrated that the proposed method is accurate, precise and selective and can be employed successfully for the estimation of Rilpivirin.

Keywords: Rilpivirin, HPTLC andDensitogram.

I. INTRODUCTION

Chromatography is a laboratory method for analysis of chemicals to determine purity, impurities, similarity, identification etc. Chromatography today is a science with the help of different instruments, materials, techniques, as would be required to analyse hundreds of thousands of chemicals. The prominent chromatography methods are High Performance Liquid Chromatography (HPLC), High Performance Thin Layer Chromatography (HPTLC), Gas Chromatography (GC) etc.

High Performance Thin Layer Chromatography (HPTLC) is a powerful method equally suitable for qualitative and quantitative analytical tasks. Applications of HPTLC such as identification and quantitation of constituents, impurities, active substances, process development and optimization, process monitoring, and cleaning validation have been demonstrated. HPTLC has been reported to provide excellent separation, qualitative and quantitative analysis of a wide range of compounds, such as herbal and botanical dietary supplements, nutraceuticals, traditional-style medicines, traditional Chinese medicines and Ayurvedic (Indian) medicines and determination of radiolabeled substances in chemical, biochemical, biological, pharmaceutical, and medicinal samples. HPTLC is superior to other analytical techniques in terms of total cost and time for analysis. It is an offline process in which various stages are carried out independently. Important features of HPTLC include the ability to analyze crude samples containing multi-components, application of an unlimited number of sample, and a series of standards using the spray-on technique, choice of solvents for the HPTLC development as the mobile phases are fully evaporated before the detection step, processing of standards and samples identically on the same plate leading to better accuracy and precision of quantification, different and universal selective detection methods, and in situ spectra recording in sequence to obtain positive identification of fractions, storage of total sample on layer without time constrains[1].

HPTLC-Methodology:

Set the analytical objectives first that may be quantification or qualitative identification or separation of two components/multi-component mixtures or optimization of analysis time before starting HPTLC. Method for analyzing drugs in multi-component dosage forms by HPTLC standards primary knowledge about the nature of the sample, namely, structure, polarity, volatility, stability, and the solubility parameter. Method development involves considerable trial and error procedures. The most difficult problem usually encountered is to decide with what kind of mobile phase. Selection of stationary phase is quite easy, silica gel will be the first choice which is reasonable and nearly suits all kind of drugs. Mobile phase optimization is carried out by using three level techniques. First level involves use of neat solvents and then by finding some such solvents which can have average separation power for the desired drugs. Second level involves decreasing or increasing solvent strength using hexane or water for respective purposes. Third level involves trying of mixures instead of neat solvents from the selected solvents of first and second level which can further be optimized by the use of modifier like acids or bases.

Analytes are detected using fluorescence mode or absorbance mode. But, if the analytes are not detected perfectly than it needs change of stationary phase or mobile phase or need the help of pre or post chromatographic derivatization. Optimization can be started only after a reasonable chromatogram which can be done by slight change in mobile-phase composition. This leads to a reasonable chromatogram which has all the desired peaks in symmetry and well separated. Procedure for HPTLC method development is outlined as follow (Figure 1).[2]

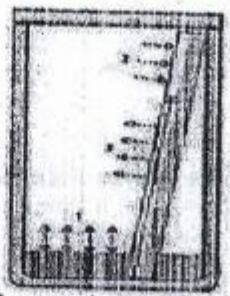


Figure.1. process in developing chamber

Stationary Phase:

HPTLC is the most advanced form of modern TLC. It uses HPTLC plates featuring small particles with a narrow size distribution which results in homogenous layers with a smooth surface to be obtained. HPTLC uses smaller plates (10 × 10 or 10 × 20 cm). HPTLC plates provide improved resolution, higher detection sensitivity, and improved in situ quantification and are used for industrial pharmaceutical densitometric quantitative analysis. Normal phase adsorption TLC on silica gel with a less polar mobile phase, such as chloroform– methanol, has been used for more than 90% of reported analysis of pharmaceuticals and drugs [4-10].

Mobile Phase:

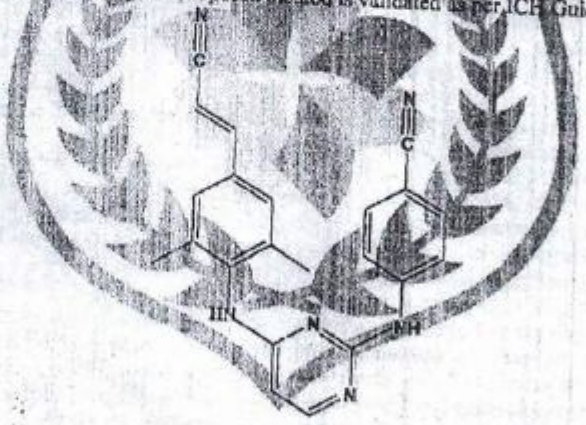
The selection of mobile phase is based on adsorbent material used as stationary phase and physical and chemical properties of analyte. The mobile-phase systems are used based on their diverse selectivity properties are diethyl ether, methylene chloride, and chloroform combined individually or together with hexane as the strength adjusting solvent for normal-phase TLC and methanol, acetonitrile, and tetrahydrofuran mixed with water for strength adjustment in reversed-phase TLC. Separations by ion pairing on C-18 layers are done with a mobile phase such as methanol–0.1 M acetate buffer (pH 3.5) containing 25 mM sodium pentanesulfonate (15.5:4.5) [3-21].

Preparation of plate:

TLC plates can be made with suitable apparatus. Such layers do not adhere well to the glass support. Pre-coated plates use small quantities of very high molecular weight polymer as binder overcomes most limitations of a homemade layer.Precoated layers are reasonably abrasion resistant, very uniform in layer thickness, reproducible, pre-activated, and ready to use. They are available with glass or aluminum or polyester support. Aluminum foil plates are less expensive to buy, cheaper, can be cut, and therefore easy to carry around or transport or mail. Glass plates are the best for highest quality of results. Most often, layers containing a fluorescent indicator F 254 are used. This enables the visualization of samples in a UV cabinet very simply, instantly, and in a nondestructive manner.Commonly used size of plates in TLC is 20×20 cm and in HPTLC 20 × 10 cm or 10 × 10 cm is widespread.

Simultaneous estimation of Rilpivirin, Emtricitabine and Tenofovir

Rilpivirinischemically4-{[4-({4-[(1E)-2-cynoeth-1-en-1-yl]-2,6dimethylphenyl}amino)pyrimidin-2-yl]amino}benzonitrile. Rilpivirin is non-nucleoside reverse transcriptase inhibitor (NNRTI) which is used for the treatment of HIV-1 infected patients. It is a diarylpyrimidine, a class of molecules that resemble pyrimidine nucleotides found in DNA. Because of its flexible chemical structure, resistance of Rilpivirin is less likely to develop than other NNRTI's Literature review revealed that UV[21-25],HPLC[26-34]and HPTLC[29-35]methods have been reported for analysis of Rilpivirin as a single form and in combination with other drugs. To date there have been no published reports on simultaneous quantitation of Rilpivirin by HPTLC in bulk drug and in tablet dosage form. This present study reports for the first time the simultaneous quantitation of Rilpivirin by HPTLC in bulk drug and in tablet dosage form. The proposed method is validated as per ICH Guidelines [36].



Structure of Rilpivirin

II. MATERIAL AND METHODS

MATERIAL

Pure drugs Rilpivirin were obtained as gift sample from EmcurePune,India. Methanol and Ethyl acetate was obtained from Qualigens Fine Chemicals Ltd. All chemical used were of analytical grade. HPTLC aluminum plates pre-coated with silica gel 60F254 (10 cm X 10 cm) were from Merck. Densitometry was carried out using Camag TLC Scanner 3 (Camag, Muttenz, Switzerland) fitted with win-CATS software version 1.4.3.6336. Samples were applied as band on the HPTLC plates using the spray-on technique of CamagLinomat V under nitrogen gas flow, and developed in a Camag 10 cm X 10 cm twin trough chamber.

METHOD

Method development:

Standard stock solutions 20 µg/ml of Rilpivirinwas prepared in methanol as solvent. Solutions of 2 µl were applied on the HPTLC plates as spot bands of 6 mm using Linomat V. Application positions were at least 15 mm from the sides and 10 mm from the bottom of the plates. Mobile phase components were mixed prior to use and the development chamber was saturated with mobile phase vapours for 20 min before each run. Development of the plate was carried out by the ascending technique to a migration distance of 8 cm. Then the plates were dried on a hot plate. Room temperature and relative humidity were always maintained at

25°C ± 2 and 60 % ± 5. Densitometric scanning was done in absorbance mode at 272 for Rilpivirinusing a deuterium lamp. The slit dimensions were 5 mm X 0.45 mm and the scanning speed was 20 mm/s and the data resolution at 100μm/step.

METHOD VALIDATION

Linearity and range: From the mixed standard stock solution 20μg/ml of Rilpivirin, 2μl to 7μl solution was spotted on HPTLC plate to obtain finalconcentration 40-140μg/spot for Rilpivirin.Each concentration was applied six times to the HPTLC plate. The plate was then developed as per procedure described above.

Precision: The intra-day precision (RSD, %) was assessed by analyzing standard drug solutions within the calibration range, three times on the same day. Inter- day precision (RSD %) was assessed by analyzing drug solutions within the calibration range on three different days over a period of a week.

Limits of Detection and Quantitation: To determine the limits of detection (LOD) and quantitation (LOQ), solutions of concentration in the lower part of the linear range of the calibration plot were used. LOD and LOQ were calculated using the equations LOD = 3.3 × *N*/*B* and LOQ = 10 × *N*/*B*, where *N* is the standard deviation of the peak areas of the drugs ($n = 3$), taken as a measure of noise, and *B* is the slope of the corresponding calibration plot.

Specificity: The specificity of the method was ascertained by analysis of drug standards and samples. The mobile phase resolved the drugs very efficiently, as shown in Figure 2.

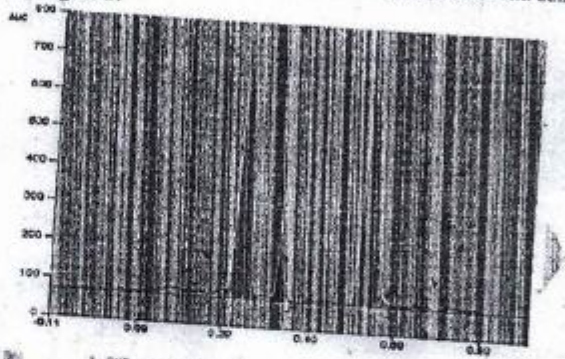


Figure 2: Densitogram of Rilpivirin

Accuracy: Analysed samples were overapplied with an extra 80, 100, and 120% of the drugs from standard solutions ofRilpivirin the mixtures were reanalyzed by use of the method. The experiment was conducted in triplicate. This was done to check for the recovery of the drug at different levels in the formulation.

Robustness: Robustness was assessed by deliberately changing the chromatographic conditions and studying the effects on the results obtained.

Analysis of a marketed formulation

To determine the content of Rilpivirin in conventional tablet compressed on tablet mini(Rimek) press in institute with reference to (Brand name: Complera, Label claim: 25 mg of Rilpivirin per tablet), twenty tablets were weighed, their mean weight determined and finely powdered. The weight of the tablet triturate equivalent to 5 mg of Rilpivirin were transferred into a 25 mL volumetric flask containing 15-20 mL methanol, sonicated for 30 min with occasional shaking and diluted to 25 mL with methanol. The resulting solution was centrifuged at 3000 rpm for 5 min and the drug content of the supernatant was determined (200μg/mL for Rilpivirin).Pipette out 1ml of supernatant solution and dilute to 10ml with methanol. Then 3 μL of the spot was applied which gave final concentration of 600 ng/spot for Rilpivirin 1800 ng/spot. The HPTLC plate was then developed in optimized mobile phase. The analysis was repeated in triplicate. The possibility of excipient interference with the analysis was examined.

Forced Degradation Studies: To ensure that the analytical method was stability indicating, stress studies were performed.

a) Acid Degradation Studies: 2ml of 0.1N hydrochloric acid was added to 5mg of Rilpivirin. This solution was allowed to stand for 3hour at 100°C after that make dilutions to obtain 20μg/ml solution of Rilpivirin.

b) Alkali Degradation Studies:2ml of 0.1N Sodium Hydroxide was added to 5mg of Rilpivirin. This solution was allowed to stand for 3hour at 100°C after that make dilutions to obtain 20μg/ml solution of Rilpivirin.

c) Oxidation studies: 2ml of 3% Hydrogen Peroxide was added to 5mg of Rilpivirin. This solution was allowed to stand for 3hour at 100°C after that make dilutions to obtain 20μg/ml solution of Rilpivirin.

Method Development:

The HPTLC procedure was optimized for simultaneous determination of Rilpivirin. The mobile phase Methanol: Toluene: Ethyl acetate: Ammonia (1.5:5.5:1.5:0.1 v/v/v/v) resulted in good resolution, and sharp and symmetrical peaks were obtained at Rf 0.59 ± 0.02 for Rilpivirin. It was observed that prewashing of HPTLC plates with methanol (followed by drying and activation) and pre saturation of HPTLC chamber with mobile phase for 20 min (optimum chamber saturation time) ensured good reproducibility and peak shape of three drugs.

VALIDATION OF THE METHOD

Linearity

Linear regression data for the calibration plots revealed good linear relationships between response andconcentration over the ranges 40-140 μgper spot for Rilpivirin. Eachconcentration was applied in triplicate on the HPTLC plate (Table I).

Table I: Linear regression data for drugs

Parameter	Rilpivirin
Linearity range	40-140µg/spot
correlation coefficient (r^2)	0.998
Slope	38.60
Intercept	102.5

LOD and LOQ

The LOD & LOQ were determined from slope of the lowest part of the calibration plot.LOD and LOQ of respected drug shown in table (II)

Table II: LOD &LOQ for drugs

Parameter	Rilpivirin
LOD	3.67
LOQ	11.14

Precision: The precision of the method was expressed as relative standard deviation (RSD, %). The results listed in Table (III)reveal the high precision of the method.

Table III: Statistical evaluation of precision of developed method (n=3)

Drug	Conc. (µg/band)	Intra day			Inter day		
		*%mean	*SD	*%RSD	*%mean	*SD	*%RSD
Rilpivirin	100	98.86	0.63	0.63	99.16	1.13	1.14

*Mean of three determinations, SD: Standard Deviation, R.S.D: Relative Standard Deviation

Recovery Studies: When the method was used for extraction and subsequent analysis of three drugs from the pharmaceutical dosage forms, and the extract was over applied with 80, 100, and 120% of additional drug. As shown in the Table (IV) good recoveries of the Rilpivirin in the range from 98.00 to 102.00 % were obtained at various added concentrations. The average recoveries of three levels (nine determinations) were 99.10± 0.50 % for Rilpivirin.

Table IV: Recovery study Data

Drug	Level of % recovery	*%mean	*SD	*%RSD
Rilpivirin	80%	98.25	0.11	0.11
	100%	99.53	0.59	0.59
	120%	99.52	1.14	1.14

*Mean of three determinations, SD: Standard Deviation; R.S.D: Relative Standard Deviation

Robustness: The standard deviations of peak areas were calculated, for the aaforementioned four parameters (variation in composition of the mobile phase, amount of mobile phase, Time from spotting to chromatography, Time from chromatography to scanning) and coefficients of variation were found to be less than 2% in all cases as shown in Table (V).

Table V. Results of Robustness

Parameters	%RSD for Rilpivirin*
Mobile phase composition (0.1 ml)	98.68
Amount of mobile phase	98.97
Time from spotting to chromatography	98.67
Time from chromatography to scanning	98.96

*Mean of three determinations, R.S.D: Relative Standard Deviation

Forced Degradation Studies

HPTLC studies of the samples obtained during the stress testing of Rilpivirinunder different conditions. Different degradations peak as shown in figures 3-5.The mass balance is a process of adding together the assay value and the levels of degradation products to see how closely these add up to 100% of initial value with due consideration of the margin of analytical error. The amount of drug recovered after degradation studies and the Rf of the degradation products are given in table (VI).

a) Acid induced degradation

The drugs were degraded in the acidic condition and shows different degradation products at Rf 0.01 for Rilpivirin and 0.15, 0.24 for Emtricitabine and 0.14, 0.29, 0.79 for Tenofovir as shows in the figures 3-5.

b) Base induced degradation

The drugs were degraded in the alkaline condition and shows different degradation products at Rf0.14, 0.51 for Rilpivirin and 0.25 for Emtricitabine and 0.02 for Tenofovir as shows in the figures 3-5.

c) Hydrogen peroxide-induced degradation

The drugs were degraded in hydrogen peroxide (3%) at room temperature shows different degradation products at Rf 0.23,0.35, 0.45, 0.46 for Rilpivirin and 0.57, 0.37 for Emtricitabine and 0.58 for Tenofovir as shows in the figure8-10.

