Annexure-I

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

Sl. No.	Subject area	Project Title	Main Objective	Project Commencement & Duration		Work done in brief	Achievements, i.e.Development of process/ equipment, etc.	Dissemination of R&D achievements	Economy & Acceptability by user industry/ Beneficiary industry	Achievements
1	2	3	4	5		6	7	8	9	10
1	Raw material fibre/filament/ false twist/ texturisation	Development of new look synthetic filament yarns on false twist texturiser for value added fabrics.	To develop modified yarns using false twist texturising and various combinations of LOY, MOY, POY and flat synthetic yarns, to study the effect of process variables on the structural and mechanical properties of modified yarns and to produce fabrics using the developed modified yarn and evaluate its properties and end uses.	13.05.99	2 years	Using combination technique, following types of newlook false-twist textured yarns were developed,viz.,normal dyeable and cationic dyeable poly combination textured yarns having novel pebble-like appearance, semi-dull poly &bright poly.were textured to prodduce textured yarn with diff.lustre,normal den.poly & microden. poly.were also textured to develop textured yarn with soft feel; and also nylon & diff.types of poly.yarns such as bright, semi-dull and cationic dyeable were textured to produce nylon- poly. combination yarn having combined property of nylon & poly.. Single tex.poly. yarns having intermittent twisted appeance were developed and when it is used in fabric as weft gives grainy look and diff.feel.Properties of above-developed yarns were studied for para meters like D/Y, etc.It is seen that they can be used for sarees & dress materials.	Developed textured yarns have new-look appearance and fabric samples produced from these yarns have unique look and aesthetic properties. Developed yarns & fabric samples are exhibited at MANTRA for benefit of decentralised powerloom and texturing sectors. Textured yarn producer as well as the weaver can increase their range of value-added products by using the developed yarns.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Yarn preparatory units, texturising units, powerlooms have been benefited for value-added products.	New look false twist textured yarns were developed using normal dyeable, cationic dyeable PET,etc. Developed textured yarns have new-look appearance and fabric samples are exhibited at MANTRA for the benefit of the decentralised powerloom and texturing sector. The textured yarn producer as well as weaver can increase their range of value –added products by using newly developed yarns.

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1	2	3	4	5		6	7	8	9	10
2	Pollution control	To study the toxicity of various chemicals, finishing agents & auxiliaries used in textile processing and bio-assay study of different anti-bacterial finished fabrics.	To study toxicity of various chemicals, finishing agents, and auxiliaries used in textile processing, bio-assay study on different anti-bacterial agents and finished fabrics, to study the mechanism by which treated fabrics are resistant to disease causing bacteria and to study the dura-bility of anti-bacterial finish towards wash and wear.	13.05.99	2 years	Fish aquatic toxicity has been studied on chemicals which are being used in synthetic tex.processing. Labeo Rohita was selected for test.Samples of treated & untreated effluent from tex. units & certain auxiliaries were tested & analysed for short term toxicity.Above study shows that certain common auxiliaries,viz.,non ionic/anionic surfactants, binders,benzene based pro-ducts,napthalene,sulphonic acid based products,cetyl alcohol based products,etc. which are being used in tex. processing of synthetic textiles, are highly toxic for fish. Bio-assay study of anti-bacterial finished fabric & effect of diff.pathogenic micro-organisms,viz.E-coli, E.Klabsiella,Pneumoniae, Stapaureus,baceilus subtills, etc.on anti-bacterial finished fabrics were carried out. Durability of anti-bacterial finish towards wash & wear was studied.Also,certain chemical compounds were identified & studied as anti-bacterial agents.	Present study has generated data which is useful to the society, in general, and manufacturers & processors, in particular, for finding out the source of toxins.Work was presented in 8th Tech. Conference of MANTRA & published in MANTRA Bulletin for benefit of local industry.Now, MANTRA has testing facilities for bio-assay test, micro-biology test and are getting good no.of samples for commer-cial testing.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Decentra-lized process houses, fabric,dyes & chemical exporters & manufac-turers have taken benefits and society in general for pollution/ toxicity control measures.	Fish aquatic toxicity has been studied onchemical which are being used in synthtic textile process-ing. Above study shows that certain common auxiliaries, viz.,aniline surfactants, binders, benzene based product napthalene sulphonic acid based products, cetyl alcohol based products,etc.which are being used in textile processing of synthetic textiles are highly toxic for fish.Also,bio-assay study of anti-bacterial finished fabrics & effect of diffderent pathogenic micro-organisms,viz. E-coli,Stapaurerus,baceilus subtilis,etc. on anti-bacterial finished fabrics were carried out.Such type of fabric is used for curtains,bed sheets,etc.in hospitals. Also,certain chemical compounds were indentified & studied as anti-bacterial agents.The present study has generated data which is useful to society, in general, and manufacturers &processors, in particular, for finding out source of toxins.

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1	2	3	4	5		6	7	8	9	10
3	Processing	Bio-technologi-cal applications in textiles for quality improve-ment and value addition.	To study the enzymatic pre-treatment process for fibres and fabrics based on regenerated cellulosic fibres by different techniques, viz., enzymatic process, chemical finishing process and dyeing techniques, optimisation of the process parameters & careful selection of enzymes that allow for shorten-ing of individual steps &to develop single stage processes. To optimise existing processing route & improve final fabric appearance and study Brasso cutting of poly.-viscose/nylon-viscose by bio-technological methods based on enzymes.	13.05.99	2 years	Tencel fibres have very strong memory & creases formed during first wet swelling are permanently fixed. Main aim of project was to develop processes to reduce crease,abrasion mark shrinkage & fibrillation of tencel.Cellulosic fabrics & modified processes based on ensymatic finishing,merceri-sation & dyg.techniques. Tested for evaluation of physical properties,viz,count reed,pick,tensile strength, % elongation at break,etc. Experiments conducted by varying parameters,viz,pH, temp.,conc.of enzyme,time, etc.Processed fabrics tested for various physical and performance properties,viz. tensile strength,% elonga- tion at break,crease recovery angle,pilling behaviour, microscopic appearance, fastness to washing, absorbency, whiteness and dyeing behaviour,etc.Tencel fabric samples were dyed with reactive bi-functional dyes & compared for de-fribrillation properties.	Preparatory processing route has been modified for cellulosic-fibre fabrics. Parameters for dyeing and finishing processes were optimised and improvement in surface characteristics and final appearance of cellulosic-fibre fabrics was achieved.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Decentra-lised process houses and exporters for value-addi-tion and quality improve-ment.. Local process houses have been benefited. Lyocell based garments are being developed by Grasim Birla.	Cellulosic fibre fabrics, viz., tencel were processed by modified processes based on enzymatic finishing, mercerisa- tion and dyeing techniques. Preparatory process-ing route has been modified for cellulosic fibre fabrics. Parameters for dyeing and finishing processes were optimised and improvement in surface characteristics and final appearance of cellulosic fibre fabrics is achieved.

