# Accreditation of Organic Cotton by Spotting Pesticides on Cotton Fiber

Dr.V.Stephanie, M.Marilyn
*Assist. Professor, Student,Department of textile engineering,*
*Alagappa College of Technology (ACT), Chennai*

***Abstract***

*This work grants a evaluation of the properties of predictable and organic cotton, using device which are presented at the Faculty of Textile and TUL, an analysis of cotton was made with the raster electron microscope SEM VEGA TS 5130, the physicochemical properties through GC / MS, analytical method of gas chromatography, the mechanical properties of both types of cotton were deliberate in Labor dynamometer test, strength was measured using Pressley Tester instrument answer and fibers on the dynamic mechanical analyzer DMA., cotton maturity was strong minded using a polarizing microscope, using the apparatus Micronaire for fineness, essential length with staple diagram, thermal properties with the discrepancy scanning calorimeter (DSC) and thermos gravimetric analyzer TGA. To perceive the presence of insecticides in samples of cotton, gas chromatography with mass was employed and the results were associated to those obtained from the gas chromatography mass spectrum GC / MS. On the basis of these results it was determined that the gas chromatographic method can be used to detect pesticides in cotton samples and can be applied to all natural fibers of plant origin. In this way, they can be notable as organic and conservative cotton, thus contributing to the certification of organic cotton and substances of vegetable origin. Analysis, which is familiarized in this thesis, exhibits difference in conventional and organic cotton from Senegal, Egypt, Russia and India.*

**Keywords** - *Organic, Conventional, Chromatography, Abundance.*

## I. INTRODUCTION

Cotton is the most imperative natural textile fiber, as well as cellulosic textile fiber in the world, used to harvest apparel, home fittings, and industrial products. Worldwide about 40% of the fiber disbursed is cotton. Cotton is grown commonly for apparel application but it is also a food crop the major end uses for cotton stones are vegetable oil for human feeding; whole seed, meal, and hulls for animal. Cotton fibers are seed hairs from shrubberies of the order Malvales, family Malvaceae, tribe Gossypieae, and genus Gossypium. Botanically, there are four principal trained species of cotton of commercial importance: hirsutism, Barba dense, arboretum, and herbaceous. Thirty - three types are currently recognized; though, all but these four are wild shrubs of no marketable value. Each one of the commercially important species contains many diverse varieties developed through breeding programs to produce cottons with continually improving properties, faster maturing, enlarged yields, and improved insect and disease confrontation and fibers with greater length, strength, and uniformity.

All organic fibers, organic cotton is one of the records popular. Organic cotton is grown using approaches and materials that have a low impact on the environment. Organic production systems restock and preserve soil fertility, reduce the use of toxic and persistent pesticides and fertilizers, and build biologically diverse agriculture. Third - party documentation organizations verify that organic producers use only methods and ingredients allowed in organic production. Organic cotton is grown without the use of toxic and determined pesticides and synthetic fertilizers. In addition, federal regulations prohibit the use of hereditarily engineered seed for organic farming. All cotton sold as organic in the United States must meet strict centralized regulations covering how the cotton is grown.

Eradicates the negative possessions, such as human and animal poisoning by chemicals and soil toxicity, as well as natural cosmetics, also called organic resources beginning to have a firm place in the shopping area for only biologically minded consumers. But what really means in the case of bio preposition shirt, towel or baby products. And how to traverse in their marking? Textile industry has long beenquarter of all pesticides

applied annually is used in the cultivation of cotton. Textile industry has long been among the biggest load factors of the atmosphere. Nearly a quarter of all insecticides practical annually are used in the cultivation of cotton. Additionalmomentous amounts of toxic chemicals are expended annually in the conversion of cotton fiber for shirts, towels, bed linen etc. Either the neither textile production of other vegetable and animal fibers, nor the complex chemical processes of 100% cotton, silk or wool, is far from the idea of the nature of natural materials that we recall at first glance.