Table VI: Results of Forced Degradation studies

Stress condition	Drug	Mass balance (%assay of recovered + %impurities + % degradents)	Rf values of degradation Products
Acid hydrolysis (0.1N HCl)	Rilpivirin	100.20	0.01
Alkali hydrolysis (0.1N NaOH)	Rilpivirin	99.96	0.14,0.51
Oxidation(3%H_2O_2)	Rilpivirin	99.06	0.23,0.35,0.45,0.46

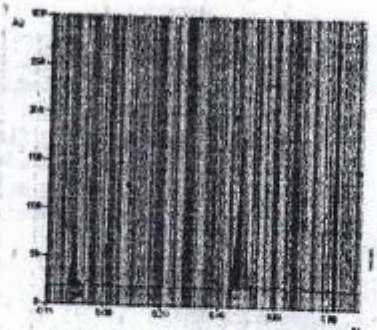


Figure3: Densitogram of acid hydrolysis of Rilpivirin

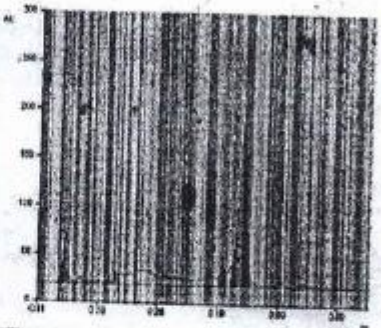


Figure4:Densitogram of alkali hydrolysisof Rilpivirin

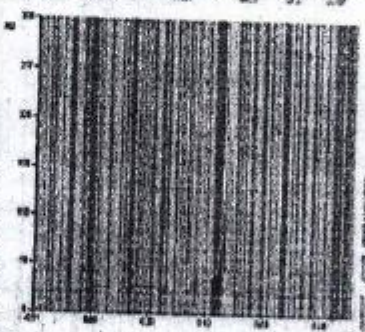


Figure 5: Densitogram of oxidative degradation of Rilpivirin

III. CONCLUSION

The proposed method based on the HPTLC was developed and validated as per ICH guidelines. The standard deviation and % RSD calculated for the proposed method is low, indicating high degree of precision of the method. The results of the recovery studies performed show the high degree of accuracy for the proposed method. Hence, it can be concluded that the developed chromatographic method is accurate, precise and selective and can be employed successfullyfor the estimation ofRilpivirin in bulk and formulation.

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PATIENT NAME	: NAWAB SAYYED	**SAMPLE COLL. DATE**	: 05/02/2020 01:08PM
REF. BY DOCTOR	: DEONI RH	**REG. DATE/TIME**	: 05/02/2020 02:17PM
FACILITY NAME	: RH DEONI	**REPORT DATE/TIME**	: 05/02/2020 04:47PM
CLIENT NAME	: NHM	**REG. LAB NAME**	: UDGIR

BIOCHEMISTRY

Investigation	Result	Units	Bio. Ref. Interval
Serum Blood Urea	: 22.0	mg/dl	12.8 - 42.8
BUN-Blood Urea Nitrogen	: 10.274	mg/dl	6 - 20
• Method: BUN is calculated (from Urease-GLDH-Kinetic).			
Serum Creatinine	: 0.81	mg/dl	0.7 - 1.3
• Method: Enzymatic.			
Serum Bilirubin, Total	: 0.61	mg/dl	0.2 - 1.2
Biological Ranges: 0-1 day-(full term)=2-6 1-2 day(premature)= 6-12 1-2 day(full term)=6-10 3-5 days(premature)=10-14. 3-5 days(full term)=4-8			
Serum Bilirubin, Direct	: 0.2	mg/dl	0.0 - 0.3
Serum Bilirubin, Indirect	: 0.41	mg/dl	0.2 - 0.9
• Method: Diazo.			
Serum SGOT	: 29.2	U/L	0 - 35
Serum SGPT	: 22.3	U/L	0 - 45
• Method: IFCC without PDP			
Serum Alkaline Phosphatase	: 77.0	U/L	53 - 128
• Method: IFCC with AMP buffer.			
Serum Total Protein	: 7.02	gm/dl	6.4 - 8.3
Serum Albumin	: 4.2	gm/dl	3.2 - 4.5
Serum Globulin	: 2.82	gm/dl	2.5 - 3.5

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Note

$KF\text{-}Al_2O_3$ catalyzed mild and efficient preparation of symmetrical disulfides from thiols

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A facile, efficient, convenient and environmentally friendly method for the oxidation of various thiols to their corresponding disulfides catalyzed by $KF\text{-}Al_2O_3$ in very short reaction times in acetonitrile and at room temperature has been reported.

Keywords: Potassium fluoride-alumina, oxidation, thiols, disulfides

Selective oxidation of thiols to disulfides is one of the widely studied transformations in organic chemistry as the disulfide moiety frequently occurs in proteins and bioactive natural products[1-4]. Moreover, thiols can be conveniently protected as disulfides and be regenerated by cleavage of the S-S bond[5]. Disulfides have found numerous applications in industry as vulcanizing agents[6] for rubber and elastomers, imparting them excellent tensile strength. Also, these compounds are important intermediates with many applications in organic synthesis[7-9]. As a result, vast array of reagents and oxidants are reported in the literature to accomplish this transformation which includes Fe(III)/EDTA[10], Fe(III)/NaI[11], $DMSO/Al_2O_3$[12], MnO_2[13], Caro's acid on silica gel[14], H_2O_2 in fluoro alcohols[15], Br_2/ silica gel[16], I_2/HI[17], $KMnO_4/CuSO_4$[18], Sodium perborate[19], Rhodium(I)/PPh_3 complex[20], DBDMH[21] and so on. Although some of these methods are carried out under mild reaction conditions, most of them require strong acidic/basic media, strong oxidizing agent, expensive, not readily available reagents and environmental concerns. Thus, there is still an avenue to develop a mild and facile procedure for the preparation of disulfides from corresponding thiols.

In recent years, there has been increasing interest on catalysts and reagents supported on inorganic substrates due to the benefits of enhanced reaction rates, improved yields, cleaner reaction profiles and operational simplicity[22-24]. $KF\text{-}Al_2O_3$ is one such versatile solid supported reagent and it has been used for a number of organic reactions and offered several advantages over classic bases[25-28]. As a part of our program related to development of environmentally benign synthetic methodology, herein we wish to report our results, which constitute a mild and convenient method for the preparation of symmetrical disulfides from thiols using $KF\text{-}Al_2O_3$ as a catalyst.

Results and Discussion

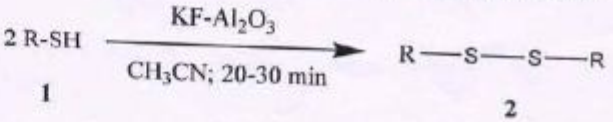
The experimental procedure is simple. The reaction can be carried out simply by stirring an acetonitrile solution of the thiol with $KF\text{-}Al_2O_3$ at room temperature for 20-30 min, followed by isolation of the product by filtration, evaporation on rota evaporator and purification by silica gel column chromatography (Scheme I). The generality of the method was elaborated to aliphatic, aromatic and hetero aromatic thiols. A variety of thiols were selectively oxidized to their corresponding disulfides in good yields without any evidence for the formation of the over oxidized products of their corresponding disulfide S-oxides (thiolsulfinates), disulfide S-dioxides (thiolsulfonates), and/or sulfonic acids under the reaction conditions.

Among the aliphatic thiols the reactivity was found to slightly decrease with increasing carbon chain length. Under identical reaction conditions aliphatic thiols and aromatic thiols have shown almost similar reactivity. Pertinent results are summarized in Table I.

In the present report, we have shown that $KF\text{-}Al_2O_3$ is an efficient, rapid, mild and inexpensive reagent for the synthesis of aliphatic, aromatic and hetero aromatic disulfides.

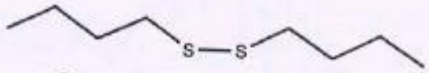
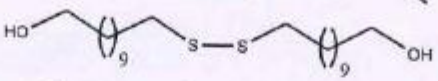
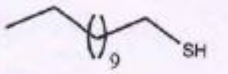
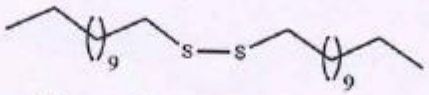
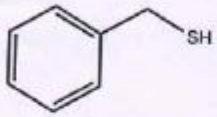
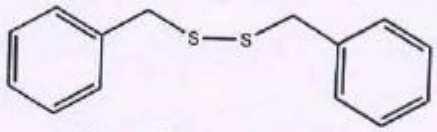
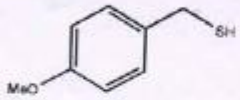
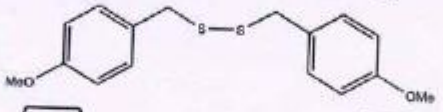
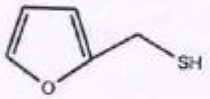
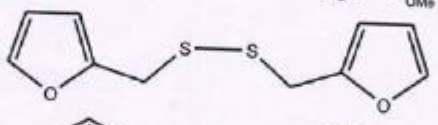
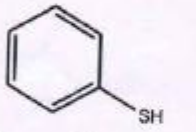
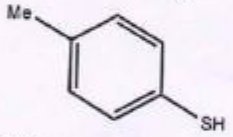
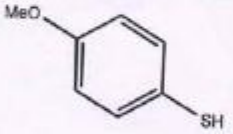
Experimental Section

All the products are known compounds and were checked by comparison of their spectral and physical



Scheme I

Table I — Oxidative coupling of various thiols

Entry	Substrate	Product [b]	Time (min)	Yield (%) [a]
1			30	75
2			24	82
3			20	80
4			30	72
5			20	78
6			25	82
7			30	72
8			30	80
9			30	70

[a] Yields are based on isolated products.
[b] All products were known compounds and identified by comparison of their physical and spectroscopic data with those of authentic samples.

properties with an authentic sample. KF-Al_2O_3 was prepared by a reported procedure[29].

Oxidation of Thiols

General Procedure

To a mixture of 11-mercapto undecene-1-ol (0.5 g; 2.4 mmol) in acetonitrile (6 mL), KF-Al_2O_3 (1 g) was added and the reaction mixture was stirred at RT for 24 min. After completion of the reaction (monitored by TLC), the KF-Al_2O_3 was filtered off. Evaporation of the solvent under reduced pressure followed by chromatography over silica gel using light petroleum-ethyl acetate as eluent furnished the corresponding pure disulfide in 70–82% yield.

Conclusion

In summary, the use of KF-Al_2O_3 for oxidation of thiols has numerous advantages. The use of KF-Al_2O_3 provides a remarkably simple, mild, very rapid, selective, general and practical procedure for the high-yielding preparation of a variety of disulfides. KF-Al_2O_3 is an excellent, cheap and environmentally friendly solid supported reagent; therefore it is superior to various other reagents reported for the oxidation of thiols.

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Isolation And Identification Of Fungi From Some Leafy Vegetables In Latur District

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Abstract - **The present investigation was carried to study the different fungal sp. present in various leafy vegetables. Six fungi, which caused leafy vegetables in latur district area, were isolated from various samples of different leafy vegetables in flied, Isolated from diseased leafy vegetables on PDA media. The isolated fungi were identified as Alternaria tenuissima, Fusarium proliferatum, Alternaria spinaciae, Fusarium oxysporum f. sp. Spinaciae, Alternaria alternata, and Phytophthora colocasiae on the basis of their microscopic characteristics. Finally, the pathogenicity tests showed that all the fungi isolated were pathogenic to all the leafy Vegetables**

keywords - **leafy Vegetables, Fungi and Potato Dextrose Agar (PDA) media and pathogenicity tests.**

I. INTRODUCTION

Vegetables are increasingly becoming important as produce for domestic and export markets. They have a great potential to improve the nutrition and there by health of consumers as most are good sources of vitamins, minerals and proteins needed for the proper functioning and development of the human body [1].Vegetable however, have serious challenges to their existence and these include changes in climatic condition, pests, inadequate rainfall and fungal attack [2]. Post harvest losses of vegetables are particularly high in the tropics and may be in the order of 25% and even higher for more perishable produce [3]. Losses in fruits and vegetables are more serious in developing countries than the developed ones. In Ghana, it is estimated that about 20% to 30% of fresh food products including vegetables harvested each year never reach the final consumer in the market because they are either lost or damaged during the various stages of the distribution chain [4].

Vegetables are more susceptible to insects pests and diseases due to their tenderness and softness as compared to other crops and virtual absence of resistance characters because of intensive hybrid cultivation [5].The native value of healthy vegetables are altered because of fungal attack and sometimes fungi produce certain mycotoxin in them and make them unsuitable for human consumption. Thus the present study was aimed to evaluate the Fungal spp. in laboratory conditions identify and isolate pathogencity tests the fungal associated with their leafy vegetable.

II. MATERIALS AND METHOD

i) Isolation of pathogens

Flied presented leafy vegetables infected parts of selected vegetables viz. *Rumex acetosa L., Spinacea oleracea L.,, Trigonella foneum-graecum,* and *Colocasia esculanta* were brought into the laboratory and cut into small pieces (1-2 mm) by sterilized blade then surface sterilized with 1% mercuric chloride ($HgCl_2$) for 1 min. The pieces were washed with sterilized distilled water thrice. The pieces were incorporated with Potato Dextrose Agar medium (PDA) kept at 27±2oC and pathogens were isolated and identified by manuals [6;7, and 8]

The fungal isolates were identified on the basis of colonial, morphological characteristics and micrometry. The fungal colonies identified on the basis of microscopic examination were purified. The morphology of isolated fungi was studied by Lactophenol cotton blue staining [9].

ii) Pathogenicity test: Pathogenicity (on leaves).

For pathogenicity test isolates were grown on PDA for 7 days inoculation was done using detached surface sterilized on leaves. A single drop (5µl) of spore suspension (1x10₅conidia/ml) was placed on each leaves. Leaves were incubated in humid growth chamber (80-90% relative humidity) for intensity with a photoperiod of 12h. After 8 days, leaf spots similar to the original symptoms were developed on all tested leaves and root was consistently re-isolated fulfilling Koch's postulates [10]. Control leaves inoculated with sterilized distilled water remained symptomless.

Pathogenicity (on roots).

Pathogenicity test were conducted, using healthy leafy vegetable grown in the glass house. Two plants and a control were used for each of two replications. For each treated plants were sprayed with conidial suspension (ca.1×10₅conidia/ml) and maintained in a humid growth chamber for 24h in room temperature. Five days after inoculation white mycelial roots were infected. No control displayed symptoms and remained healthy in the tests. The fungus was reisolated and identical to the stock culture. Pure cultures were maintained on PDA slants.

Table 1: Cultural and microscopic characteristics of fungi isolated from different leafy vegetables.

Fungal isolate No.	Name of the Leafy Vegetables	Cultural characteristics	Reverse side of Colony	Microscopic characteristics	Fungal species identified
LVGf *1	**Chuka** *Rumex acetosa* (L.)	Green colonies with whitis peripheral. Concentric rings are formed. Radial growth of the fungus in culture was uniform.	Green	Conidiophores solitary or in groups, simple or branched less cylindrical, septate pale or mid pale brown smooth with 1 or several scars up to 115 µm long 4-6 µm thick. Beak, generally 4-7 transverse and 0-6 longitudinal septa. Total length of spores is 22-95 (54) µm, 8-19 (13.8) µm thick in the broadest part and beak 2-4 µm.	1)*Alternaria tenuissima*
LVGf *2		The abundant aerial mycelium initially was white and later became purple violet. Colonies were fast growing, hyphae were septate. Conidiophores were short, simple and branched.	Hyaline	Microconidia were abundant and produced on mono and polyphialids, single celled, oval to clubshaped size 7.0-22.5~3.5µm. Macroconidia were slightly sickle shaped to straight, with 2-5 septa and measured 43-65×3.3-5.0µm. Chlamydospores were absent.	2)*Fusarium proliferatum*
LVGf *3	**Spinach** *Spinacea oleracea* (L.)	Blackish white ash colonies with whitish peripheral concentric rings are formed.	Black	Hyphae short, septate, olivaceous, conidia elongate, clavate, 6-10 septate, yellowish to olivaceous, 80-120×12-14 µm.	3)*Alternaria spinaciae*
LVGf *4		Colonies cottony whitish soft texture. becoming pink in colour on maturity, cottony, fast growing	Hyaline	Conidia when born in sporodichia typically broader toward the apex and usually abruptly constricted at the apex, pedicellate, mostly 3-septate 35×5-25(27-43×4.8-6.3) µm;1-septate 20×4.8(14-24×4.4-5.0) µm;0 septate 8×3.2(6-11×3-4.8) µm.	4)*Fusarium oxysporum f.*sp.*spinaciae.*
LVGf *5	**Fenugreek** (*Trigonella foneum-graecum*)	Colonies usually black conidia formed in long, often branched chain.	Black	Overall length 20-63(37) µm, 9-18(13) µm thick in the broadest part; beak pale, 2-5µm thick.	5)*Alternaria alternata* (Fr.) Keissler

LVGf*6	**Colocasia** (*Colocasia esculanta* L.)	Mycelium branched and coenocytic, sporangia on specialized hyphal sporangiophores which are branched and with indeterminate growth.	Hyaline	Zoospores reniform, laterally biflagelated. Sporangia were ovoid, hyaline, papillate, caducous, 30 to 60 × 17 to 28 µm, and pedicels were 3.5 to 10 µm long.	6) *Phytophthora colocasiae* Rac.