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4	Eco-testing/ Pollution Control	Characterisation of amine based and other acid and disperse dye intermediates by creation of impurity profile using GC-MS & HPTLC and AAS systems.	It is likely that amines which are declared as `safe' may contain a banned amine or heavy metal introduced during manufacture of compound. Such `phantom' impuri-ties may go undetected till dyed fabric is tested. At that stage it is difficult to deter-mine source of impurity. Hence, main objective is to develop impurity profile of amines which are not banned. By creating this impurity profile processor will be provided with the list of safest eco-friendly dyes covering entire range of hues.	13.05.99	2 years	Detailed list of intermediates used for disperse and acid dyes was prepared and the routes of synthesis, starting materials, conditions of reactions, etc., were compiled. Characterisation of these intermediates was carried out by instrumental, chemical & physical analysis techniques. Physical tests like melt-ing & boiling points of intermediates were determined experiment-ally & % purity of some amine based inter-mediates was determined by nitrite value method.	Characterisa-tion study of intermediates can be used for tracing out the possible sources of impurities such as heavy metals, amines, etc., in the dyestuffs. Using this data, processors can select safe dyes & thus meet export require-ments. During the conducting of survey, awareness has been created among the manufacturers and users. Manufacturers and processors have started using safe intermediates and dyes.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Decentralised process houses, exporters,dye manufacturers & society, in general, for pollution and toxicity control.	A detailed list of intermediates used for disperse and acid dyes was prepared & routes of synthesis, starting materials, conditions of reactions, etc., were compiled. Characteri-sation of these intermediates was carried out by instrumental,chemical and physical analysis techniques.Charac-terisation study of intermediates can be used for tracing out possible sources of impurities such as heavy metals, amines, etc., in dyestuffs. Using this data, processors can select safe dyes & thus meet export requirements. During conducting of survey, awareness has been created among the manufacturers & users. Manufacturers and processors have started using safe intermediates and dyes.

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1	2	3	4	5		6	7	8	9	10
5	Processing	Development of economical thickener for printing synthetic fibre fabrics by replacing guar gum fully or partially with other alternatives.	1.To study physico-chemical properties of guar gum & other alternatives like TKP, modified starches, synthetic thickener, etc.in self and in mixtures of diff. composition. 2. To carry out printing of poly.,CDPET, & nylon fabrics using above thickener mixtures with suitable dye and to evaluate the same for colour yield, ease of washing, fastness properties, etc. 3. To study the cost economic aspects of above results and to arrive at best thickener composition having low cost with better qualities.	1.8.2000	2 years	Rheology of various thickeners,viz.,Indalka AGBV,Tamarind(TKP) Starch,CMC & synthe- tic thickener & their mixtures was studied. Comparative printing trials with disperse dye & diff.thickener compo- sitions were carried out & relation between color yield & composition was studied. Printed,steamed and washed samples were evaluated for K/S values (color yield), bending length (stiffness),& crock fastness properties. From this study it was found that mixtures containing starch show poor color yield.However,AGBV: TKP mixture shows comparable color yeild. Suitable chemical modification of TKP including de-oilation, has been carried out using diff.techniques. Further,shear thinning behaviour of modified TKP,which was improved using these products was compared.	Experiments show that partial & full replacement of gum by modified TKP is possible and the modified thickener composition gives comparable results in terms of color yield & brilliancy of print. Cost of printing can be controlled using this alternative thickener. It was found that fullreplacement of guar gum is possible by product based on physico-chemical modified TKP in printing of polyester.The product exhibits better qualities at low cost.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Decemtralized process houses and exporters for value-addition and quality improvement.	Suitable chemical modification of TKP by inorganic compounds including de-oilations has been successfully carried out.Experiment shows that partial & full replacement of guar gum by modified TKP is possible and the modified thickener gives comparable results in terms of colur yield and brilliancy of the print. Cost of printing was controlled using this alternative thickener. Processing sector has taken immense benefit out of it.

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1	2	3	4	5		6	7	8	9	10
6	Raw material	Development of continuous synthetic sewing thread by airjet texturing for domestic as well as export garment sector.	1.To develop synthetic sewing threads using airjet texturing from various blends of polyester and other types of synthetic filament yarn. 2.To study effect of various process variables on the mechanical proper-ties of developed sewing threads. 3.To evaluate the performance of developed sewing threads on laboratory and industrial scale. 4. To evaluate the economical viability of the produced sewing threads.	1.8.2000	2 years	Following experimental has been completed: *Air-textured yarn samples of 130,150 & 230 den. have been prepared by core-effect technique at diff. effect-yarn overfeed ratios, viz. 5%, 10% & 15%. The physical properties of developed yarn samples have been evaluated. *Air-textured yarn samples of various den. like 30,50,70,80, 90, 100 & 160 havebeen prepared & physical properties assessed. *50 & 80 den.airtexured samples were twisted to produce two-ply & three-ply yarns.Physical properties of twised yarns were estimated. *At different air-pressure levls, viz. 5 bar 7 bar & 9 bar, the air-textured yarn samples of 150 & 230 denier have been prepared.	Machine parameters have been established]for develop-ment of air-textured sewing threads. This work was presented at the 8th Tech.Conf. of MANTRA & industry was made aware of developments. Industry representatives appreicated the development & have shown keen interest.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Yarn preparatory units, texturising units and powerlooms and mills sector for producing value-added products.	Machine parameters have been established for development of air-textured sewing threads. Work has been presented at the 8th Tech.Conference of MANTRA and industry was made aware of the development..

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7	Weaving	A study on the comfort proper- ties of the woven fabrics produced in diff. weave constructions using yarns of different strucural characteris-tics.	1. To develop woven fabrics for dress-material in various types of weave constructions (like plain, twill, satin, sateen, mat, crepe, etc.),using synthetic filament yarns of different structural characteristics. 2. To study effect of structural characteris-tics of yarns on the comfort related properties of fabrics. 3. To study influence of various types of weaves on above properties of the fabrics. 4. To study properties of some important commercially available dress-material fabrics and to suggest modified weaving parameters required for improve-ment in comfort-related properties.	1.8.2000	2 years	Under this project, fabric samples were prepared using micro-denier Polyester of normal denier per filament, viscose fila- ment yarn,cuprammo-nium rayon filament yarn, polyester air-jet textured yarn & tencel in diff.weave constructions such as plain,twill & mock-leno with a view to study effect of various constructional parameters & raw material type on the comfort related properties of woven fabrics. Develpment of fabric samples was carried out keeping(i) same warp & weft cover factors & varying content of yarns produ- ced from man-made regenerated cellulosic fibres which are known to have higher natural moisture regain andabsorbency & (ii)same content of yarn produ- ced from man-made regenerated cellulosic fibre & varying cover factor of fabric.	**Product Development** Dress materials & sarees made from synthetic fil.yarns are popular due to easycare pro-perties,durabi-lity & lower cost.However, due to lower natural moisture regain values of synthetic fil. yarns,they are not comfort-able.So,attenpt was made to develop dress material using both synthetic fil.yarns and man-made, regenerated cellulosic fibre yarns. Also, influence of various con-structional parameters on comfort pro-perties were studied.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Powerlooms and mill sector for producing value-added products.	Fabric samples using various combinations have been prepared using polyester, microdenier, viscose, cuprammonium, poly-urethane, diacetate, etc. and their comfort related properties were assessed. Silk fabrics possess good lustre, soft feel, superior handle and comfort in wear. On the other hand, these fabrics have some limitations like less durability, poor abrasion resistance, poor anti-crease properties, and high price, whereas polyester fabrics are durable, crease resistant, possessing easy wash and wear properties and comparatively cheaper. Therefore, in order to exploit the properties of both the polyester and silk yarns, the union woven fabrics using polyester and silk yarns were developed. As the characteristics of diacetate rayon is more similar to that of silk, the union woven fabrics using polyester and diacetate were also developed. Apart from that, various fancy union fabrics were also developed using different types of new combination of yarns such as texturised polyester, lycra, nylon, etc. The above work provided new product types and range.

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1	2	3	4	5		6	7	8	9	10
8	Processing/ Pollution Control	To develop eco-friendly substitute products for the dyeing & printing of synthetic fabrics & to reduce the pollution load of the effluent.	1. Development of eco-friendly substitute to sodium hydro-sulphite based on aliphatic carboxylic acids & alcohols,viz., glutaric acid,sulphinic acid, glucose,hydroxy acetone,dextrin, thiodiurea oxide, fatty alcohol ethoxy-late,fatty & sulphates & their mixtures,etc. & their performance evaluation in reduc-tion clearing process and to develop technology so as to prepare such products at the site of process houses & make processors self-reliant & self sufficient. 2. Development of eco-friendly substitute for carriers & migrat-ing & levelling agents based on non-alkyl-phenol ethoxylates (AEPO), non-chlorina-ted solvents, viz., Butyl benzoates, benzoic acid, salicylates, acetate compounds & fatty acid esters and their performance evaluation.	1.8.2000	2 years	Polluting nature of basic chemical & commercial products were evaluated by analysing COD/BOD values.Pollution load for scouring,bleaching & desizing of popular varieties made from sized & non-sized poly. yarns was evaluated with conventional process chemicals &eco-friendly substitutes based on alkoxy alcohol ethoxylated compounds. To optimize consumption of sodium hyro-sulphite,trials were done to modify precessing sequence in scouring as well as washing process for printed fabrics and attempts made to replace hydro by diff.reducing agents like TUD,Na-borohydride,sod.sulphite glucose & mixture of surfactants.Dyg. trials with diff. acids like oxalic acid, formic acid, glycolic acid & their mixtures were carried out to replace acetic acid in dyeing & citric acid in printing.	**Process Development** It was observed that about 50% COD load can be reduced when treatment was given based on alkoxy ethoxylate compounds. Results obtained show that it is possible to get good & compa-tible color yield & brilliancy in shade in printing fabrics with glycolic acid at low cocnetrat-tions.Industry has shown keen interest in substitute products.Aware-ness has been created by paper publication in MANTRA Bulletin and presentation in seminars.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Decemtra-lized process houses and exporters for value-addi-tion and quality improve-ment..	Scouring process based on Alkoxylated fatty alcohol has been developed. It was observed theat 50% COD load can be reduced. Glycolic acid as a substitute to citric acid and tartaric acid in printing of disperse colours on polyester has been studied. Glycolic acid eliminates problem of charring of gum and improves brilliancy at low concentration. Eco-friendly products for reduction clearing process were identified.

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1	2	3	4	5		6	7	8	9	10
9	Raw material/ fibre/filament	Development of air intermingled elastane combination yarns of stretch fabrics.	1. To develop various type of air-inter-mingled elastane combination yarns using different combi-nations of Poly-urethane yarn with POY yarn, textured yarn and some staple yarns. 2. To study effect of different process variables like jet type, processing speed, & air-pressure, etc. on the physical proper-ties of developed yarns. 3. To study structure and stability of the developed yarns. 4. To evaluate end-use application of developed elastane combination yarns.	1.7.2001	2 years	*Quality evaluation of procured raw material (elastanes,textured yarns & poly. POYs).`` *Eight diff.types of air-intermingling jet's performance evaluated by air-intermingling of 40 den.elastane with 90 den.poly.textured yarn & their nip characterization. *2-component(elastane +other multifilament yarn)yarn samples were prepared & nip characteristics were also evaluated. *2-component yarn samples & 4-com-ponent yarn samples prepared & nip characteristics evaluated. *Woven & knitted fabric samples were also prepared from developed elastane combination yarn samples. *Testing & quality evaluation of diff.yarn samples were done.	Process development.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Yarn preparatory units, texturising units and powerlooms and mills sector for producing value-added products.	Various types of air-intermingled elastane combination yarns for stretch rarbics using combination with polyester, viscose, nylon prepared. The effect of different process variables, viz., air pressure, jet type and core sheath have been studied. Work was helpful in development of indigenous technology & know-how for elastane combination yarns & fibres therefrom. This was beneficial for commercial production & the decentralised sector developed innovative fashion- able stretch fabrics.