LVGf*- LVG-leafy Vegetable, f*-fungi.

III. RESULTS AND DISCUSSION

Six fungal species are isolated from various leafy vegetables. Table 1 shows the viable count of fungal isolates (LVGf*1 to LVGf*6) on PDA plates. Table 1 represents fungal species identified on the basis of reverse side of colony, cultural and microscopic characteristics. The fungal isolate LVGf*1 to LVGf*6 was present in all tested healthy leafy vegetables. The vegetables associated fungi isolated from various samples of different leafy vegetables identified on the basis of their macroscopic and microscopic characteristics are *Alternaria tenuissima* (LVGf*1), *Fusarium proliferatum* (LVGf*2), *Alternaria spinaciae* (LVGf*3), *Fusarium oxysporum f.sp.spinaciae* (LVGf*4), *Alternaria alternata* (Fr.) Keissler (LVGf*5) and *Phytophthora colocasiae* Rac. (LVGf*6) fungi were isolated.

Rumex acetosa Isolated fungus was identified as *Alternaria tenuissima* (Fries) Wiltshire [7; and 8]. There are reports *Alternaria tenuissima* of causing disease on blueberry & pepper in China, but there is no previous report of the pathogen on sorrel plants [11] and [12]. *Rumex acetosa* Leaf spots similar to the original symptoms were developed on all tested leaves and *A. tenuissima* was consistently re-isolated fulfilling Koch's postulates [13]. In order to prevent it, plants should be set apart for good air circulation and, when watering, the plant's foliage should not get wet. To help avoid soil borne diseases, such as *Rhizoctonia*, *Pythium* or *Fusarium*, the plantings should be rotated each year; in other words, spinach should not be sowed in the same row or bed every year [14]. *C. esculenta* farmers ranked diseases as the major constraint halting the cultivation of *C. esculenta*. Diseases observed on the farmers' fields affected mainly the shoot. This agrees with observation by [15]. *C. esculenta* leaf blight disease has been thought to be caused by *Phytophthora colocasiae* [16; 17 and 18]. [19] Published the only documentary evidence of *C. esculenta* disease in Ghana caused by *Cladosporium colocasiae* and remarked on critical suppression of symptom development with Thiophanate methyl. The present study did not review *Phytophthora colocasiae* in *C. esculenta* fields. Contrarily, *Cladosporium colocasiae* produced leaf spot symptoms on upland *C. esculenta*.

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संशोधनातील विविध संकल्पना

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रसिका महाविद्यालय, देवणी
जिल्हा लातूर

कोणत्याही ज्ञानशाखेचा अभ्यास करत असताना आपल्याला जेव्हा एखादी समस्या निर्माण होते ती समस्या म्हणजे संशोधनाचा विषय असतो. संशोधनाचा नवीन विषय निर्माण झाला म्हणजेच त्या विषयात निर्माण झालेली समस्या होय.म्हणजे समस्या ही संशोधनाची निर्मिती असते.निर्माण झालेल्या समस्येचा/नवीन विषयाचा अभ्यास करण्यासाठी संशोधकाला त्या विषयाची उद्दिष्टे / ध्येय निश्चित करताना त्याची व्याप्ती याचा अभ्यास करताना त्या विषयावर कोणकोणत्या मर्यादा आहेत. त्यावर कोणकोणती बंधन असतात त्यावर त्यांचे संशोधनाचे स्थान अवलंबून असते

शोध संज्ञा:- *संशोधन, संशोधन समस्या*

प्रास्ताविक

संशोधन ही समस्या निराकरणाची सुव्यवस्थित प्रक्रिया आहे. मानवी मनाला अस्वस्थ करणाऱ्या बहुविध समस्याच्या सप्रमाण व विश्वसनीय समाधानासाठी आवश्यक असलेल्या तथ्यांचे संकलन व विश्लेषण करून त्यांचा अन्वयार्थ लावण्याची व्यवस्थाबद्ध प्रक्रिया म्हणजे संशोधन होय. समस्येची निवड आणि व्याख्या ही एक शोधन प्रक्रिया आहे. या शोधन प्रक्रियेची सुरुवात एखाद्या समस्येच्या जाणिवेने होते . आणि तिचा शेवट एक अथवा अधिक परीक्षणक्षम गृहीतकांनी आणि उदरदायी प्रश्नांनी होते शोधन प्रक्रिया ही प्रामुख्याने संबंधित साहित्याच्या पुनरावलोकनवर आणि चिकित्सक विश्लेषण वर आधारलेली असते. प्रथम समस्या क्षेत्र निश्चित करून त्यातील नेमकी समस्या निवडल्यावर एक कामचलाऊ किंवा अस्थायी गृहीतक मांडले जाते. त्या साहित्य पुनरावलोकनाच्या आधारेच संशोधन गृहीतकाचे अंतिम शब्दांकन केले जाते. संशोधन समस्येची निवड व व्याख्या हा संशोधनाचा खूपच महत्त्वाचा घटक आहे आणि त्यासाठी खूपच विचार व चिंतन करणे आवश्यक असते. संशोधनाचा प्रस्ताव आणि संशोधन पूर्ण झाल्यानंतरचे संशोधन अहवाल या दोन्हीचाही प्रस्तावना विभागात समस्येचे शब्दांकन, संबंधित साहित्याचे पुनरावलोकन आणि गृहीतकाची मांडणी या तीन बाबींचा समावेश असतोच. फरक एवढाच कि, संशोधन प्रस्तावाच्या लिखाणात भविष्यकाळाचा उपयोग केला जातो. तर संशोधनाच्या अहवालात भूतकाळाचा.

संशोधनाची व्याख्या -

1. " संशोधन म्हणजे कोणत्याही ज्ञानशाखेत नवीन तत्वे अथवा तथ्य शोधण्यासाठी आणि जुनी तथ्ये व तत्त्वे प्रशिक्षणासाठी तयार केलेली चिकित्सक व पद्धतशीर अभ्यास (वेबस्टर कोशातील)
2. "संशोधन म्हणजे सु- परिभाषीत . समस्येच्या समाधानासाठी केलेला सुव्यवस्थित वस्तुनिष्ठ व बिनचूक असा शोध होय."(मौले 1970)

संशोधनाचे महत्त्व

संशोधनामुळे कोणते कार्य सुलभ होऊ शकेल, त्याचा उपयोग कुणाला, कसा, कोणत्या परिस्थितीत होऊ शकतो. हे स्पष्ट करणे आवश्यक असते. संशोधनातून जे निष्कर्ष किंवा प्रणाली सिद्ध होईल त्याचे व्यावसायिक महत्त्व या उपघटकात सांगितले जाते.

संशोधन समस्येची व्याख्या -

"संशोधन समस्या म्हणजे निराकरणासाठी (सोडवण्यासाठी) समोर आलेला प्रश्न होय" (टाउनशेडच्या मतानुसार).

"समस्या म्हणजे एक प्रश्नवाचक का वाक्य आहे"(करलिंगरच्या मते)

संशोधन समस्येचे तत्वे / घटक-

संशोधन समस्याचे निर्धारण करण्यापूर्वी या सुगण प्रकियेची घटकतत्त्वे जाणून घेणे आवश्यक आहे. याबाबतीत रॉबर्ट ॲकाॅफने केलेले विश्लेषण उपयुक्त ठरवण्यासारखे आहे. त्यांच्या मते, समस्या निर्धारण म्हणजे समस्येत अंतर्भूत असणाऱ्या विविध घटकांचे स्पष्टीकरण असून, संभाव्य चुका अथवा अडथळे टाकणे हे होय. त्यांनी सांगितलेली पाच घटक तत्वे खालीलप्रमाणे आहेत.

1) संशोधन उपभोक्ता व सहकारी

(संशोधन फलन योगी) - या तत्त्वानुसार प्रत्येक समस्येचा संबंध कोणत्यातरी व्यक्तीशी अथवा गटाशी असतो या तत्वानुसार संशोधनाचा उपभोक्ता व त्याच्या प्रभावाखाली येणाऱ्या सर्व लोकांचा समावेश होतो त्या सर्वांना सहभागी म्हटले आहे सर्वांना म्हणजे संशोधक संशोधकाचा गट किंवा संशोधकाकडे आलेले असेल व गिऱ्हाईक.

2) संशोधन- उपभोक्त्याचे उद्दिष्टे -

संशोधनाचा फायदा घ्यायचा असतो. अशी व्यक्ती संशोधन कर्त्याकडे निश्चित उद्देशानेच जाते. उदा. एखादा कारखानदार संशोधन उपभोक्त्याची गरज लक्षात घेऊनच संशोधन समस्या मांडले जाते. अथवा सुत्रीत केली जाते.

3) उद्दिष्टसिद्धीची पर्यायी साधने -

उद्दिष्ट साध्य करून घेण्यासाठी एकच साधन नव्हे तर एकमेकांना पर्यायी ठरतील अशी अनेक साधने आवश्यक असतात. निदान कमीत कमी दोनतरी साधने आवश्यक असतात. जर उपभोक्त्या समोर पर्यायी साधने नसतील तर त्याच्यासमोर समस्याही राहणार नाहीत. अर्थात पर्यायी साधने कशी उपलब्ध करून घ्यावीत ? हाही समस्येचा एक प्रकार उपभोक्ता सुचवू शकतो.

4) विशिष्ट उद्दिष्ट -

विशिष्ट उद्देश साध्य करून घेण्यासाठी किमान दोन तरी मार्ग उपलब्ध पाहिजेत त्याशिवाय

समस्या जन्मास येत नाही पण केवळ दोन किंवा जास्त साधने असूनही समस्या तयार होतेच असे नाही. तर उपभोक्त्याच्या मनात त्या दोन किंवा अनेक साधनांच्या उपयोगितेसंबंधी शंका उत्पन्न होणे आवश्यक आहे. कोणते साधन प्रभावी होईल. याचा निर्णय लावावा लागतो. याचा अर्थ असा की, समस्या निर्माण होण्यासाठी उपभोक्त्याच्या मनात पर्यायी साधनाच्या प्रभावाबद्दल शंका निर्माण व्हावी लागते.

5) संशोधन समस्येचा परिस्थितीशी संबंध -

प्रत्येक समस्येशी संबंधित असे वातावरण उपलब्ध होणे आवश्यक असते. वातावरण किंवा परिस्थितीतील बदल हा समस्या निर्माण करू शकतो .किंवा समस्येचे निराकरणही करू शकतो.

संशोधन समस्येची निवड -

संशोधनाचे काम नव्याने सुरू करणाऱ्या विद्यार्थ्याकरिता योग्य संशोधन समस्येची निवड करणे हे संशोधन प्रक्रियातील एक सर्वात महत्त्वाचे आणि तितकेच कठीण काम असते. संशोधनाची निश्चित कल्पना नसल्यामुळे त्याबद्दलचा आवश्यक अभ्यास झालेला नसल्याने विद्यार्थी शोध प्रबंधासाठी आवश्यक असलेल्या समस्येचा शोध कुठे आणि कसा घ्यावा या विचारात चिंतामग्न दिवस व निद्राहिंन रात्री घालवीत असतात . आपण निवडलेली प्रत्येक शोध समस्या जणू फालतू किंवा शिल्लक आहे किंवा तिच्यावर अगोदरच संशोधन झालेले आहे. म्हणून मार्गदर्शकाकडून फेटाळले जाईल अशी सामान्य विद्यार्थ्याला भीती वाटत असते. वास्तविक पाहता संशोधन योग्य समस्येचा अथवा ही खरी समस्या नसते नसते. संशोधन समस्या विपुल असतात. परंतु संशोधन समस्या निवडण्यासाठी उपयुक्त संदर्भ साहित्य प्रकारची ओळख विद्यार्थ्यांना नसते. हीच खरी समस्या असते.

संशोधन समस्या निवडण्यापूर्वी अभ्यासकाणे सर्वसामान्य अशा समस्या क्षेत्राची निवड करावयाची असते. आपण निवडलेल्या समस्या क्षेत्रात अभ्यासकाला बरेच वाचन करावयाचे असते. आणि संकल्पित संशोधन अभ्यासाचे नियोजन व कार्यवाहीसाठी बराच खर्च करावयाचा असल्याने निवडलेले समस्या क्षेत्र आपल्या व्यवसायासंबंधी आपल्या अभिरुचीप्रमाणे व आपल्या विशेषज्ञतेनुसार निवडणे योग्य असते.

समस्यांचे प्रमुख उगमस्थान –

1) सिद्धांतापासून निगमनाने काढलेले अनुमान -

सिद्धांत हा पारिभाषिक आणि परस्परसंबंधित संकल्पनांनी युक्त अशा विधानांचा संच असतो. (कर्लिंगर 1973) आणि कोणत्याही सिद्धांतांचा सम सर्वसामान्य उद्देश वर्तमान ज्ञानाचे संक्षेपण करणे, अवलोकित घटनांचे व त्यांच्यातील संबंधाचे स्पष्टीकरण प्रस्तुत करणे आणि सिद्धांतांतच अंतर्भूत असलेल्या स्पष्टीकरणात्मक तत्त्वांच्या आधारे पुढे घडणाऱ्या घटनाबाबत व त्यांच्यातील संबंधाबाबत भाकीत करणे, हाच असतो.(कुक 1964) कोणत्यातरी प्रस्थापित सिद्धांत पासून निगमनाने काढलेल्या ग्रहतकांचे व पर्यायाने त्या सिद्धांताचीच चाचणी घेणे हे आवश्यक असते.

सिद्धांत विद्यमान ज्ञानाला संघटित रुप देत असते आणि सिद्धांतद्वाराच अद्याप अनभ्यासित किंवा अज्ञान राहिलेले क्षेत्रे कोणती किंवा विद्यमान ज्ञानात कुठे रिक्तस्थाने आहेत किंव उनिवा कुठे राहिल्या आहेत हे स्पष्ट होते. म्हणून आपल्या विषयक्षेत्रातील प्रस्थापित सिद्धांत बाबतचे ज्ञान संशोधकास असणे आवश्यक आहे.

2) व्यवसायिक अनुभव -

महाविद्यालय किंवा कोणत्याही शाखेतील ग्रंथालयात कार्य करीत असताना प्राध्यापक विद्यार्थी कर्मचारी विद्यार्थी, विद्यार्थी ग्रंथ, माहिती माहितीचा उपभोक्ता यांच्यात सतत गतिमान आंतरक्रिया होत असतात. या आंतरक्रियाच्या चिकित्सक निरीक्षणातून संशोधनासाठी बहु विध समस्या उपलब्ध होऊ शकतात.

3) संबंधित साहित्य -

वरील दोन स्थानात समस्या गवसली नाही. तर अभ्यासकाने आपल्याला स्वारस्य असलेल्या क्षेत्रातील प्रकाशित संशोधन साहित्याचा शोध घ्यावयाचा असतो. संबंधित साहित्यात "युनिव्हर्सिटी न्यूज" या मासिकात संशोधन झालेल्या विषयाची माहिती मिळते.

समस्येचे मूल्यांकन -

1) समस्या संशोधनाची योग्य असावी -

संशोधनासाठी निवडलेली समस्या संशोधनयोग्य असावी अर्थात वैज्ञानिक संशोधन प्रक्रियेच्या आधारे तिचे निराकरण करता यावयास हवे.

उदा.-

1) शालेय अभ्यासक्रमात त्या तत्त्वज्ञानाचा समावेश असावा काय?
2) माध्यमिक शाळांमध्ये लैंगिक शिक्षण देणे योग्य आहे काय?

यासारखे तात्विक आणि मूल्याधिष्ठित प्रश्न वैज्ञानिक प्रगत पद्धती द्वारा सोडवता येणे शक्य नसते. या प्रश्नाबाबत लोकांच्या भावना काय आहेत आहेत हे संशोधनाने जाणून घेता येणे शक्य असते. परंतु या प्रश्नाची निर्णयक उत्तरे मात्र संशोधनद्वारा मिळू शकत नाहीत. तशी उत्तरे मिळवण्यासाठी या प्रश्नाची पुनर्रचना करावयास हवी.

* तत्वज्ञानाचा अध्ययनाने विद्यार्थ्यांच्या विचार करण्याच्या क्षमतेवर काय परिणाम होतो.

2) समस्या निराकरणाने संचित ज्ञानात भर पडावी -

निवडलेल्या समस्येचे निराकरणातून प्रस्थापित ज्ञानात मोलाची भर पडावयास हवी, प्रस्थापित ज्ञानव्यवस्थेतील विसंगती उजेडात आणली जावी. किंवा उपलब्ध ज्ञानातील रिक्त स्थाने दर्शविली जावीत व ती भरून काढली जावीत. निवडलेल्या समस्येत पद्धती, तंत्र, आधार सामुग्री व निष्कर्ष यापैकी कोणत्या तरी बाबतीत निराळेपणा मौलिकता किंवा नवा दृष्टिकोन असणे आवश्यक आहे.