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10	Processing	Application of formaldehyde- free finishes to man-made fibre fabrics such as tencel, viscose, polyester & their blends and performance evaluation of the finished fabrics.	1. To study and compare formal-dehyde-free finishing systems. These will be based on di- and polycarboxylic acids such as citric acid, aconitic acid, itaconic acid, maleic acid, lactic acid, etc., and DMEDHEU imidazolidinones, polyvinylacetate, etc. 2. To study effect of additives such as polyethylene, organopoly-siloxane, Beta-cyclodextrin and glyoxal on the performance of finishing agent. 3. To study cost-effectiveness and performance characteristics of finishing formula-tions.	1.7.2001	2 years	The required fabrics, viz., polyester, viscose & their blends, were studied & blend compositon were determined. Desizing, scouring & bleaching done by conventional methods. Finishing agents/chemicals, which are formalde-hyde free, were identified. Formulation of finish-ing recipes based on polycarboxylic acids, DMEDHEU,acrylates etc. has been done. Finishing systems were applied on fabrics by pad-dry-cure method. Effect of additives such as glyoaxal, chitosan, b-cyclodextrin, etc. and performance properties of finished fabric, viz., crease recovery angle, stiffness, pilling behaviour, etc has been studied.	Process development, standardisa-tion and product formulation.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Decemtra-lized process houses and exporters for value-addi-tion and quality improvement.	MANTRA develops formaldehyde-free finishing recipes using formaldehyde scavengers. The addition of formaldehyde scavengers such as citric acid and urea give good results with an almost negligible increase in yellowness. In case of commercial non-formaldehyde finishing agents, there is no yellowing of the treated fabrics. However, the required degree of stiffness of finished fabrics is not obtained. Viscose and polyester/viscose give reasonably good easy-care properties with the non-formaldehyde finishing agents. In case of cotton and tencel, low formaldlehyde finishing gives the best results.

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11	Processing	Flame retardant finishing based on eco-friendly formulations, viscose,polyester and their blends.	1. Development of flame retardant viscose, polyester and its blends by applying commercial FR finishing products & to assess emission level of toxic gases. 2. To modify existing FR system in order to minimise toxic emissions during end use.	1.7.2001	2 years	Flame retardant chemicals, auxiliaries & other finishing agents have been identified. These are based on acrylonitrile, polyacrylates, poly-carbonates & polymer emulsions with TiO_2 etc.These include poly.,viscose & poly./ viscose/cotton blends. Fabric samples for finishing experiments are prepared by giving desizing, scouring & bleaching treatments by conventional methods. Flame retar- dant finishes are applied at various concentration levels. Performance has been evaluated with ref.to LOI, vertical flamabi-lity, washing fastness & certain physical para-meters,viz., tensile strength, elongation, air permeability, drape, etc. Toxic gas level has been detected.	Process development and product development.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Decemtra-lized process houses and exporters for value-addi-tion and quality improvement..	Chemicals based on acrylonitrile, poly-acrylates, poly-carbonates, polymer emulsions with TiO_2 are studied as additives. These chemicals are applied on fabrics and performance has been assessed. Emission level of toxic gas has been assessed. FR polyester, viscose products durable upto 15 washings are develooped. The project will help in producing FR textiles based on polyester and its blends.

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1	2	3	4	5		6	7	8	9	10
12	Processing	Application of cationic dye to anionically modified nylon and their performance evaluation in comparison with cationic dye dyebale poly-ester and regular nylon with special reference to fastness properties.	1. Physico-chemical characteristics of selected anionically modified fibres such as nylon and polyester for similar salt content (-SO_3 Na groups). Bright nylon yarns will be used with micro or regular filaments. 2. To optimise dyeing of anionically modified nylon with a range of cationic dyes and comparison with regular nylon. Comparisons will also be made with regular shades of silk to assess natural silk-like effect produced. 3. Fastness properties in general and light fastness in particular of cationic dyes on normal nylon is poor. Hence, in the present study, dyeing of newly marketed cationic dye dyeable nylon with cationic dyes will be studied and process parameters will be optimised and light fastness and other fast-ness properties will be assessed.	1.7.2001	2 years	CDN & regular nylon were tested for physical Properties i.e.denier(yarn),filament, reed/pick,ends,elongation at break,strength,tenacity etc.CDN yarn was woven into fabric with following construction. Reed:80/2 in;Warp: 72 picks/in; Weft: 80 picks/in; width of warp in reed:17.5 in; Beam:65m; plain weave. The fabrics,viz Cationic Dyeable Nylon (CDN) & regular nylon were scoured & heatset.Certain chem. analysis also carried out on CDN,CDP & nylon yarns.Nylon yarns tested for amino end-group content & carboxylic acid end-group content.Dyeing cycles optimised using series of cationic dyeable dye. Performance of dyed samples evaluated,viz.,light fastness,washing fast-ness, CCM value, brightness, etc.Comparison of shade is made for regular shades of poly. & silk.	Process development.	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences.	Decemtra-lized process houses and exporters for value-addi-tion and quality improve-ment..	Cationic dyeable nylon is a new fibre-fabric. Dyeing process has been developed and standardised. Keeping in view the overall fastness performance. The new nylon (modified) fibre can be partially substituted to real silk.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

Sl. No.	Subject area	Project Title	Main Objective	Project Commence-ment & Duration		Work done in brief	Achievements, i.e.Develop-ment of process/ equipment, etc.	Dissemina-tion of R&D achieve-ments	Economy & Accepta-bility by user industry/ Beneficiary industry	Achievements
1	2	3	4	5		6	7	8	9	10
12	Processing (Contd..)					Dyeing was carried out on scoured & heatset CDN fabric. Seven basic dyes of Coracryl range were selected to cover entire gamut of colors. Dyes used were Coracryl Yellow C7G (200%),Coracryl Golden Yellow CGL (200%), Coracryl Red C4G(200%),Coracryl Red C2B(200%), Coracryl Blue C2R (200%), Basicol Brilliant Blue CBR (200%), Basicol Violet C3R.. Also dyeing of CDP was carried out for similar shades and depths. Dyed samples of CDN were assessed & measured on CCM system. These will serve as data base for recipe formulation with cationic dyes. Dyed cationic dyeable nylon based on selected dyes were compared with regard to shades of silk for brilliance of shades and handle.				Cationic dyeable nylon is a new fibre- fabric. Dyeing process is being developed and standardised. Keeping in view the overall fastness performance. The new nylon (modified) fibre can be partially substituted to real silk.