पूर्ववर्ती संशोधनाची जशीच्या तशी पुनरावृत्ती केल्यास त्यात कोणत्याच बाबतीत

नाविन्य राहणार नाही. निवडलेली समस्या ग्रंथालय शास्त्रातील परिस्थिती व गरज या दृष्टीने महत्त्वाचे असणे इष्ट असते. संशोधनाच्या निष्कर्षांचा उपभोग सिद्धांत निर्मितीसाठी किंवा ग्रंथालयातील समस्या व प्रश्न याचे निराकरण करण्याच्या कामी मार्गदर्शन ठरणे आवश्यक असते.

3) **समस्या व्यवहार्य असावी –**

निवडलेली समस्या व्यवहार्य असावी. अर्थात संशोधकाच्या योग्यतेला अनुकूल असावी या संदर्भात अभ्यासकाणे स्वतःशीच प्रश्न विचारावेत व त्यापैकी जितक्या अधिक प्रश्नांची उत्तरे होकारार्थी येतील तितक्या प्रमाणात ती समस्या व्यवहार्य आहे असे समजावे.

संशोधनाची उद्दिष्टे -

संशोधन समस्येच्या प्रथक्करणातून आणि अनेक छोटे प्रश्न निर्माण होतात. या प्रश्नाचे उत्तरे शोधण्यासाठी जे कार्य आवश्यक आहे. ते लहान विधानात मांडणे म्हणजे संशोधनाची उद्दिष्टे सांगणे होय.

- संशोधन ज्या हेतूने केले जात आहे तो हेतू किंवा उद्दिष्टे निश्चित करणे आवश्यक असते.
- उद्दिष्टे जितकी स्पष्ट असतील त्या प्रमाणात संशोधनास अचूक दिशा प्राप्त होते.
- संशोधन उद्दिष्टे कृतिप्रवणशब्दांत(प्रत्यक्ष कार्य करता येईल अशा शब्दात) क्रमाने सांगणे अधिक परिणामकारक ठरते.
- त्यामुळे ही उद्दिष्टे साध्य करण्यासाठी आवश्यक ती माहिती संकलित केली जाते.
- तसेच संशोधनाअंती ही उद्दिष्टे कितपत साध्य झाली हे मानता येते.

संशोधन समस्येची व्याप्ती-

संशोधनासाठी निवडलेल्या समस्येचे भौगोलिक क्षेत्र म्हणजे अभ्यासक्षेत्र होय. हे अभ्यासक्षेत्र एक संस्था, तालुका, जिल्हा, विभाग, राज्य, देश किंवा सभोवतालचा परिसर असू शकतो. त्यामुळे या अभ्यास क्षेत्राची सामाजिक व सांस्कृतिक वैशिष्ट्ये व मर्यादा स्पष्ट करणे आवश्यक असते. निष्कर्ष प्राप्तीसाठी या माहितीचा उपयोग होतो.

- **संशोधन समस्येची मर्यादा –**

संशोधन कार्य कोणत्या वेळेत किंवा कालावधीत केले जाणार आहे. हे आधीच निश्चित केले असेल तर त्यासाठी आवश्यक ती सर्व पूर्वतयारी करता येते.

उदा: 2017 ते 2020 या तीन वर्षातील ग्रंथ देवदेघेव किंवा ग्रंथ वाढ अभ्यासकाने आपली माहिती संकलनासाठी निवड केलेल्या काळाची स्पष्टीकरणात्मक माहिती देणे आवश्यक असते . तसेच संशोधन पूर्ण होण्यास लागणारा खर्च व वेळ याची नोंद काही संशोधन आराखड्यात केली जाते (खर्च फक्त अनुदान मागण्यासाठी सादर करावयाच्या प्रकल्पासाठी देतात. शैक्षणिक प्रकल्पात नाही)

सारांश

अशाप्रकारे वरील विश्लेषणावरून आपल्याला असे दिसून येते की , संशोधन समस्या ही निराकरणाची एक सुव्यवस्थित प्रक्रिया आहे. कारण संशोधन करत असताना संशोधकाला संशोधन

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समस्या ही महत्त्वाची असते संशोधन समस्या हीच संशोधनाची निर्मिती नसते . कोणत्याही ज्ञानशाखेत नवीन तत्वे , तथ्ये शोधण्यासाठी पद्धतशीरपणे चिकित्सा करावी लागते , ती समस्येच्या आधारावरच संशोधन समस्येची निवड करण्यापूर्वी अभ्यासकाने सर्वसामान्य समस्या निवड करावयाची असते समस्या निवड निश्चित केल्यानंतर त्याची व्याप्ती व मर्यादा एका विशिष्ट कालखंडावर तपासावी लागते . म्हणजे संशोधनात वस्तुनिष्ठपणे दिसून येण्यास मदत होईल .

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Librarians As Knowledge Managers

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ABSTRACT

This paper deals with the objectives, features, components, Resources, Key Elements, Process of knowledge Management etc.

Introduction

The term knowledge management was first applied in the profit – seeking enterprise to improve the operations to gain competitive advantage and make profits. Now, knowledge management can also be applied to non- profit making institutions such as government bodies and statutory bodies as well by exploring present and future roles in the transformation of individuals, communities, government and societies at Large.

It can also be used to LICs simultaneously for communicating knowledge between different levels of management and who are directly involve improving work processes as well as in service sectors. Knowledge management stimulates and manages an environment in which knowledge is created, shared and used for the benefit of the organization its, people and its customer or users. Knowledge management has gained significance with the advent and application of Information Technology. Knowledge management enables sharing of information by the people by over coming the limitations of geographical boundaries.

Knowledge Management -

In simple terms knowledge management means, management of knowledge. Knowledge management enables the creation, Communication and application of knowledge of all kinds to achieve goals. (Tiwana, 2000) Knowledge management in general tries to organize and make available important know how, wherever and whenever its's needed. This include processes, procedures, patents, reference work,

formulas, best practices, forecasts and fixes, technologically, intranets, groupware, data warehouses, networks, bulletin boards, video conferencing are key tools for storing and distributing this intelligence (Maglitta, 1996)

Objectives of Knowledge Management.

The broad objectives of knowledge management are :

- To leverage internal and external expertise to build and apply industry leading skills.
- To develop and exploit intangible assets including brands, technology and know how.

The primary objective of knowledge management is to provide right knowledge at the right time to the right person. This would enable individuals to make appropriate informed choice, based on relevant information pieced together through intelligent systems.

Features of Knowledge Management.

The following are the important features of knowledge management :

- Knowledge management is to implement the concept of sharing information and expertise by which employees not only share their knowledge but also make it available to the entire organization.
- The knowledge management is to change the culture from "Knowledge is power" to "knowledge sharing is power"
- Knowledge management is the subject that accepts intellectual capital as the main management assets.
- Knowledge management provides an environment and opportunities of learning while doing.

Components of Knowledge Management.

Knowledge management basically involves the following three components ;

1. People management recognition of skills of people.
2. Process management links into the identification and deployment of practice may be associated with Business process Reengineering.
3. Information management.

Knowledge Resources.

Organizations have numerous kinds of knowledge resources. The intellectual and knowledge based assets fall into one of two categories : explicit or tacit. Explicit knowledge is that what we can express to others. It is formal and systematic. For this it can be easily communicated and shared, in product specifications or a computer program.

Key Elements of Knowledge Management

Implementation of knowledge management requires :

1. High level commitment to change.
2. Human Resource of organization.
3. Understanding among the staff.
4. Keeping track of the process of workflow in the organization.

The knowledge management system should be able to provide information relevant to the ongoing projects at the right time and in the right context.

Process of Knowledge Management –

Davenport explains that knowledge management is about acquisition, creation, packaging and application or reuse of knowledge, some examples of each of these types of knowledge management process are :

1. Knowledge Acquisition :
2. Finding existing knowledge understanding requirements, searching among multiple sources.
3. Knowledge creation :
   Research Activities, creative processes in advertising ,writing books or articles, making movies and so on.
4. Packaging : Publishing , editing, design work.
5. Applying or using existing knowledge :
   Auditing, medical Diagnosis
6. Reuse of knowledge for new purpose :
   Leveraging knowledge product development processes, software development.

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6. Reuse of knowledge for new purpose :
   Leveraging knowledge product development processes, software development.

Librarians As Knowledge Managers :

Tools of knowledge management consists 70% of services and 30% of Technologies. Librarians provide these 70% services. This indicates the role of librarians as knowledge manager . Where their functions are :

1. Sharing of information and understanding of user needs.
2. Providing services to the user community.
3. Analyzing documents, classifying and sorting them for easy retrieval.
4. Building the index etc.

Conclusion :

Knowledge Management is not managing or organizing books or journals, searching the internet for clients or arranging the circulation of materials. However each of the activities can in some way be part of the knowledge activities can management spectrum and process.

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ROGOR INDUCED HISTOPATHOLOGICAL CHANGES IN THE GILLS OF FRESHWATER FISH *PUNTIUS STIGMA* FROM SUKHANA RIVER, AURANGABAD (M.S) INDIA

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ABSTRACT:

Histological biomarkers of toxicity in fish organs are a useful indicator of environmental pollution. The histological effects of rogor, an organophosphate insecticide, on the gill tissues in *Puntius stigma* were determined. The fishes *Puntius stigma* were exposed to lethal concentrations at 96 hrs LC_{50} and sub lethal concentrations at (1/5, 1/10 and 1/15 ppm) of rogor for 30 days. The fishes shows severe histological changes in the gill lamellae such as bulging, epithelial hypertrophy, fusion of secondary lamellae, hemorrhage, curling of lamellae, swelling of pillar cells, swelling of chloride cells.

Key word: Histopataology, Rogor, LC_{50}, Sub-lethal Concentration, Gills, *Puntius stigma*.

Introduction:

Fish species were recently suggested as environmental biomarkers (Tom *et al.*, 2003). Quantification of fish metallothionein transcript levels in absolute units has only recently been presented (Evans *et al.*, 2000). It also, considered as early warning for degradation of environmental quality, but also specific measures of the toxic, carcinogenic and mutagenic compounds in the biological materials (Verlecar *et al.*, 2006).

Fish are very susceptible to bioaccumulation in their fatty tissues, as they take up linden residues from the water through the gills and skin (Ortiz *et al.*, 2002). The exposure to chemical contaminants can induce a number of lesions and injuries to different fish organs suitable for histopathological examination in searching for damages to tissue and cells (Rabitto *et al.*, 2005).

In fish, gills are critical organs for respiratory and osmoregulatory functions. Respiratory distress is one of the early symptoms of pesticide poisoning. In the gills these toxicants appear to break down the adhesion between epithelial branchial cells and the underlying pillar cells; this is accompanied by a collapse of the structural integrity of the secondary lamellae and subsequent failure of the respiratory functioning of the gills.

A review of literature shows that no much more efforts were made to study the histopathological changes caused by rogor (dimethoate) in the different tissues of the freshwater fishes, *Puntius stigma*. The present investigation was undertaken to study in detail the histopathological changes in the gills of the freshwater fishe, *Puntius stigma* after acute and chronic exposure to the rogor.

MATERIAL AND METHODS

The live specimens of *Puntius stigma* were collected from Sukhana River flowing near Nipani, 25 km away from Aurangabad (M.S.) and brought to the laboratory. The fishes were maintained in glass aquaria and were acclimatized for four weeks. During the acclimatization healthy fishes showing normal activities were selected for histopathological studies.

The fishes were maintained in sufficiently large aquaria so to prevent overcrowding, the acclimatized fishes were given artificial air by aerator. Glass aquaria of size (3* 1* 1* feet) were used as test container.

The *Puntius stigma* ranged from 7.5 to 8.5 cm in length and 4.5 to 5.5 gm in weight were selected for the test. The fish, *Puntius stigma* exposed to lethal concentrations for 96 hr at 7.1 ppm (LC_{50}) of rogor. Simultaneously a control aquarium was also maintained. At the end of acute exposure for 96 hrs the survived fishes were killed by decapitation and gill were removed and fixed in Bouins fluid for 24 hrs, and histopathology was studied.

In the second set of experiment, the test fishes, *Puntius stigma and* were exposed to three sublethal concentrations of rogor for 30 days such as 1/5, 1/10 and1/15 ppm were prepared. Simultaneously, a control aquarium was maintained. At the end of experiment, surviving fishes were utilized for histopathological study. All the tissues were immediately fixed in Bouins fluid for 24 hrs and processed according to standard procedure of routine micro technique.

RESULTS

The remarkable histopathological changes due to exposure to rogor in the gill of *Puntius stigma* are depicted in microphotographs. In the controlled set no histopathological changes were observed.

Histology of Gill (control):

Gills were situated in branchial chamber on either side of the body in fishes. Each gill has a gill arch with double row of elongated, laterally projecting gill filaments. These filaments were flat and leaf like and joint at the base on gill rackers by a gill septum. Numerous semicircular, leaf like projections were lined up along both sides of the primary lamellae (PL) called as secondary gill lamellae (SL). The primary gill lamellae consist of centrally placed rod like supporting axis with blood vessels on either side. The secondary lamellae termed as respiratory lamellae were highly vascularised and covered with thin layer of epithelial cells. Blood vessels were extended into each of the secondary gill filaments provided with pillar cells (PC) and chloride cells (CC).

The secondary lamella was supplied with marginal blood sinus lined by an endothelium. In between the secondary gill lamellae and the primary filament, lined by thick stratified epithelium (ILR). This region between two adjacent secondary gill lamellae was known as interlamellar region (Fig 1a).

Histopathology of gill:

The fish exposed to lethal concentration for 96 hrs at 7.1 ppm (LC_{50} of 96 hrs) of rogor showed noticeable degenerative changes in the architecture of gill, fusion of secondary lamellae (FSL), curling of secondary lamellae (CSL), swelling of chloride cells (SCC), swelling of pillar cells (SPC) and degeneration of secondary lamellae (DSL) have been noticed (Fig.2 b).

Fish was exposed to sublethal concentration at 1.41 ppm (1/5) of rogor (dimethoate), for 30 days displayed marked histopathological changes. In the gills, the most common symptoms of toxic exposure were haemorrhage (HR), curling of secondary lamellae (CSL), swelling of chloride cells (SCC) and swelling of pillar cells (SPC). (Fig.3 a).

Fish was exposed to sublethal concentration at 0.70 ppm (1/10) of rogor for 30days exhibited noticeable pathological changes. The most common symptom was hemorrhage (HR), curling of secondary lamellae (CSL), swelling of chloride cells (SCC) and widening of primary gill lamellae (WPL). (Fig.4 b).

The fish exposed to sublethal concentration at 0.46 ppm (1/15) of rogor for 30 days showed pathological changes such as bulging tip of primary lamellae (BPL), fusion of secondary lamellae (FSL) hemorrhage (HR) and reduction in secondary lamellae (RSL) have been noticed (Fig.5 a).

DISCUSSION

In the present study it has been observed that increased exposure period, though exposed to a lower concentration, leads to increased damage to the tissue of the freshwater fishe *Puntius stigma* respectively.

The main objective of the histological assessment of the gill is to verify the possible damages caused to the organism by rogor, evidencing alterations resulted from the acute and chronic toxicity. The gills have a large superficial area through which gaseous exchanges between the blood and the external medium take place (Newstead, 1987). Beside the respiratory function, this organ performs other vital functions such as osmoregulation and excretion (Mallat, 1985). The direct contact between this organ and water promotes the interaction with toxic substances present in the water as they are sites of ionic link to perform normal functions. Adsorption of metal and other pollutant with charges may eventually occur; bring about toxic effect on the organism (Hollis and Playle, 1997).

Many investigators have reported the histopathological changes in gills of different fish species exposed due to pesticides. Mucus extrusion, lamellar swelling, fused and reduced microridges were observed in bluegill sunfish, *Lepomis macrochirus* to different sublethal concentrations of diazinon (Dutta *et al.,* 1997).

In another study, cloudy swelling, bile stagnation, focal necrosis, atropy and vacuolization have been reported in the *Corydoras paleatus* exposed to methyl parathion (Fanta *et al.,* 2003). Hyperplasia, vacuolation, disintegrated blood vessels, disrupted hepatocytes, focal coagulative necrosis, disorganized hepatic canaliculi were observed by (Sarkar *et al.,* 2005) in *Labeo rohita* exposed to cypermethrin.

Herbicide atrazine was administered to *Labeo rohita* fingerlings in 120 hours. The used dose of atrazine was 0.18 mg/l for 120 hours .The histopathological changes in the gill tissue like epithelial hyperplasia, curling of secondary lamellae and changes in chloride cells, besides these changes pyknotic nuclei, vacuolization, degradation of epithelial cells and pillar cells, were noticed (Jayachandran and Pugazhend 2009).