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6	7	8	9	10
13	Machinery/ Raw material/ Fibre/ Filament/ Draw-texturing	Development of novel stack-disc friction units made from the combination of polyurethane (soft) friction discs with other hard-materials' friction discs & quality evalua-tion of draw-textured yarns made therefrom.	1. To develop novel stack-disc friction units using combina-tions of Polyurethane (PU) friction discs & hard friction discs. 2. Performance evaluation of the developed friction unit by characterisa-tion of textured yarn quality made therefrom. 3. Optimisation of number/combination of polyurethane friction discs & hard friction discs in texturing unit for the production of fault-free textured yarns.	1.9.2002	2 years	1. Market survey done regarding availability of polyester POY. 2. Polyurethane friction discs of 6 mm thickness & different hardness (90º & 85º) have been studied. Solid ceramic friction discs of 6 mm thickness have also been studied. Other type of friction discs have been ordered. 3. Six diff. type of poly. POYs, viz., 126/36 SD, 130/36 SD 140/36 SD, 140/48 SD, 250/36 SD, 250/100 SD have been studied. Physical proper- ties of 126/36 SD and 130/36 SD POY have been evaluated. Quality assessment of different types of POY was carried out. These include all physical & some thermal properties. Novel stack- disc unit (Pu-ceramic combination) was develop- ed & its trial was taken on draw texturing machine. After proper optimization of para-meters, textured yarn samples were prepared for property evaluation.	Process develop-Ment, through machine part modification	Published in MANTRA Bulletin. Work has been presented in seminar & technical conferences. (7th Asian Textile Conference, held in Delhi on December 01-03, 2003.	Texturing units,twisting units, powerlooms mill sector and value-addition.	Benefits of both soft and hard friction discs can be obtained from a single twisting unit. It is possible to run twisting unit at a commercial speed within the range of normal parameters. Development of novel stack disc friction unit in case of hard & soft material combina-tions, the torque transferred in the yarn may have increased as compared to 100% hard material friction disc unit. So, lower D/Y ratio can be used. Hence, reduces energy consumption and noise level.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6	7	8	9	10
14	Weaving/ Technical Textiles	Development of light weight reusable protective fabrics from micro-denier synthetic filament yarns.	1. Development of protective woven fabrics from micro-denier synthetic filament yarns in diff. constructional para-meters & assessment of their protective performance against fine particulate matters & liquids along with assess-ment of durability and comfort.	1.9.2002	2 years	Some commercially available woven and non-woven type protective fabrics used in the medical field were procured.Evaluation of their properties, viz., tear resistance,tensile strength bursting strength, abrasion resistance, air permeabi-lity, etc. has been carried out to assess the require-ments of fabric properties for their use as protective clothings. One in-house developed polyester fabric woven from micro denier (80D/100 Roto) filament yarn and differential shrinkable airjet textured yarns.	Product develop-ment	--	Powerlooms mill sector for value-addition and diversified product development..	Introduction of micro denier synthetic filament yarn and shrinkable airjet textured yarns, woven fabrics were developed for protective clothing. This study has helped in developing new product type for decentralized sector.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6	7	8	9	10
15	Technical Textiles	Development of canvas fabric from high tenacity air textured synthetic yarns.	Aim of the project is to substitute cotton based tent fabrics by high tenacity air textured polyester based tent/cover fabrics, which can be more durable and cheap and flexibles. It was also aimed to develop FR (fire retardant) fabric. Such fabrics have good domestic and overseas demand.	07.01.05	1 ½ years	In this project canvas fabrics were made from high tenacity polyester air-textured yarns and coated are found to be superior than that of normal air textured yarns. This is a technical textile product and can be used as cover fabric, tarpaulin, tent and protective fabric & is cheaper substitute having high shelf life and good stability. Product is also having excellent flame retardancy and fabric is well accepted.	Technical textiles product develop-ment.	Through seminars and interaction, the informa-tion has been discussed.	Decentralized weaving sector has accepted the product.	Fire-proof canvas fabrics were developed from high tenacity polyester air-textured yarn. The product is suitable as tent cover fabrics and cheaper substitute with longer life to cotton tent fabrics.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6		7	8	9	10
16	Chemical processing	Improvement in chemical processing technology of modified rayon (filament and modal fibre fabrics and enhance the realization and entire value chain.	Processing of viscose filament and modal yarns poses problems like crease, fibrillation, shrinkage and dimensional stability. Also uneven, patch and faulty process occur due to faulty preparatory process. The scope is to develop suitable processing technology to cover these defects and improve the quality of fabrics which are used mainly in garments which has tremendous export potential.	16.10.06	2 years		Technical textiles, weaving. In the present work, objective is to manufacture low cost green-house based on polyester for particular green vegetables and flowers produced in South Gujarat and to increase yield and productivity of land. Work has been conducted under five distinctive heads as discussed below:-	Process & product development	Planning to publish in international and national journals.	Processing units and weaving units.	Surat being a hub for sarees and dress material and is producing viscose varieties for domestic and export market. But for the better growth in niche high end segments and to boost exports, special care is required in manufacturing and chemical processing of regenerated fibre (VFY) and new varieties of regenerated viscose like Modal (HWM) and lyocell fibre. All these regenerated fibres have some limitations. All these limitations are addressed in this present study and the precau- tions are highlighted for manufacturing and processing route and selection of machineries are also studied and following conclusions are made.
						1	Baseline survey has been conducted to assess the quality vis-a-vis defect cause analysis of VFY fabrics produced in Surat. Based on observation, special cases & changes required during yarn preparatory process were studied to bring down defects in grey fabrics.				

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6		7	8	9	10	
16	Chemical Processing (Contd..)					2	Dimensional stability and shrinkage control is very much impor-tant in case of VFY fabrics. Experimental trials of VFY fabrics (popular varieties) were conducted in soft flow U-tube machines and soft Flow long tube Machines, the results were also compared with "Conventional tapela processing".				1	After assessment and thorough study of VFY, we have optimized the factors like tension, speed at yarn preparatory and weaving stage and we also suggested remedial measures to minimize defects like warp and weft strikes, pattas, thick & thin, etc., and demonstrate the ways to produce quality fabrics.``
						3	For `shrinkage Decrease' of VFY yarn to meet stringent export demands and as per the global Requirement in Manufacturing of Garments, experiments in Chemical finishes with DMDHEU resin were also carried out and boiling water shrinkage (ISI-1299 method) and other properties were evaluated.				2	Viscose is very prone to crease and has low wet tenacity. Ceasing problem can b e resolved by proper selection of the machine like long tube soft flow dyeing machines with gentle action of flow water and fabric movement by reel.

Annexure-I(Contd..)

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1	2	3	4	5		6		7	8	9	10	
16	Chemical Processing (Contd..)					4	Chemical processing parameters were Optimized for the Modal fabrics, using jigger machine.				3	Excessive shrinkage to the extent of 15-16% in the grey fabric can be further controlled by treat-ment with cross linking resin and proper selection of catalyst with the commercial acceptance limit of 4-3.5%,. This probably is due to formation of greater no. of covalent bond.
						5	Chemical processing Parameters for excel Fabrics were optimized on Jigger.				4	Strength loss is also significant. It is likely that energy of bond formed compensates for that caused by dis-ruption of the hydrogen bond.
											5	Being viscose the amorphous fibre, the strike rate is very high. It may cause uneven dyeing. Guideline is given in suggestion section to control the same.

Annexure-I(Contd..)

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1	2	3	4	5	6	7	8	9	10
16	Chemical Processing (Contd..)								6 Process has been optimized for new variants of regenerated viscose like `Modal' (HWM) and lyocell fibre. Overall, present study is very useful and fruitful to get consistent & good quality conformance result. The technology has been adopted by one unit and we are in consultation with other unit for transfer of know-how.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6	7	8	9	10
17	Technical Textiles	Development of anti-allergenic protective clothing for use in bed sheets, pillows and mattress casing.	Anti-allergenic curtains, bed sheets are the need of the day. Such fabrics are imported and hence very costly. The project aims at the development of such cloth/fabric which will prevent allergies that causes asthma, in particular.	16.10.06	2 years	In order to prepare the required anti-allergenic fabrics, commercial samples of such fabrics were procured from National Allergy Supply Inc., USA. Besides this, locally available bed sheets with a high thread count were also procured. All these fabrics were analysed for mechanical parameters such as reed/pick, weave, denier, fabric composition, etc. Based on these results, fabrics were woven with the required thread count & pore size. These fabrics included 100% PET (3 varieties of thread count – 230), 100% cotton (2 varieties, thread count - ~ 200) and PET/COT blend (2 varieties, thread count ~ 230). All these fabrics were given adequate pre- treatment & then finished with anti-bacterial & water- repellent finishes. Finishing was done by padding method & samples were cured on Rotolabo coating machine. All fabric samples were analysed for (i) mechanical properties; (ii) air - permeability; (iii) water vapour transmission; (iv) spray test for water repellency; (v) anti-microbial properties.	Product & Process Develop-ment.	Work has Been Presented in workshop.	Manufacturing & processing units, hospitals	The barrier fabrics developed in this project have the requisite properties of a high thread count (small pore size), anti-microbial effect and comfort properties. The test results of air permeability and water vapour transmission are indicative of the comfort properties. The fabrics developed in this project can be used effectively as barrier fabrics for hospital bed sheets, surgical gowns, etc., as well as in applications which require protection from microbes.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6	7	8	9	10	
18	Technical Textiles	Development of commercial quality green-house shade cloth for low cost poly-house for controlled crop production (2008).	Agriculture and farming are one of the chief livelihood of large majority of the Indian population. It is necessary to develop low cost green house for better quality and larger quantity of yield. The project aims at develop-ing low cost green house cloth based on polyester. The product will have export potential also.	18.08.08	1 ½ years	Technical textiles, weaving. In the present work, objective is to manufacture low cost green-house based on polyester for particular green vegetables and flowers produced in South Gujarat and to increase yield and productivity of land.	Alternative product development	On-going.	Technical textiles coating, processing and weaving units.	**Work done**	
										1	Literature survey of the project was completed and preliminary work plan was made after discussion with weaving personnel.
										2	Procured comer- cial quality green- house shade nets from local shops.
										3	Procured green-house covers from Rose Farm at Kuched, Navsari.
										4	Visited Rose Farm at Kuched and held discussions with owners regarding use & procurement of greenhouse shade materials – nets, covers, mosquito nets.

Annexure-I(Contd..)

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1	2	3	4	5		6	7	8	9	10	
18	Technical Textiles (Contd..)									**Work done**	
										5	Visited Navsari Agricultural University & held dsiscussions with Dr.R.G.Patil regard – ing requirement, use and testing of greenhouse shade nets.
										6	Analysis of commercial shade nets by (i) Chemical testing; (ii) DSC; (iii) Mechanical analysis to deter- mine chemical class of material and mechanical properties.
										7	Procured addresses of manufacturers of PE, PP, PET yarns for weaving green-house shade nets.
										8	Surfed internet for all details about greenhouse shade nets – Indian manu-facturers, uses and analyses of materials.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6	7	8	9	10	
18	Technical Textiles (Contd..)									**Work to be done**	
										1	Weaving of green-house shade nets of different materials – PE, PP, PET.
										2	Weaving of green-house shade nets with different amounts of light transmission.
										3	Treatment of mosquito net with insect repellent finish.
										4	Measurement of light transmission and mechanical properties.
										5	To co-ordinate with NAU for growing crops with different nets.
										6	Cost analysis of shade nets.