The present study reveals extensive damage to the gill architecture of treated fishes compared to gill of control fish. In the present investigation, *Puntius stigma* subjected to rogor showed marked histopathological changes in gill like, bulging tip of primary lamellae, Fusion and curling of secondary gill lamellae, widening of interlamellae distance, swelling in pillar and chloride cells and their nuclei appear swollen and pyknotic. Hemorrhage at primary in the rogor treated fishes in contract to control fish. The pathological changes in the gills might have resulted due to shifting from aerobic to anaerobic pathway in tissue respiration of fish under stress.

Histopathological evidences in the present study have been correlated to some extent with the work of (Paithane, 2010; Butachiram,*et al.*, 2009; Daksh and Capoor; 2011 and Subburaj A *et al.*,2018).

In the present study an attempts have been made to evaluate the intensity of the damage done to different organs of fishe *Puntius stigma* subjected to its lethal and sublethal concentrations of rogor. Histological changes induced due to the rogor in the gills of the freshwater fishes *Puntius stigma* were studied.

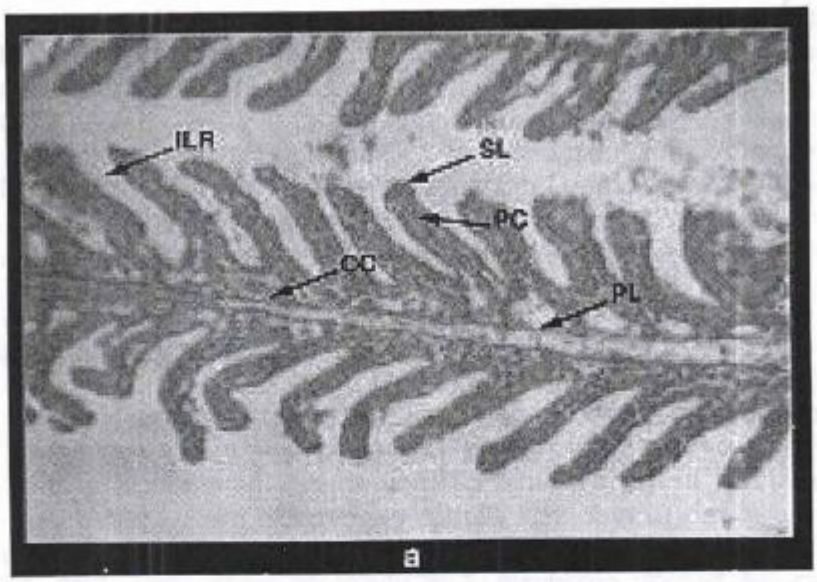

Fig 1(a) L.S. of Gill of Puntius stigma (Control). H/E 100X: ILR (Inter Lamellar Region), P (Primary gill Lamellae), CC (Chloride Cell), SL (Secondary Gill Lamellae), PC (Pillar Cell)

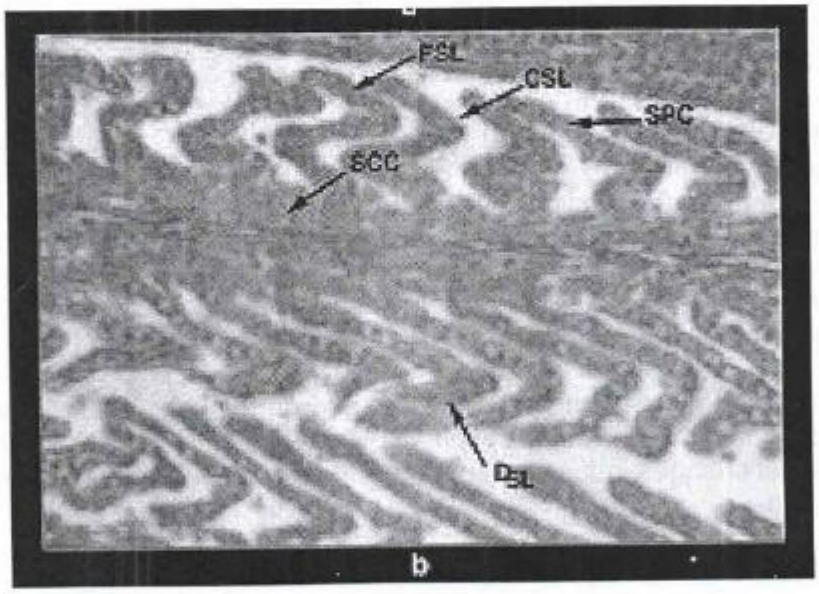

Fig 2 b) L.S. of gill of *Puntius stigma* after 7.1 ppm (LC_{50} of 96 hrs) exposure to rogor. H/E 400 x: DSL (Degenerated Secondary Lamellae), SPC (Swelling of Pillar Cell), CSL (Curling of Secondary Lamellae), SCC (Swelling of Chloride Cells), FSL (Fusion of Secondary Lamellae)

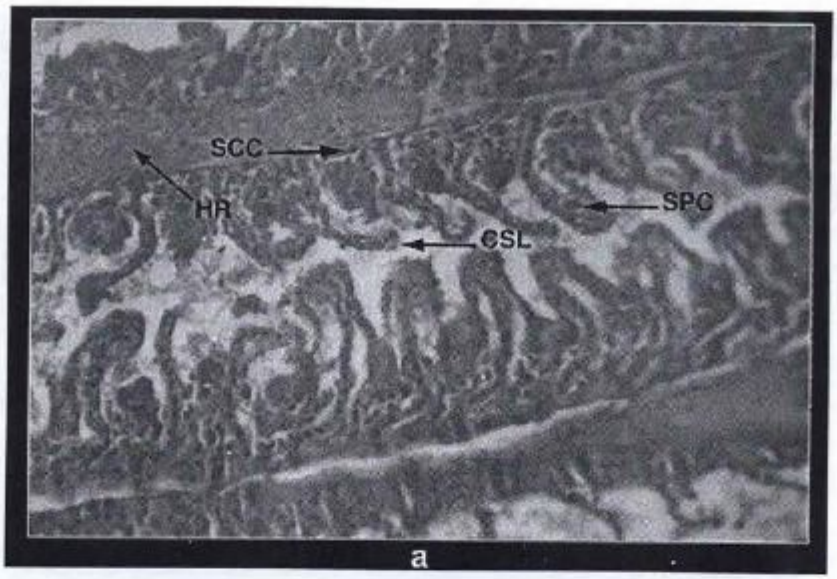

Fig 3 a) L.S. of gill of *Puntius stigma* after 1.70 ppm (1/5) exposure to rogor. H/E 400 x. HR (Haemorrhage), CSL (Curling of Secondary Lamellae), SCC (Swelling of Chloride Cells) and SPC (Swelling of Pillar Cells).

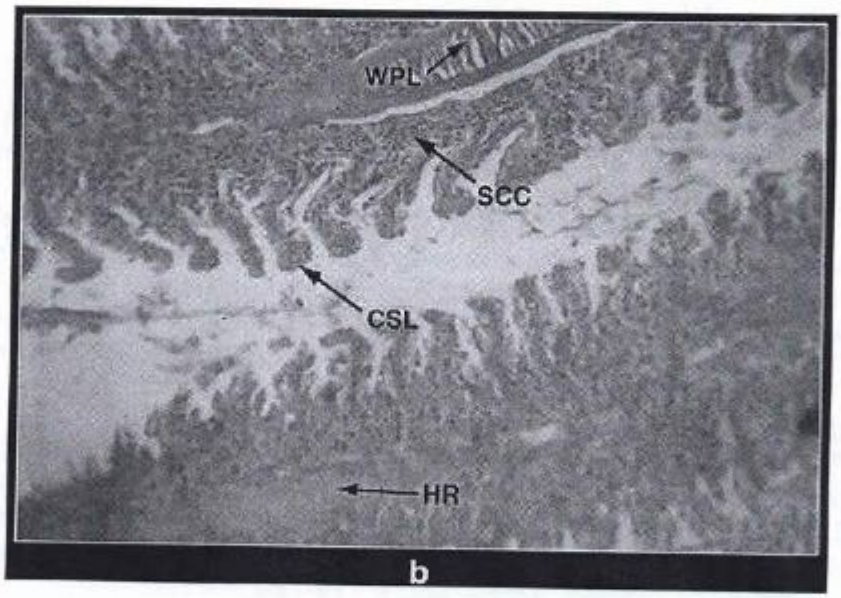

Fig 4 b) L.S. of gill of Puntius stigma after 0.70 ppm (1/10) exposure to rogor. H/E 400 x. SCC (Swelling of Chloride Cells), WPL (Widening of Primary Lamellae), HR (Haemorrhage), CSL (Curling of Secondary Lamellae).

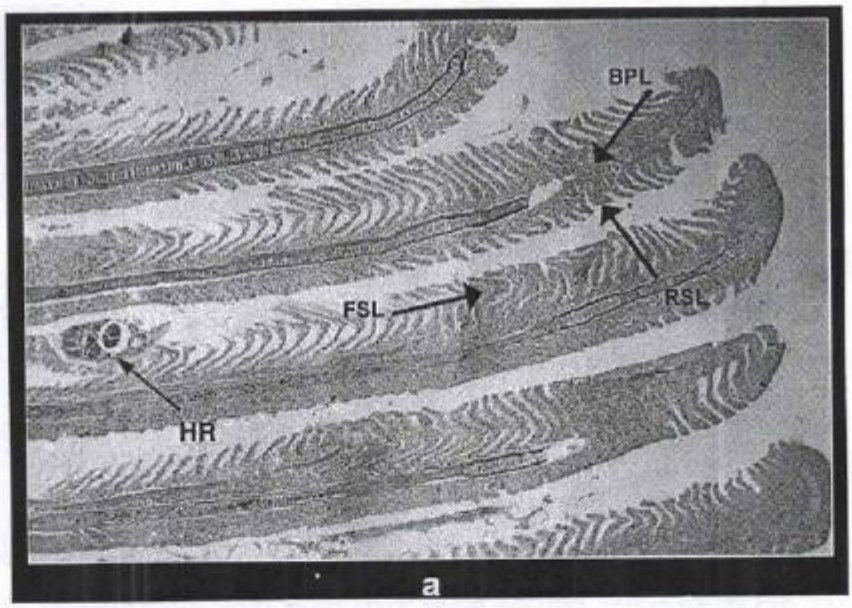

Fig 5 a) L.S. of gill of Puntius stigma after 0.46 ppm (1/15) exposure to rogor. H/E 100 x. BPL (Bulging tip at the Primary Lamellae), FSL (Fusion of Secondary Lamellae), RSL (Reduced Secondary Lamellae), HR (Haemorrhage).

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INDUCED BREEDING OF FRESH WATER FISH CATLA CATLA BY THE APPLICATION OF CARP PITUITARY EXTRACT AND OVAPRIM, AT FISH BREEDING CENTER JAIKWADI, PAITHAN, DIST. AURANGABAD (M.S.) INDIA.

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Abstract

In present study, June - August 2009 and June-August 2010. (breeding season) spawning response of ovaprim compared with pituitary extract in *Catla catla*, at fish breeding center at Jaikwadi, Paithan Dist. Aurangabad (M.S) India. Total ten trial doses of ovaprim were and ten trial doses of Carp Pituitary Extract (CPE) were used for induced breeding in Indian major carps *i.e Catla catla,*. The overall fertilization 77.12% was found with CPE treatment. and 94.20% with ovaprim treatment. The overall hatching 68.25% with CPE treatment and 92.08% with Ovaprim.
Key words: Induced breeding , *Catla Catla*, Synthetic hormone, Carp pituitary extract, Fertilization rate, hatchling rate etc.

INTRODUCTION

Fish serves as an important source of human diet as they provide proteins, fats and especially vitamins A and D. A special feature of fish is content of vitamins - B, which is absent in plant food. Fish is a good source of calcium. Polyunsaturated fatty acids (PUFA) belonging to linolenic acid series (18:3) are normally present in fish. Fish oil is essential for the prevention of coronary heart diseases. Balanced ratios of ω3 linolenic acid (18:3) and ω2 linoleic acid (18:2) in fish flesh are found to be useful for maintaining a healthy heart. The most important fatty acid for human diet is linoleic acid (18:2n6) and linolenic acid (18:3n3), because they cannot be endogenously synthesized (George *et al.*, 2000).

In order to provide food to the ever increasing population, agricultural production alone may not be sufficient to fulfill the demand of the country. As fish food is cheap, rich in protein can possibly be used as an alternative. For this the production of fish on a commercial basis has to be increased, for which all efforts both from research point of view as well as government needed support. The fish eating population is about 56% with a per capita consumption of 9.5 kg/annum. (Jagtap, 2002).

Due to heavy population growth, severely facing the problem of malnutrition and health hazards in common people. For the increasing demand of nutritious food and to get rid off malnutrition, scientists are busy to explore the aquatic resource to the maximum to tide over the problem of people. In the present investigation comparative study of ovaprim and CPE was carried out and finding out an effective substitute for CPE.

MATERIAL AND METHODS

The experiments were carried out during June - August 2009 and June-August 2010. (breeding season) at fish breeding center Jayakwadi, Paithan, Dist. Aurangabad in Maharashtra state 55 km away from Aurangabad. Brooders were collected from the stocking pond of fish breeding center at

Jayakwadi. Healthy males and females were selected: by the external morphological characteristics males and females were identified for the experiments.

After selection of males and females of *Catla catla* in the ratio 2:1 (male: female) were brought to circular hatchery. Pituitary extract was injected intramuscularly in the dorsolateral region. The first dose 0.2 - 0.4 ml/kg body weight was administrated to the females for promoting maturation and second dose 0.6 - 0.8 ml/kg body weight was administrated to the females at the same time, the first dose 0.2 - 0.4 ml/kg body weight was administrated to the males. At the same time for inducing spawning a single dose of ovaprim 0.4-0.6 ml/kg body weight were administered to the both males and females.

Injected brooders were released in a breeding pool. Experimental brooders were observed for 72 hrs after injection; at interval of 4 to 6 hrs the fishes gave responses as a behavioral changes, regarding, maturation, ovulation and spawning.

Preparation of pituitary extract:

The pituitary glands were collected from Indian major carp in the month of June to August. To procure the pituitary, the top of the skull was removed with the help of a knife. Collected pituitaries were homogenized in 0.6% salt solution or distilled water. The solution was centrifuged and the clear supernatants were used for injection.

OVAPRIM:

Ovaprim is a synthetic drug (spawning hormone for fish) manufactured by M/s Syndel Laboratories Ltd., Canada, containing 20 µg sGnRH (salmon gonadotropin releasing hormone) and 10 mg domperidone in 1 ml solution. It was used for final maturation spawning of *Catla catla* and effectiveness is compared with CPE.