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

Sl. No.	Subject area	Project Title	Main Objective	Project Commencement & Duration		Work done in brief		Achievements, i.e.Development of process/ equipment, etc.	Dissemination of R&D achievements	Economy & Acceptability by user industry/ Beneficiary industry	Achievements
1	2	3	4	5		6		7	8	9	10
19	Pollution control	Application of suitable cost effective technology for reuse of water jet effluent.	Pollution control. Generation of effluent from water-jet loom is 2-3 m^3/day. The main parameter is COD and emulsified oil in waste water. Pollution control authority has imposed stringent conditions for discharge water. The industry is highly decentralized and small. The main objective is to develop plant/treatment which is low cost and effective.	18.08.08	2 years	1	The samples of raw water, feed water to water jet looms & effluents were collected from different water jet looms situated in different areas.	Process Development (On-going)	On-going	Waterjet looms	**Work to be done** Coagulation process will be studied for different effluent samples from units located at different localities, viz., Sachin, Kadodara, Pandesara, Kim, etc., by using lime + $FeCl_3$ and lime + Alum. This will be also taken on pilot scale. Pilot scale trials will be taken at units having existing ETP. Process parameters will be scaled up for particular type of effluent. Simultaneously, prototype model will be designed based on input and output parameters of the effluent.
						2	Samples were analysed for various parameters like COD, BOD, oil and grease, TSS, TDS, Total Hardness, etc.				
						3	The samples which contain higher amount of oil & grease & COD were selected for different treatments, viz., ozonolysis, sedimentation, coagulation, etc.				

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6		7	8	9	10
19	Pollution control (Contd..)					4	Treatments were Given to above Selected samples using different coa-gulants, chemical treatments, market available emulsifiers and ozonolysis, etc.				
						5	Study was conducted by injecting ozone at different concentra-tion levels for ozonolysis. There was reduction in oil and grease & COD, but there was increase in hard-ness. The treatment was effective but costly. Samples were also treated with 1,4 Dioxan. Result showed that there were no reduction in oil & grease. Study was conducted with commercial emulsi – fier wherein the reduction in oil & grease was obser-ved but the process was tedious & costly				

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1	2	3	4	5		6		7	8	9	10
19	Pollution control (Contd..)					6	Further, effluent was treated with different coagu-lants, e.g., Alum, $CaCl_2$ and $AlCl_3$, however, effective separation of oil & water was not observed.				
						7	Study was done by treatment with line & $FeCl_3$ in May. Results show that oil & grease were nil & also reduction in BOD & COD was observed. But, there was little increase in TDS & hardness of sample.				
						8	Again study was conducted with Lime + $FeCl_3$ and lime + Alum for sample of another area. Results Observed the com-bination Alum + Lime gave better performance compared with Lime + $FeCl_3$.				

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6	7	8	9	10	
20	Technical Textiles	Smart fabric/ garment products with smart colours for security label.	Thermochromic and photochromic colourant will be exploited for technical and industrial applications to develop sensor fabrics.	18.08.08	2 years	Garment, chemical processing and technical textiles. The objective of this project is to develop sensor fabrics for analysis of pH, light, thermal, etc. In the present work photo-chrome colours will be used to make sensor garments/fabrics.	Develop-ment of Smart fabrics (product development) with smart colours for security labeling.	On-going	Process house/TT unit garments manufacturing, security, defence.	**Work done**	
										1	Literature survey of the project was completed till date.
										2	Price quotations procured for smart colours.
										3	Planning for fabrics /substrates to be woven for applica-tion of smart colorants.
										4	Considering the high cost of smart colorants (thermo- chromic & photo- chromic colorants – Rs.6000 & Rs.10000/ kg (paste) & Rs.38000 & Rs.60000 per 250/100g powder detailed planning of the quantity required and application method has been done.
										Work to be done	
										1	Pre-treatment of substrates.
										2	Application of smart colorants.
										3	UV irradiation of substrates after application.
										4	Testing of fabrics.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

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1	2	3	4	5		6	7	8	9	10
21	Technical Textiles/ Weaving/ Processing	Development of eco-friendly recyclable bio-degradable value added technical textiles from banana yarn.	* To develop eco-friendly light weight, bio-degradable composites and fabrics composite from banana and other yarns on high-speed modern looms. * To develop value added apparel products by chemical finishing and coating and lamination. * To prepare data and sample books. * To study cost economics.	05.10.09	2 years	* Literature survey work has been started. Banana fibre and yarn samples are being collected. * Banana fibre and yarn samples will be analysed for physical and chemical characteristics. * Basic studies in scouring and bleaching of banana fibres will be done. * Scouring process standardized for fibre/yarn. * Bleaching process standardized for fiber and yarn.	Development of fabric suitable in Home furnish-Ing and hometch.	On-going	Farmers, weavers..	New fibre/fabric development which will be eco-friendly and may be a substitute to cotton to some extent and development of technical textile products.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

Sl. No.	Subject area	Project Title	Main Objective	Project Commence-ment & Duration		Work done in brief	Achieve-ments, i.e.Develop-ment of process/ equipment, etc.	Dissemina-tion of R&D achieve-ments	Economy & Accepta-bility by user industry/ Beneficiary industry	Achievements
1	2	3	4	5		6	7	8	9	10
22	Technical Textiles/ Packtech	Polyactic Acid Fibres in technical textile applications for packaging and disposable food containers.	* To develop woven/ knitted PLA fibre fabrics for the required applications. * Coating of PLA fabrics with Polyolefins/silicone & functional finishes for specific applications such as packaging for food products, Medicines, disposable products. * To prepare sacks, bags, containers from PLA coated fabrics. * Testing of coated fabrics and products developed out of it according to standard test methods for flame retardancy, soiling, liquid penetration, effect of micro-Organisms & other performance tests. * Cost economics of products.	05.10.09	2 years	* To procure PLA fibres with the required properties for packaging end-uses. * Completed literature survey till date on PLA fibres used in technical textiles. * Correspondence carried out with different manufacturers/suppliers of PLA fibers. * Procured equipment required for the project..	Development of disposable Packaging material based on eco-friendly PLA fibre.	On-going	Packaging industry	Packaging material based on PLA, which will be at par with polyester as far as tensile properties are concerned and will be bio-degradable material.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

Sl. No.	Subject area	Project Title	Main Objective	Project Commence-ment & Duration		Work done in brief	Achieve-ments, i.e.Develop-ment of process/ equipment, etc.	Dissemina-tion of R&D achieve-ments	Economy & Accepta-bility by user industry/ Beneficiary industry	Achievements
1	2	3	4	5		6	7	8	9	10
23	Technical Textiles/ Industrial Textiles/ weaving	Development of cost effective filter fabrics suitable for bag filters.	* To develop bag filter fabric from polyester, PPS, PTFE, etc., by weaving. * To make material such that it is controlled air Permeability, abrasive resistant, acid & other chemical resistant, antistatic, FR, resistance to stretch & impacts & vibrations. * To optimize the performance by taking field trials. * To study cost economics.	05.10.09	2 years	* Thorough literature Survey work has been started and inquiries of filter fabrics are being made with suppliers. Fabric samples are being collected. * Quotations for equip-ments and filter fabrics are invited.	Low cost filter fabric on weaving based.	On-going	.Weaving, processing, chemical plants, power plants, etc.	Development of filter fabric for bag filter.

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

Sl. No.	Subject area	Project Title	Main Objective	Project Commence-ment & Duration		Work done in brief	Achieve-ments, i.e.Develop-ment of process/ equipment, etc.	Dissemina-tion of R&D achieve-ments	Economy & Accepta-bility by user industry/ Beneficiary industry	Achievements
1	2	3	4	5		6	7	8	9	10
24	Garment/ processing	Development of fabrics made from PTT yarn and to optimize processing parameters to use in apparel sector including cost effectiveness.	* Development of PTT fabrics in different constructions, designs using twisted & textured yarns. * To standardize and optimize the para-meters for pre-treat-ment & dyeing process of PTT fabrics. * To study the proper-ties of processed fabrics. * To establish guide-lines for development of new range of products based on PTT fibers for decentralized textile saector.	05.10.09	2 years	* Correspondence has been done to procure PTT yarn from various suppliers. Request in this regard has been made to supplier of `Corterra' fibres of Shell Chemical Co. Similarly, supplier of Triexta' fibers of Dupont Co. has been approached. We are awaiting their response. * Since no response was received from M/s Shell Co., correspondence has been done with Product Marketing Manager of M/s DuPont India. He has arranged 10 kg of DuPont Sorona (PTT) fiber from their agent in Korea, which will be received by 1st week of February. Under this project, an HTHP beaker dyeing machine is required. For this, quotations from two companies have been received. To create awareness about PTT fibers, we have conducted a half-day seminar on PTT fiber in collaboration with M/s DuPont India.	Development of appropriate Processing technology for pre-treatment and dyeing.	On-going	Process houses, garment manufacturers, weavers, texturisers	Development of appropriate processing technology.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

Sl. No.	Subject area	Project Title	Main Objective	Project Commencement & Duration		Work done in brief	Achievements, i.e.Development of process/ equipment, etc.	Dissemination of R&D achievements	Economy & Acceptability by user industry/ Beneficiary industry	Achievements
1	2	3	4	5		6	7	8	9	10
25	Nano technology	Application of nano technology for delustering of bright polyester fabric varieties.	* To study the application of TiO_2 nano Particles on bright polyester fabric by various methods like exhaust and pad-dry-cure and to evaluate delustering and also the durability of the same. * To study the effect of chemical modification like alkaline hydrolysis aminetion, solvent, catalyst, etc., on lustre of polyester fiber. * To study the effect of above modification on physical properties of polyester fiber. * To optimize parameters for the most suitable technique that will decrease the lustre with minimum strength loss & loss in other desirable properties.	16.12.09	2 years	* Thorough literature survey work has been started. Basic experiments with available slurry are being planned. * Initial trial has been conducted in laboratory using TiO_2 micro-emulsion. The trial has been conducted with H.T. exhaust method as well as pad dry cure method. The results found are not satisfactory. * To produce TiO_2 nano emulsion, we require homogenizer. We have collected information regarding homogenizer supplier/manufacturer and have asked for quotation.	Delustering process development and nano finishing formulation development.	On-going	Processing unit, chemical auxiliary manufacturers	Development of nano finishes and TiO_2 supervisors for delustering, etc.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

Sl. No.	Subject area	Project Title	Main Objective	Project Commence-ment & Duration		Work done in brief	Achieve-ments, i.e.Develop-ment of process/ equipment, etc.	Dissemina-tion of R&D achieve-ments	Economy & Accepta-bility by user industry/ Beneficiary industry	Achievements
1	2	3	4	5		6	7	8	9	10
26	Bio-technology	Development of enzymatic technique for weight reduction of polyester.	* Optimization and characterization of lipases enzymes suitable for esterifica-tion, hydrolysis and weight reduction of polyester & scouring of polyester. * Use of purified enzyme/microbial cells for hydrolysis of polyester under Controlled laboratory conditions & scouring of polyester fabrics. * To develop and optimize polyester esterification of eco-friendly process using `Lipase' enzyme. * To study the environ-mental aspects of the process. * Scaling up the process at industrial level and to build-up reproducibility in the process.	05.10.09	2 years	* Thorough internet and journals survey have been started. Overseas inquiries are being made for procure-ment of lipase and allied enzymes. * Initiated procedure for selection and procurement of necessary raw materials and we will float inquiries for incubator. * Basic chemicals and enzymes search is done. As a preliminary study, commercial grade enzymes are procured.	Bio-technolo-gical weight Reduction of Polyester and Development of process and product.	On-going	Process houses and bio-Technology industry	Eco-friendly bio-technology based technology will be developed which will consume no chemicals and can be energy saving.

Annexure-I(Contd..)

COMPENDIUM OF R&D PROJECTS FUNDED BY MINISTRY OF TEXTILES UNDERTAKEN BY MANTRA DURING LAST 10 YEARS (1999 TILL DATE)

Sl. No.	Subject area	Project Title	Main Objective	Project Commence-ment & Duration		Work done in brief	Achieve-ments, i.e.Develop-ment of process/ equipment, etc.	Dissemina-tion of R&D achieve-ments	Economy & Accepta-bility by user industry/ Beneficiary industry	Achievements
1	2	3	4	5		6	7	8	9	10
27	Technical Textiles/ Sportstech	Development of multi-layer fabrics for sportswear.	To develop different types of multi-layer fabrics using synthetic filament yarns such as polyester, polyamide and performance evaluation of the same.	16.12.09	2 years	* Thorough literature survey work has been started. * Quotations for equip-ments, viz., filtration tester, and certain fabrics are invited.	Development of multi-layer fabrics based on PTA and polyester yarn suitable for sportswear and garments.	On-going	Garment weaving, coating and lamination.	Development of sportswear suitable to Indian climate.