Counting of egg:

Total number of eggs laid can be calculated by using following formula

$$\text{Total no. of eggs Laid (approx)} = \text{Average number of eggs each sample beaker} \times \text{Number of beakers of eggs}$$

Percentage of Fertilization:

The fertilization rate was calculated through random sampling by examining 2-3 samples from each breeding tank by using following formula

$$\text{Fertilization rate (\%)} = \frac{\text{Average no. of fertilized Eggs in a sample}}{\text{Average no. of eggs in a sample}} \times 100$$

Percentage of Hatchling:

Percentage of hatchling were calculated by following formula

$$\text{Hatchling \%} = \frac{\text{Total no. of spawn}}{\text{Total no of fertilized eggs}} \times 100$$

Table no. 1:- Spawning response of female *Catla catla* with Pituitary extract. (Year 2009)

Mon	No. of female treated	Total wt of female (kg)	Average no. of eggs obtained	Dose of Pitutary extract ml/kg body weight		Average no. of fertilized eggs	Total no. of hatchling	Average no. eggs Kg^{-1} (Fecundity)	Average no. fertilized eggs Kg^{-1}	Average no. Hatchling eggs Kg^{-1}	Fertilization rate (%)	Hatchling rate (%)
				I st	II nd							
Jun	4	12.0	9800	0.	0.	6800	40000	7906	5666	33333	69.38	58.82

e 09			**00**	2-0.4	6-0.8	**00**	**0**	**9**	**6**			
July 09	4	16.5	1300000	0.2-0.4	0.6-0.8	1000000	690000	78787	60606	41818	76.92	69
July 09	4	16.5	1200000	0.2-0.4	0.6-0.8	930000	635000	72727	56363	38484	77.5	68.27
Aug .09	4	17.5	1300000	0.2-0.4	0.6-0.8	970000	630000	74285	55428	36000	74.61	64.94
Aug .09	4	21.5	**1700000**	0.2-0.4	0.6-0.8	**1450000**	**1135000**	**81666**	**67441**	**52790**	**85.29**	**78.82**

Table no. 2:- Spawning response of female *Catla catla* with Ovaprim (Year 2009)

Months	No. of female treated	Total wt of female (kg)	Average no. of eggs obtained	Dose of ovaprim ml/kg body weight	Average no. of fertilized eggs	Total no. of hatchling	Average no. eggs Kg-1 Fecundity)	Average no. fertilized eggs Kg-1	Average no. Hatchling eggs Kg-1	Fertilization rate (%)	Hatchling rate (%)
June 09	4	19.0	**2000000**	0.4 - 0.6	**1900000**	**1790000**	**121052**	**92682**	**87317**	**92.00**	**89.31**
July 09	4	12.0	1450000	0.4 - 0.6	1370000	1230000	95294	114166	102500	94.48	89.78
July 09	4	16.0	1760000	0.4 - 0.6	1690000	1560000	120833	105625	97500	96.02	92.30
Aug. 09	4	17.0	1620000	0. 4-0.6	1500000	1350000	140000	88235	79411	92.59	90
Aug. 09	4	20.5	**2300000**	0.4 - 0.6	**2116000**	**1890000**	**110000**	**111368**	**99473**	**95.00**	**94.21**

Month	No. of female treated	Total weight of female	Average no. of eggs obtained	Dose of Pitutary extract ml/kg	Average no. of fertilized eggs	Total no. of hatchling	Average no. eggs Kg^{-1} Fecundity)	Average no. fertilized eggs Kg^{-1}	Average no. Hatchling eggs Kg^{-1}	Fertilization rate (%)	Hatchling rate (%)

		(kg)		body weight								
				I st	II nd							
June 10	4	10.5	**780000**	0.2-0.4	0.6-0.8	570000	380000	74285	54285	36190	73.07	66.66
July 10	4	7.0	535000	0.2-0.4	0.6-0.8	420000	300000	76428	60000	42857	78.50	70.42
July 10	4	13.0	900000	0.2-0.4	0.6-0.8	720000	510000	69230	55384	39230	**77.64**	**68.18**
Aug .10	4	10.5	830000	0.2-0.4	0.6-0.8	650000	430000	79047	61904	40952	78.31	66.15
Aug .10	4	12.0	**850000**	0.2-0.4	0.6-0.8	**660000**	**450000**	**70833**	**55000**	**37500**	**80**	**71.83**

Table no. 3:- Spawning response of female *Catla catla* with Pituitary extract. (Year 2010)

Table no. 4:- Spawning response of female *Catla catla* with Ovaprim (Year 2010)

Months	No. of female treated	Total weight of female (kg)	Average no. of eggs obtained	Dose of ovaprim ml/kg body weight	Average no. of fertilized eggs	Total no. of hatchling	Average no. eggs Kg-1 Fecundity)	Average no. fertilized eggs Kg-1	Average no. Hatchling eggs Kg-1	Fertilization rate (%)	Hatchling rate (%)
June 10	4	18.0	1700000	0.4 - 0.6	1595000	1440000	97560	88611	80000	93.82	90.28
July 10	4	17.5	2015000	0.4 - 0.6	1914000	1800000	94444	109371.	102857	94.98	94.04
July 10	4	19.5	2200000	0.4 - 0.6	2112000	1964000	122500	108307	100717	**93.06**	92.99
Aug. 10	4	20.0	2450000	0.4 - 0.6	2280000	2170000	115142	114000	108500	**96**	95.17
Aug. 10	4	20.5	2210000	0.4 - 0.6	2080000	1930000	112820	101463	94146	94.11	**92.78**

Table no. 5: Overall effect of Pituitary extract and ovaprim on spawning, *Catla catla.* (2009-2010)

Pituitary extract		Ovaprim	
Parameters	**Results**	**Parameters**	**Results**
No. of females treated	40	No. of females treated	40
Total weight of females	137	Total weight of females	180
Total no. of eggs obtained	1037500	Total no. of eggs obtained	1970500
Total no. of fertilized eggs	805000	Total no. of fertilized eggs	1855700
Total no. of hatchlings	556000	Total no. of hatchlings	1712400
Average no. eggs per kg.	75636	Average no. eggs per kg.	112964
Average no. of fertilized eggs per kg.	58307	Average no. of fertilized eggs per kg.	103383
Average no. of hatchlings per kg.	39915	Average no. of hatchlings per kg.	95242
Overall fertilization %	77.12	Overall fertilization %	94.20
Overall hatchlings %	68.25	Overall hatchlings %	92.08

RESULTS

In the present study we have practiced intramuscular injections in each trial during June-August 2009 to June- August 2010 applying appropriate doses of the hormones. Aggressiveness in the brooders was noticed after 4-6 hrs, of the second dose (0.6 - 0.8 ml/kg body weight) of pituitary extract to female and first dose (0.2 - 0.4 ml/kg body weight) of pituitary extract to male. Whereas the single dose of ovaprim were administrated to both male and female *C. catla*.

The ratio of the male:female (2:1) were selected for each trial. In the present study, 80 males and 40 females which were healthy and disease free brooders selected for the experiments. The average results during study period i.e June-August 2009 and June-August 2010 have been tabulated (Table nos. 1, 2, 3 & 4).

Spawning response due to pituitary extract (2009):

In the month of June 2009 the number of treated females fish were four, total weight of fish was recorded 12 kg. The minimum response was recorded the average number of eggs obtained

980000, average number of fertilized eggs were 680000, average number of hatchlings were 400000, average number of eggs per kg body weight of the fish was 79069, average number of fertilized eggs per kg body weight of the fish was 56666, average number of hatchlings per kg body weight of the fish was 33333, fertilization rate (%) was 69.38% and hatchlings rate (%) was 58.82% of *C. catla* presented (Table no. 1).

While in the month of August 2009 the number of treated females fish were four, total weight of fish recorded was 21.5 kg. maximum response was recorded such as the average number of eggs obtained 1700000, average number of fertilized eggs were 1450000 average number of hatchlings were 1135000, average number of eggs per kg body weight of the fish was 81666, average number of fertilized eggs per kg body weight of fish was 67441, average number of hatchling per kg body weight of the fish was 52790, fertilization rate (%) was 85.29% and hatchling rate (%) was 78.82 % of C. catla presented (Table no. 1).

Spawning response due to ovaprim (2009):

During June, 2009 the number of treated female fish were four, total weight of fish recorded was 19.0 kg. the minimum response was observed such as the average number of eggs obtained 2000000, average number of fertilized eggs were 1900000, average number of hatchlings were 1790000, average number of eggs per kg body weight of fish was 121052, average number of fertilized eggs per kg body weight of fish was 92682, average number of hatchling per kg body weight of fish was 87317, fertilization rate (%) was 92.00% and hatchling rate (%) was 89.31% of *C. catla* presented (Table no. 2).

In the month August, 2009 the number of treated females fish were four, total weight of fish recorded was 20.5 kg. the maximum response was noticed such as the average number of eggs obtained 2300000, average number of fertilized eggs were 2116000, average number of hatchling were 1890000, average number of eggs per kg body weight of fish was 110000, average number of fertilized eggs per kg body weight of fish was 111368, average number of hatchling per kg body weight of fish was 99473, fertilization rate (%) was 95.00% and hatchling rate (%) was 94.21% of *C. catla* presented (Table no. 2). Fertilization and hatchling rate (%) which were observed due to pituitary extract and ovaprim are presented in (Fig no. 1& 2).

Spawning response due to pituitary extract (2010):

During June, 2010 the number of treated female fish were four, total weight of fish recorded was 10.5 kg. minimum spawning response was found such the average number of eggs obtained were 780000, average number of fertilized eggs were 570000, average number of hatchling were 380000, average number of eggs per kg body weight of fish was 74285, average number of fertilized eggs per kg body weight of fish was 54285, average number of hatchling per kg body weight of fish was 36190, fertilization rate (%) was 73.07% and hatchling rate (%) was 66.66 % of *C. catla* presented (Table no. 3).

In the month August, 2010 the number of treated female fish were four, total weight of fish recorded 12.0 kg. maximum response was found such as the average number of eggs obtained were 850000 average number of fertilized eggs were 660000 average number of hatchling were 450000, average number of eggs per kg body weight of fish was 70833 average number of fertilized eggs per kg body weight of fish was 55000, average number of hatchlings per kg body weight of fish was 37500, fertilization rate (%) was 80.00% and hatchling rate (%) was 71.83 % of *C. catla* presented (Table no. 3).

Spawning response due to ovaprim (2010):

During the month of June 2010 the numbers of treated female fish were four, total weight of fish recorded was 18.0 kg. minimum spawning response was found such as the average number of eggs obtained were 1700000, average number of fertilized eggs were 1595000, average number of hatchling were1440000, average number of eggs per kg body weight of fish was 97560, average number of fertilized eggs per kg body weight of fish was 88611, average number of hatchling per kg body weight of fish was 80000, fertilization rate (%) was 93.82% and hatchling rate (%) was 90.28 % of *C. catla* presented (Table no. 4) and fertilization and hatchling rate (%) which were observed due to pituitary extract and ovaprim are presented in (Fig no. 3 & 4).

During month August, 2010 the number of treated female fish were four, total weight of fish recorded 20.5 kg. the maximum response was observed such as the average number of eggs obtained 2210000, average number of fertilized eggs were 2080000, average number of hatchling were 1930000, average number of eggs per kg body weight of fish was 112820, average number of fertilized eggs per kg body weight of fish was 101463, average number of hatchling per kg per

kg body weight of fish was 94146, fertilization rate (%) was 94.11% and hatchling rate (%) was 92.78% of C. catla presented (Table no. 4).

The overall effect of pituitary extract such as average number of eggs per kg body weight of fish was 75636, average number of fertilized eggs per kg body weight of fish 58307, average number of hatchling per kg body weight of fish 39915 overall fertilization rate (%) 77.12% hatchling rate (%) 68.25% of *C. catla* presented in (Table no. 5).

While the overall effect due to ovaprim such as average number of eggs per kg was 112964, average number of fertilized eggs per kg was 103383 average number of hatchling per kg 95242, overall fertilization rate (%) 94.20%, hatchling rate (%) 92.08% of C. catla presented in (Table no. 5). The effect of ovaprim on spawning response was noticed such as average number of eggs obtained, average number of fertilized eggs, total number of hatchling, average number of eggs per kg body weight of fish, average number of fertilized eggs per kg body weight of fish, average number of hatchling, per kg body weight of fish, fertilization rate (%), hatchling rate (%) of *C. catla* was higher as compared with pituitary extract in every trial. The fertilization and hatchlings percentage were graphically presented (Fig. nos. 1, 2, 3 & 4). The overall response due ovaprim was found better than response due to pituitary extract.

FERTILIZATION (%) RATES:

In the present study due to the pituitary extract the overall average number of fertilized eggs per kg body weight was 58307, Overall fertilization 77.12% while due to the ovaprim the overall average number of fertilized eggs per kg body weight of fish was 103383 and Overall fertilization rate 94.20%.

Fertilization rate was analyzed by T- test, the average number of fertilized eggs per kg body weight of treated fish with pituitary extract as well as ovaprim t- value 1.72 recorded was showed non- significant difference. However, due to ovaprim treatment 17% better results towards fertilization rate (%) as compared with the pituitary extract treatment had been recorded.

HATCHLING (%) RATES:

In the present study due to the pituitary extract the overall average number of hatchling eggs per kg body weight of fish was obtained 39915 and the overall hatchling rate 68.25% while due to the ovaprim the overall average number of hatchling eggs per kg body weight of fish was obtained 95242 and overall hatchling rates 92.08% (Table no. 5)

Hatchling rate was analyzed by T- test, the average number of fertilized eggs per kg body weight of fish treated with pituitary extract as well as ovaprim t- value 1.27 recorded was showed non- significant difference. However, due to ovaprim treatment 24% better results were noticed towards hatchling rate as compared with the pituitary extract treatment.

DISCUSSION

During the present study, a single intramuscular dose of pituitary extract administered to the male and double dose to the female. Whereas due to a single dose of synthetic hormone ovaprim to both male and female were resulted in successful spawning in Indian major carp, *C. catla*. The results of the hormonal stimulation in the present study are quite similar to the earlier findings using ovaprim-C (Muhammad *et al.*, 2005; Basaran *et al.*, 2008).

Results of the present study indicate that ovaprim had the better results as compared with the pituitary extract. Due to pituitary extract ovulation, fertilization and hatchlings values in *C. catla* were recorded such as, total number of eggs 1037500, fertilization percentage 69.38-78.50 %, hatchlings percentage 58.82-78.82%.

Due to ovaprim ovulation, fertilization percentage and hatchlings percentage in *C. catla* were recorded such as total number of eggs 1970500, fertilization percentage 92 - 96.02 %, hatchlings percentage 89.31 - 94.98 %.

In the present study from June-August 2009 – 2010 (breeding seasons), every trial shows that the number of eggs per Kg body weight are higher in ovaprim treated fishes as compared with the pituitary extract treated fishes. Due to the pituitary extract administration, the number of eggs obtained per kg body weight of fish were 79069 – 81666 and due to the ovaprim administration the number of eggs obtained per kg body weight of fish recorded were 94444 – 140000.

Earlier workers have been reported that ovaprim has better results in induced spawning, fertilization and hatchling rate compared with pituitary extract are more or less similar to the present findings regarding induced breeding (Nandeesha *et al.*, 1990); (Azad *et al.*, 1991); (Khan *et al.*, 1992); (Alok *et al.* 1993); (Chauhan *et al.*1999); (Reddy *et al.*, 2000); (Ragade, 2000);

(Dhabe, 2002); (Dhawan *et al.*,2004); (Das, 2004); (Muhammad *et al.*2005); (Naeem *et al.*, 2005a, b, c); (Rokade *et al.*2006); Sahoo *et al.*, 2007); (More *et al.*, 2010); (Seyed *et al.*, 2010); (Indira *et al.*, 2012); (Abdulraheem *et al.*, 2012) and (Indira, 2012). (More *et al.*, 2016)

Conclusions

Present result indicates that ovaprim might be considered best substitute over pituitary extract during induced breeding.

Based on present study it is consequently concluded that the rate of fertilization and hatchling are higher in ovaprim because reduced handlings of brood fish due to the single dose administrated to both the sexes at the same time which decrease post spawning mortality of fish and increase spawning response in ovaprim dose compared with pituitary extract treatment.

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EFFECT OF PLANT LEAF EXTRACT ON FUNGAL DISEASES OF IVY GOURD

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ABSTRACT

The present investigation with deals effect of leaf extract in fungal diseases of Ivy gourd in vitro condition. Leaf extracts use of *Azadirachta indica, Ocimum gratissimum, Adhatoda vasica, Aegle mormelos* and *Santalum album*. 25, 50, 75 and 100 ppm concentration antifungal activity against fungi in fruit rot of *Ivy* gourd viz. *Geotrichum candidus*.

Keywords: Ivy Gourd, *Geotrichum candidus* Plant Extract, Food Poisoning Technique

INTRODUCTION

Ivy gourd (*Coccinia indica* L.) is a tropical plant in the family of *Cucurbitaceae*, commonly known as little gourd. The other common names for Ivy gourd are scarlet fruited gourd, Tindori, and locally known as Thondekai (Wasantwisut and Viriyapanich, 2003). The origin of ivy gourd lies in the tropical zone of Asia, North and Central Africa. It is commonly found in countries like India, Indonesia, Malaysia, Philippines and Thailand (Wasantwisut and Viriyapanich, 2003). The fruit of ivy gourd belongs to the berry type: ovoid to elliptical and hairless with thick and sticky skin. The raw fruit is green in color and turns bright red when it is ripe. The mature fruit is usually from 25 to 60 mm long by 15–35 mm in diameter and contains several pale, flattened seeds (Wasantwisut and Viriyapanich, 2003:Pekamwar et al.,2013). The harvesting maturity of ivy gourd is determined by the fruit colour which changes from green to light green.

The normal storage life of fruit is 3 to 4 days at room temperature and 7 to 10 days at refrigerated conditions (Sushmarani et al., 2013). The tender green fruits are nutritious and are good source of protein, calcium, fibre and ßcarotene (vitamin A as precursor). Consuming 100 grams of ivy gourd supplies, 1.4 mg of Iron 1.6g of total dietary fiber, 40 mg of calcium and 30 mg of phosphrous (Behl et al., 1993). In addition to nutrient composition, it is valued for its major biochemical constituents such as alkaloids, glycosides, flavonoids, tannins, saponins have been identified (Shaheen et al., 2009) Apart from its nutritional significance, ivy gourd is valuable in medicine and various preparations which have been mentioned in indigenous system of medicine (Behl et al.,

1993). Despite, its good nutritional and medicinal value. There is not much demand for ivy gourd fruit either in fresh market or in processed form which may be due to poor awareness of consumers about its nutritive and medicinal importance. Thus, ivy gourd being under-utilized indigenous crops may be useful in food industries in the formulation of value added products thus cater for the daily needs of the citizens nutritionally.

The present study reports the effects of different plant leaf extracts on fungal disease spores germination of *Ivy* gourd *Azadirachta indica, Ocimum gratissimum, Adhatoda vasica, Aegle mormelos* and *Santalum album.* Caused by some important fungal disease in *Geotrichum candidus* fruit rot of *Ivy* gourd.

MATERIALS AND METHODS

Plant collection

Fungi toxicity of leaf extracts was studied by food poisoning technique described by (Mishra and Tiwari, 1992). The plants were collected from the non-irrigated cultivated lands in and around Osmanabad (district), Maharashtra. Plants species such leaf extract *Azadirachta indica, Ocimum gratissimum, Adhatoda vasica, Aegle mormelos* and *Santalum album* were collected from Department of Botany, Arts Science and Commerce College of Naldurg for the study.

Sterilization of Plant Materials

The disease free and fresh plants were selected. They were washed with distilled water for three times. Then surface sterilized with 0.1% mercuric chloride for 20 seconds. Again the leaves were washed thoroughly with distilled water (three times).

Preparation of Plant Extracts

Oven dried and pulverized to obtain dry powder. Plant extract of each prepared with water i.e. 100gm powder dissolved in 100 ml distilled water. Mixed well and filter through double filter muslin cloth, it served as stock. This stock was used against tested fungi in four different concentrations (25, 50, 75 and 100%). Petri plates containing CZA supplemented with different leaf extract at four different concentrations with three replications were inoculated with fresh 8th days old culture of test fungi and (8mm) cork borer disc and kept upside down and incubated in BOD incubators at 27± 2^{0}C. Plates without leaf extracts were served as control. Radial growth of the tested pathogens was measured at regular intervals.

RESULTS AND DISCUSSION

Plant leaf used in this study was tested against four pathogenic fungi to determine their antifungal activity. Different concentrations of plant leaf (25, 50, 75 and 100%) were tested against pathogenic fungi. Minimum inhibitory concentration (MIC) was measured to determine the antifungal activity. The inhibition effects of the *Azadirachta indica*, *Ocimum gratissimum, Adhatoda vasica, Aegle mormelos* and *Santalum album* medicinal plant on pathogenic fungi are presented in table 1. Among leaf extracts tested, *Azadirachta indica* leaf extract it showed reduction of radial growth of *Geotrichum candidus* sensitive (88.88 %) at 50% conc. and resistant (83.33 %) at 100% concrespectively. It also showed significantly results at 100% concentration (Plate I).

Azadirachta indica inhibiting growth of *Alternaria alternate, Bipolaris sorokiniana* and several other fungi have been reported (Singh and Dwivedi, 1990; Alam et al., 2002a). In most cases, Ocimum sanctum extract exhibited less inhibitory effect against *B. sorokiniana* (*Nargis Akhter et al., 2006). Azadirachta indica* (leaf, root and seed) extracts showed good (100%) inhibition results on *Bipolaris sorokiniana*, and *Rhizopus artocarpi* (Shahidul, Alam et al., 2002). Aqueous extract of *A. indica* has also been reported to cause significant growth inhibition of other fungi such as *Rhizoctonia solani, Botrytis cinera* and *Fusarium oxysporum* (Alkhail, 2005). Hasan et al. (2005) Alcoholic extracts of neem (*Azadirachta indica*) and garlic (*Allium sativum*) completely controlled the intensity of *Bipolaris sorokiniana*, *Fusarium* sp., *Aspergillus* sp., *Penicillium* sp. and *Rhizopus* sp. after the treatment on wheat seeds. Next to garlic and neem, *Vinca rosea* extract showed good inhibition and 1.40% intensity of *Bipolaris sorokiniana* followed by bulb extract of *Allium cepa* and leaf extract of *Achyranthes aspera* (1.53 and 1.53%). Chaudhary and Raj (2004) *in vitro* effect of aqueous extract (1.5%) of three medicinal plant parts namely rhizome of *Zinziber officinalae, Cucurcuma longa* and *bulb of Allium sativum* on four plants pathogenic fungi *viz. Helminthosporium oryzae, Alternaria solani, Fusarium solani* and *Sclerotium rolfsii, Allium sativum* showed maximum inhibition at 15% in four test fungi. Ganguly, (1994) reported that aqueous neem leaf extract inhibited mycelial growth and spore germination of *Helminthosporium oryzae* and *pyricularia oryzae* responsible for blast and brown spot of rice plant respectively.

These results are in accordance with many workers. Similar results were recorded from preliminary investigations by Hassanein et al., (2008) reporting antifungal activity of *Azadirachta indica* leaf extract against *Alternaria solani.* According to Shivpuri et al. (1997) ethanol extracts of *Azadirachta indica, Datura stramonium, Ocimum sanctum, Polyalthia longifolia* and *Vinca rosea* were more toxiz to *Alternaria brassicicola, Colletotrichum capsici, Fusarium oxysporum,*

Rhizoctonia solani and *Sclerotinia sclerotium*, their efficacy was more pronounced at100 µg/ml. Overall, *Dodonaea viscosa* appeared significantly the most effective and suppressed the radial mycelial growth of the *Alternaria solani* and *Rhizoctonia solani*, whereas, *Adhatoda zeylanica* exhibited maximum inhibition (77.44%) against *Macrophomina phaseolina* Aqsa Aslam (2010).

Table 1: Antifungal activity of plant extracts (leaf) against pathogenic fungi of *Coccinia indica*.

Plant species	Conc. (%)	Isolates	Radial growth of *G. candidus* (mm)
Azadirachta indica	25	S	15 (83.33)
		R	19 (78.88)
	50	**S**	**10* (88.88)**
		R	19 (78.88)
	75	S	00 (00.00)
		R	18 (80.00)
	100	S	00 (100.00)
		R	**15^{+} (83.33)**
Ocimum gratissimum	25	S	31 (65.55)
		R	34 (62.22)
	50	S	30 (66.66)
		R	32 (64.44)
	75	S	25 (72.22)
		R	28 (68.88)
	100	S	20 (77.77)
		R	22 (75.55)
Adhatoda vasica	25	S	29 (67.77)
		R	30 (66.66)
	50	S	26 (71.11)
		R	28 (68.88)
	75	S	20 (77.77)
		R	23 (74.44)
	100	S	19 (78.88)
		R	20 (77.77)
Aegle mormelos	25	S	38 (57.77)
		R	40 (55.55)
	50	S	31 (65.55)
		R	35 (61.11)
	75	S	28 (68.88)
		R	30 (66.66)
	100	S	25 (72.22)
		R	29 (67.77)

Santalum album	25	S	23 (74.44)
		R	29 (67.77)
	50	S	20 (77.77)
		R	27 (70.00)
	75	S	19 (78.88)
		R	25 (72.22)
	100	S	00 (100.00)
		R	23 (74.44)
Control	-	-	**90.00**

Figures in parentheses are % value of inhibition,*Sensitive, +- Resistant.

PLATE - I

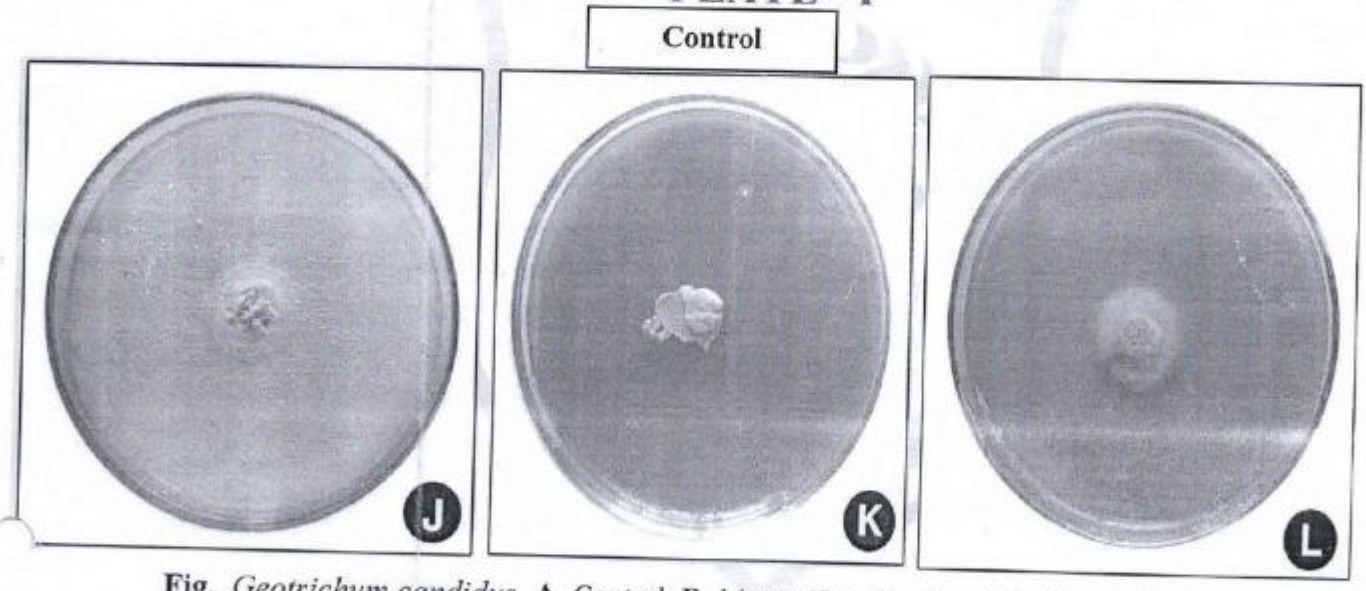

Fig. *Geotrichum candidus.* **A.** Control, **B.** 14mm (Sensitive), and **C.** 20mm (Resistant) against *Azadirachta indica.*

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Research Article

EFFECT OF PASSAGE ON THE DEVELOPMENT OF BENOMYL RESISTANCE IN FUSARIUM OXYSPORUM F. SP. CUBENSE CAUSING PANAMA WILT OF BANANA

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ABSTRACT

Culturing of sensitive *Fusarium oxysporum* f.sp. *cubense* isolate (FOC-4) on benomyl continuously for eight successive passages significantly increased the resistance. Use of benomyl alternately with carbendazim and kocide decreased resistance of the pathogen at 4th and 6th passage, while benomyl with mancozeb increased resistance in FOC-4 benomyl sensitive isolate. Carbendazim, kocide and mancozeb in mixture with benomyl inhibited the growth of the *Fusarium oxysporum* f.sp. *cubense* completely at 3rd and 4th passage only. Inoculation of Fusarium oxysporum f.sp. cubense on banana plant continuously for eight successive passages increased the benomyl resistance. But treatment of benomyl alternately with carbendazim and kocide protected the infection by *Fusarium oxysporum* f.sp. *cubense* at 6th passage and mancozeb at 7th passage. Use of benomyl in mixture with carbendazim protected infection on banana plant at 5th passage followed by kocide and mancozeb at 6th and 7th passage of the pathogen on banana plant.

INTRODUCTION

Globally, banana (*Musa acuminata*) is grown in 8.84 million ha producing 97.15 million tonnes of banana and plantain. However, 80 per cent of the production is consumed domestically and has a small share (20%) in the global trade. In India, banana is largely grown by small and marginal farmers. Banana is the oldest and commonest fruit. Banana constitutes second largest industry in India. Panama wilt of banana is managed by various systemic and conventional fungicides by the farmers. The present study, therefore, was undertaken to manage the Panama wilt of banana and to examine the possibility of development of benomyl resistance in the pathogen. Therefore, the experiments were carried out on agar plates and banana Plants to determine whether development of benomyl resistance in *Fusarium oxysporum* f.sp. *cubense* could be delayed or avoided by continuous, alternate or combine use of two different fungicides. In the present investigation, it was seen that culturing *Fusarium oxysporum* f.sp. *cubense* on the agar medium containing benomyl for eight successive passages continuously significantly increased the benomyl resistance in the pathogen.

MTERIAL AND METHODS

Samples of banana pseudo stem exhibiting symptoms of Panama wilt were collected from different localities of Maharashtra and Karnataka State. 17 isolates of the *Fusarium oxysporum* f. sp. *cubense* were obtained from infected pseudostem on the Czapek Dox Agar medium. Their sensitivity against benomyl was tested by Food poisoning technique Dekker and Gielink, (1979) using using Czapek Dox Agar. A series of benomyl dilutions were prepared from a 1000µg/ml stock solution by dissolving in sterile distilled water. Each concentration was added to autoclaved CDA. 30 ml treated agar was poured in 90 ml Petri Plates.8mm diameter agar disc, cut from the edges of actively growing fungal colonies, were placed at centre on each plate containing treated agar. The plates were then incubated at 28±2°C in the dark and linear growth was measured at different intervals. Plates without benomyl served as control. For in vivo studies tissue cultured 3 month old banana (Grande Naine) plant were used. Individual plant roots were washed with sterile distilled water then these plants were inoculated with pathogen by root dipping technique Mohammed *et al.*, (1999). Roots of plantlets were immersed in

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aqueous suspension of 10 ml conidia in sterile distilled water. Conidia obtained from 1week old culture of *Fusarium oxysporum* f. sp. *cubense* grown on CDA. Then plants were treated with different concentrations of benomyl solutions. Inoculated plantlets were placed in a pot containing sterile river soil in a natural sunlight and fertilized every other week with mixture of fertilizer. Same procedure was followed up to 8th passage and disease severity index was calculated using Leaf Symptom Index –LSI (1 to 5 scales) by Brake *et al.*, (1995). After determination of MIC of benonyl the effects of passage on the development of benomyl resistance in continuous, alternate and in mixture with other fungicides was studied in vitro and *invivo*. To study the effect of passage in vitro, wild sensitive isolate FOC-4 in each passage was cultured on plates with 1µg/ml benomyl in triplicate. Agar disc of 8mm diameter from the previous passage of the same isolate was placed at the centre of each plate in triplicate. In each passage, linear mycelial growth was measured after 8 days. The development of resistance was studied up to 8th passage. The same was repeated by using alternate and mixture with carbendazim, kocide, and mancozeb. To study the effect of passage in vivo, 10 ml conidia suspension of wild sensitive isolate FOC-4 inoculated on the healthy banana plant, then treated with (25 µg/ml) concentration of benomyl solution alternating and mixture with carbendazim, kocide, and mancozeb. Disease severity index was calculated.

RESULTS

The table. 1 in vitro study it was observed that during the continuous passage there was significant increase in the resistance of the *Fusarium oxysporum* f. sp. *cubense* while there was increase or decrease in the resistance of the pathogen during alternate passage.

Table 1 Effect of exposure of *Fusarium oxysporum* f.sp. *cubense* (*In vitro / in vivo*) to benomyl continuous and alternating with other fungicides on the development of resistance during eight successive passages

Fungicides	Passage Number							
	1	2	3	4	5	6	7	8
Benomyl continuous	10.00*	14.00	19.00	20.33	21.33	22.00	22.00	22.00
	1.00**	1.00	1.6	1.6	1.6	1.6	1.6	1.6
Benomyl Alters Carbendazim	10.00	11.00	11.33	0.00	0.00	0.00	0.00	0.00
	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
Benomyl Alters Kocide	11.00	11.33	11.33	11.00	11.00	0.00	0.00	0.00
	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
Benomyl Alters Mancozeb	11.00	11.00	11.33	12.00	16.00	16.33	18.00	18.00
	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Mean	5.75	6.41	7.19	5.99	6.61	5.11	5.2	5.2
SE	1.80	2.07	2.45	2.66	2.95	3.11	3.25	3.25
CD(P=0.05)	4.26	4.91	5.81	6.30	6.99	7.39	7.72	7.72

*-In vitro, **-In vivo.

Benomyl alternating with carbendazim and kocide completely stopped the growth of the pathogen at 4th and 6th passages respectively. Benomyl with mancozeb failed to control the growth of the pathogen. In in vivo studies it was observed that continuous treatment of benomyl continuously for eight successive passages increased the resistance in the pathogen while alternate use of carbendazim and kocide prevented infection of the pathogen at 6th and benomyl alternating with mancozeb protected infection of pathogen at 7th passage respectively.

In in vitro studies, in mixture passage it was interesting to note that benomyl used along with carbendazim, kocide and mancozeb inhibited the growth of the *Fusarium oxysporum* f. sp. *cubense* completely at 3rd and 4th passage only. While in vivo, benomyl in mixture with carbendazim prevented infection of the pathogen at 5th passage followed by kocide and mancozeb prevented the infection at 6th and 7th passages (Table.2).

Table 2 Effect of exposure of *Fusarium oxysporum* f.sp. *cubense* (*In vitro / in vivo*) to the mixture of benomyl with other fungicides on the development of resistance during eight successive passages

Fungicides	Passage Number							
	1	2	3	4	5	6	7	8
Benomyl + Carbendazim	10.00*	10.00	0.00	0.00	0.00	0.00	0.00	0.00
	1.00**	1.00	1.00	1.00	0.00	0.00	0.00	0.00
Benomyl + Kocide	10.00	10.33	11.00	0.00	0.00	0.00	0.00	0.00
	1.00	1.00	1.00	1.00	1.00	0.00	0.00	0.00
Benomyl + Mancozeb	11.00	11.00	10.33	0.00	0.00	0.00	0.00	0.00
	1.00	1.00	1.00	1.00	1.00	1.00	0.00	0.00
Mean	5.66	5.72	4.05	0.5	0.33	0.16	0.00	0.00
SE	2.09	2.11	2.09	0.22	0.21	0.42	0.00	0.00
CD(P=0.05)	5.37	5.43	5.39	0.57	0.54	0.67	0.00	0.00

*-In vitro, **-In vivo.

DISCSSION

Excessive use of site-specific fungicides increases the resistance. By reducing the number of site-specific fungicide applications, you reduce the resistance development. In general terms, the application of fungicides with different modes of action in mixtures and the alternation between non-cross resistant fungicide classes are both suitable approaches to minimize the risk of resistance development. Hartill (1983) advised alternate use of mancozeb with metalaxyl to control late blight of potatoes. According to Kamble (1991) multisided action of carbendazim with mancozeb, benomyl, captafol and thiram might be responsible for the complete inhibition or the development of resistance in the Macrophomina phaseolina causing charcoal rot of potato. Carbendazim when used in mixture with Mancozeb and zineb completely inhibited the growth of M. phaseolina at first passage only, while in mixture with Metalaxyl and difolatum inhibited the pathogen at 2nd and 6th passage (Kamble, 1999). Similarly many workers studied the effect of passage on the development of carbendazim resistance in other pathogenic fungi (More, 2009; Patil, 2010; Jagtap, 2010).

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Research Article

MARKET STORAGE DISEASES OF SOME IMPORTANT FRUITS OF LATUR DISTRICT (M.S.) INDIA

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ABSTRACT

The present investigation with deals survey of market storage and post harvest fungal diseases of some important fruit in the market of Latur district was undertaken during June 2019. Recurrent sampling from the available market fruits depicted variable intensity of fungal flora. Fungal diseases of 6 selected fruit were studied and in all 6 fungal pathogens were observed. Among these *Verticillium theobromae, Colletotrichum gloeosporioides, Anthracnose Pomegranate, Botrytis cinerea* and *Aspergillus niger, Colletotrichum gloeosporioides* spp., were found to be major disease causing organisms. Several fungal floras were observed in fruit *Musa paradisiaca, Mangifera indica, Punica granatum, Malus domestica, Cocos nucifera* and *Carica papaya*. The present investigation revealed that fungal infection is mainly due to injury during storage and handling. Heavy loss of harvested fruits caused due to fungal, bacterial and physiological aspects.

INTRODUCTION

Fruits are important part of human diet. They are commercially important and nutritionally indispensable food commodity (Prasanna *et al.*, 2007). Man has kept these commodities in his diet to provide variety, taste, interest, aesthetic appeal and to meet certain nutritional requirements (Wills *et al.*, 1996). Fruits are edible products of the perennial higher plants with high water content, soft texture, sweet, sour and semi astringent flavors. They are rich sources of vitamins (A, B complex and C) and minerals (calcium, iron and phosphorus) in diets to keep human health in goodsted (Tucker, 1993). Fruits are easily digestible and contain ample amounts of different organic acids and digestive enzymes. They are rich sources of roughage value in food, help in bowel movement, prevents constipation, natural fiber and an energy giving materials having high calorific value. Almost all fruits have some medicinal value in one way or the other. Physicians recommend fruits for the treatment of many ailments like scurvy, night blindness, asthma, fever, anemia, ulcers etc. (Peter, 2007). 'An apple a day, keeps the doctor away' is a well known phrase indicating significance of fruits in human diet.

Fungal fruits infection may occur during the growing season, harvesting, handling, transport and post-harvest storage and marketing conditions, or after purchasing by the consumer. One of the limiting factors that influence the fruits economic value is the relatively short shelf-life period caused by pathogens attacked. It is estimated that about 20-25% of the harvested fruits are decayed by pathogens during post-harvest handling (Bhale 2011). Fruits contain high levels of sugars and nutrients element and their low pH values make them particularly desirable to fungal decayed (Singh and Sharma 2007). Present investigation envisages the study of various fungal pathogens responsible for the post harvest, decay & deterioration of economically important fruits from Latur district of Marathwada region of Maharashtra.

MATERIALS AND METHODS

The fruits *Musa paradisiaca, Mangifera indica, Punica granatum, Malus domestica, Cocos nucifera* and *Carica papaya* fruits were collected from different fruits markets of Latur District. A separate polyethylene bag was used for each type of infected fruits in all cases. Nichrome inoculating needles duly sterilized were used to isolate & the pathogens was transferred directly to PDA aseptically. The infected tissue was cut after surface application of alcohol & sterilization with 0.1% $HgCl_2$ in sterilized distilled water.

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The materials were examined critically with respect to symptomatology and etiology. In some cases the infected tissues were stained by cotton blue and Lactophenol (Mc Lean and Ivimey 1965) and observed under compound microscope. Identification of the pathogens was made with the help of available literature (Biligrami *et al.*1991, Subramanian 1971 and Barnett 1960). Pure cultures of the pathogens were maintained in the laboratory on PDA slants for further study.

The pathogens were isolated, identified and cultures were used to confirm their pathogenicity test in their respective hosts. Fresh disease free samples were brought in to the laboratory and surface sterilized with 0.1% $Hgcl_2$. For inoculations, cork borers of (2mm) diameter were used. They were sterilized by placing in spirit lamp flame, dipping in alcohol & shaking off the excess alcohol by flaming (Granger and Horne 1924). The inoculated samples and their respective controls were kept under sterile humid conditions at room temperature under bell jars. The artificially inoculated samples were examined daily & the extent of damage was recorded.

RESULTS AND DISCUSSION

Market surveys fruits were found to be affected by various fungal infections.

1. ***Musa paradisiaca* L.(*Banana*).** Symptoms of the diseases are clear and spread to blackening irregular and whitish creamy of the fruit skin, shrinkage and folding of the tissues and spot were observed on the fruit and they were very dominant. Pathogens were isolated and identified as a *Verticillium theobromae* causing the pathogen affects even the fruits of Banana.
2. ***Mangifera indica* L. (mango).** Symptoms Produces blight fruit rot. Black prominent spots appear on fruits, the pulp of which become hard, crack and start to decay at ripening. Infected fruits drop. Fungi were isolated *Anthracnose Colletotrichum gloeosporioides.*
3. ***Punica granatum* L. (Pomegranate).** Symptoms of the pericarp and seeds of fruits were infected. Small irregular black spot on fruit which turn later on as dark brown depressed spots infection begins from dorsal surface and spreads towards the seed occupying the rottening of complete fruit. At severity sticky watery fluid developed inside the fruit. Fungi were isolated form *Anthracnose pomegranate.*
4. ***Malus domestica* L. (Apple).** Symptoms of the Infection brings from small lesions on dorsal side and spread fairly towards the centre occupying the complete fruit surface showing is blackish whitish mycelium with blackish patches on the pulp of fruit. It causes "grey mold rots" of fruits Rottening of fruit take place at severity. Fungus was isolated *Botrytis cinerea.*
5. ***Cocos nucifera* (Coconut).** Smooth walled stipes and black or near black coloured conidia formed and white to yellow mycelia surface later bearing black conidia covered. Fungi isolated are *Aspergillus niger.*
6. ***Carica papaya* (Papaya).** The disease is initiated with the development of small light yellowish brown lesions on the skin of the fruit which enlarge and become dark brown in colour. With the development of the disease the spots become well differentiated from the healthy portions of the fruits. The lesions are usually regularly round or elliptical but later on become irregular due to coalescence of two or more spots. In severe cases the disease may cover one-quarter to one-half or even more of the fruit surface. The lesions remain covered with abundant black dots indicating the acervuli of the fungus. The conidia of the fungus are produced in abundance. Fungi isolated are *Anthracnose Colletotrichum gloeosporioides*

The album of post harvest diseases of fruits created to cheat awareness among the researchers regarding morphological features of infected fruits by pathogenic fungi and to promote research regarding management of post harvest diseases of fruits which is responsible for losses of millions of rupees every year. Second purpose of creating album of fruit diseases is that the preserved museum specimen of infected fruits does not show the natural symptoms of the disease. The post harvest diseases of most of the fruits available in market were collected isolated the respective pathogen and confirmed by using key proposed by Kochs postulates. Similar results on post harvest fungi on storage fruits were reported by earlier workers Good handling will ensure that the final consumers are satisfied and so will return again to buy that product (Vander Steen, *et al.* 2001).Survey of market storage diseases of some important fruits of Osmannabad District (M. S.) Bhale (2011) India Post harvest pathogens on some fruits were reported by Basha *et al.* 2009, Rao 1963, Srivastava *et al.* 1964 and Mandal and Dasgupta 1983.Similar finding has been reported by Dange (1998) and Cherian (2005). Ghurde and Pachkhede (2010) was reported the market and storage diseases of fruits from Amravati. Recently, Gadgile *et al.* (2011) was reported post harvest fungi associated with mango fruits.

CONCLUSION

Fruits are the essential requirement of human diet. Among these fruits producing the chief source of vitamin C, minerals and salts. A wide variety of fungal and bacterial pathogens cause postharvest disease in fruits. Some of these infect produce before harvest and then remain quiescent until conditions are more favourable for disease development after harvest. Other pathogens infect produce during and after harvest through surface injuries. In the development of strategies for postharvest disease control, it is imperative to take a step back and consider the production and postharvest handling systems in their entirety. Many preharvest factors directly and indirectly influence the development of postharvest disease, even in the case of infections initiated after harvest. Traditionally fungicides have played a central role in postharvest disease control. However, trends towards reduced chemical usage in horticulture are forcing the development of new strategies. All fruits are storage as the average temperature for the good marketing whereas fruit crops are affected by the many pathogens on postharvest. Thus, proper growth of postharvest technology of fruits is vital for development of India"s economy.

In present investigation, the fungi like *Verticillium theobromae, Anthracnose Colletotrichum gloeosporioides, Anthracnose Pomegranate. Botrytis cinerea Aspergillus niger* spp., and *Anthracnose Colletotrichum gloeosporioides* species were found on edible fruits which may causes allergenic effects on human health. Therefore it needs to undertake the management practices by using botanicals.

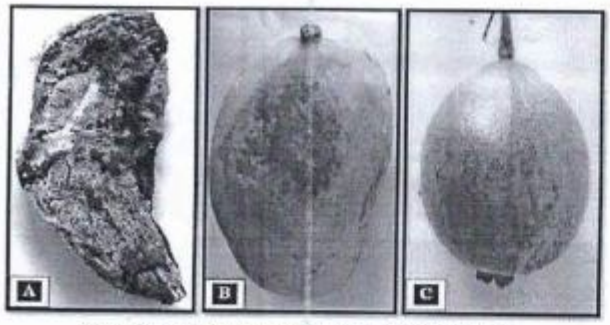

Photo Plate-I Post-Harvest Diseases of Different Fruits

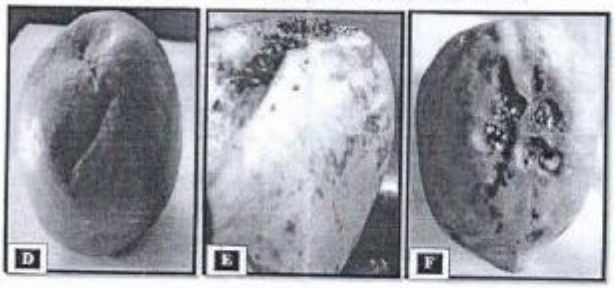

Fig 1 Row. A). *Verticillium theobromae*. B) *Colletotrichum gloeosporioides*. C) *Anthracnose pomegranate* 2. Row. D) *Botrytis cinerea*, E) *Aspergillus niger*, F) *Colletotrichum gloeosporoides*.

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Stress Management in Sport Professionals

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Abstract-

Sports is evolving at a rapid pace in India in terms of use of technology in coaching, tactical preparation of sportsman, training methods, etc. Thus sportsman being the base of this pyramid go through different stressful situation hence researcher feels the need of updating ourselves with stress management techniques and there causes. Researcher has explained different types of stress and various ways to manage stress as it plays a vital role in the overall performance of the players. Stressors have a major influence upon mood, our sense of well-being, behavior, and health. Acute stress responses in young, healthy individuals may be adaptive and typically do not impose a health burden. However, if the threat is unremitting, particularly in older or unhealthy individuals, the long-term effects of stressors can damage health. This paper attempts to look at

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the strategies for sports coaches in managing stressful situations in sports competitions. This paper therefore, writes in the introduction, the concepts of stress, competition-based stress, management, stress management in sports, stress in sports psychology. The paper also examines the sources of stress. It looks critically at the levels of stress in competitive sports. The relationship between psychosocial stressors and disease is affected by the nature, number, and persistence of the stressors as well as by the individual's biological vulnerability (i.e., genetics, constitutional factors), psychosocial resources, and learned patterns of coping. Psychosocial interventions have proven useful for treating stress-related disorders and may influence the course of chronic diseases. The paper also highlights some specific stress management strategies which sports coaches have to employ to aid excellent performance in sports competition. It also identifies the educational implications of stress management in sports competitions. In conclusion researcher feels the emphasized should also give to these techniques of street management by the coaches as well as players so as reach up to desired level of performance.

Keywords: Psychosocial stressors, Stress responses, Sports, psychosocial interventions, Stressor interactions, Stress management.

Introduction -

In the past, it was assumed that these skills were genetically based, or acquired early in life. Now, it is commonly accepted that athletes and coaches are capable of learning a broad range of psychological skills that can play a critical role in learning to achieve high performance. Almost a decade ago, technology in Sports was the means of enhancing and improving the Sports via automated technics, Skills, Matches and Competitions. Sport brings development in every sphere of the people life. Advance technologies brought new dimensions in the field of sports also. Current developments are affecting Sports vastly; it results in complexities in Sports. Sports are obliged to focus and maintaining enhancing their player total growth of knowledge and physical activity. New technologies evolve, Sports operations are changing rapidly and Sports Directors need to adapt to new plan of action. Environment pressures of today forcing Sports to focus on accelerating technology, innovation, technical complexities, social and legal issues, cost, risk, competence, skill of staff and technology itself. Therefore, the necessity is to work in a protective manner.

What is stress :-

'Stress' is defined by the "a state of affair involving demand on physical or mental energy". Stress is a measure of the internal force. It is internal forces arise as a reaction to external forces applied to the body. Stress is simply a fact of nature – forces from the inside or outside individual responds to stress in way that affect the individual. Stress is related to both external and internal factors. We think that stress is negative experience. But from a biological point of view stress can be neutral, negative or positive experience

Stress is not something 'outer' rather stress is within the person i.e. response of body or mind. People under stress have a greater tendency to engage in unhealthy behavior. The source of the demand or challenge is referred to as a "stressor". Stress affects the body, mind, behavior and emotion of the stressor.

Types of Stress :-

Stress can be divided into 3 types as bellow

1) Good Stress :

In good stress people do all work smoothly but immediately in pressure. It's good for health. Just the right amount of stress is stimulating and healthy. We perform tasks faster and better.

2) Bad stress :

In this type of stress a person became lazy and not able to do work perfectly. When we are under distress, we usually change and can even break inside. It hurts! Here are symptoms of distress that prove such a change is happening inside.

3) Ugly stress :

In case of ugly stress people became hopeless and go to suicide. It's creating an unhealthy environment.

Types of stress in Spots : -

There are many reasons for the creation of stress among sports professionals. Some of the guise has been observed to be severe while others are not but both have observed to be production negative or uncomfortable feeling among the sports.

1) Change in spots Environment
2) Change rules of Games
3) Changing players demand
4) Attitude of Sports players
5) Technology change

How can you manage your stress :-

1) Avoid stressful situation
2) see the situation how Changes
3) Figure out what is most important
4) Discover new relaxation
5) Develop interest in your works
6) Set priorities
7) Learn to say no
8) Reduce intensity of emotional reaction to stress
9) Take control of the situation
10) Take sufficient rest

Need of Stress Management :-

Today stress management is important in every one lives. There is no doubt stress is one of the leading factors in illness and absenteeism among employee. It's necessary for long happy lives with less trouble. Stress management is need because when we are in stressed situation the following things happens to us.

1) We do not sleep well

2) Blood pressure rises
3) Breathing becomes more rapid
4) Heart rate rises
5) Digestive system slows down
6) Immune system goes down
7) Muscles become tense.

How to manage stress in a better way?

There are some solutions to Manage Stress for Sports Professionals.

1) Become aware of the stress and its emotional and physical reactions
2) Recognize what you can change
3) Reduce the intensity of your emotional reactions to stress
4) Maintain the emotional reserves
5) Learn to moderate your physical reactions to stress
6) Develop interest in work
7) Cooperate with all in the Sports.
8) Meditation and yoga classes
9) New technology immediately to adopt but sufficient training to be

Comfortable with new technology

10) Less working hours, more time to home
11) Avoid stressful situation
12) Take control of the situation
13) Discover new relaxation
14) Figure out what is more important and set priority
15) Learn to say no.

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Conclusion :-

People are so developed in sports Knowledge, techniques more development means more work and more work brings stress. To do work in a smooth way it is simply not possible to remove all sources of stress in the Sports.

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