It is not shocking that many people interested in turning to clothing produced a way for nature and man favorable, even in harvests labeled as "natural", "bio", eco" or "green" textiles and necessity to be able to measure and define. Insecticides are biologically active compound which control the growth of organism e.g. bacteria, fungi, algae, insects or plants. Themarketplace of organic products rapidly increased and how we can attest that product is organic or not that s the big problematic. By using method which are supported on the latest developed knowledge i mean nanotechnology, mechatronics and informatics we are able permitting to this method to identify or detect pesticides on cotton fiber, to give a name, and chemical formula by exhilarating the molecule in order to dislocate, tomalformed in positive and negative charged ions and to identify by its ratio mass to charge that is the principle of GC/MSAsia and 45´ 8 N in main land China. Planting time for cotton varies with locality, from February to June in the Northern hemisphere. The time of embedding in the Northern hemisphere is the time of harvest in the Southern hemisphere. Seedlings emerge from the soil within a week or two after planting, 5–6 weeks later flower buds or squares form, and white, creamy yellow that is Pima cotton to dark yellow blossoms appear in another 3–4 weeks. The time intermission from bloom to open boll is about 40–80 days. The open boll lets air in to dry the white, clean, fiber, and fluff it for the harvest. Fiber bundle cross-sections obtained with communicated light microscopy for natural brown cotton where the presence of material bodies are visible inside the lumens of some fibers and for natural green cotton where the fibers are quite immature and are considered by the occurrence of sobering in the fiber walls and not material bodies in the lumen.

## II. LITERATURE OVERVIEW

If cotton can be measured as one of the fibers, which convoys man throughout life, with the appearance of organic cotton a identical serious problem develops for some professionals who have a very suspicious vision or a very shortened analysis of organic cotton. That is to provide kit for the detection of pesticides on cotton,approaches based on electrochemical using bio sensors, algae with ultra sound extractor, using FT-IR, which does not give a comprehensive solution for the discovery of pesticides. Choosing organic cotton is to contribute to the preservation of our health, especially for children; cotton consumes huge amounts of pesticides that are functional in the range of 5-10 times than other vegetables. But these chemicals are excessive problem on the atmosphere in the form of adulteration of soil, water, food, ground water etc. Another disconcerting factor in the cultivation of cotton is also that in third world countries, job and work conditions are disastrous and child labor is used. Accreditation of organic cotton is done at present under the same gardening conditions. Some argue that simply pesticides do not exist on cotton as inveterate Institute at Bremen, Germany or BVT Brno. In 2009 during a visit to TUL in mentioning us to do tests on insecticides immediately after harvest or on cotton, based on their tests on samples of cotton from Senegal, but under the suggested detection methodology. This can detect chemical pesticides. Type of pesticides and pesticide tests were accompanied also with the old cotton samples of cotton. It can be established that there is no trace of pesticides on cotton fiber, the organization developed in this work, today authorizes that this method can detect pesticide for cotton, gives a chemical name.

## III. GROWING CONDITIONS PEDOLOGICAL ORGANIC AND CONVENTIONAL COTTON

A soil in the area of Koungueul city in Senegal, wherever organic and conventional cotton is grown, is alluvial, sandy, ferric, salty, lithographical leaching.

**Type of seed:** Descent (IRMA 1243 PB * 5) - 32 45-859 E 281-789 F - G 440 company ISRA / Senegalese Institute for Agricultural Research / hybrid 1986th type of pyramid. Green-red. The lozengemedium seeds and green. Harvest 43.9% fiber (10 saws). Capsule Weight 3.72 g (ISRA). Used nourishment type NPKSB (14-23-13-5-1) 200kg/ha, pesticide, 3.7 l / ha urea 30kg/ha seeds are the same in these fibers that is con1, con2, bio1, bio2. Cotton plant cultivates in tropical and subtropical conditions, lives a period and can measure up to ten meter. Gardening of cotton shows that its size is limited to one to ten meters, to simplify the gathering of cotton and is usually used as an annual plant. During flowering period appear large white or yellow flowers with five petals flowers. For cotton, discontinuous between wet and dry climate is imperative for its development, though in the African savanna, where cotton grows, the climate is characterized by wet and

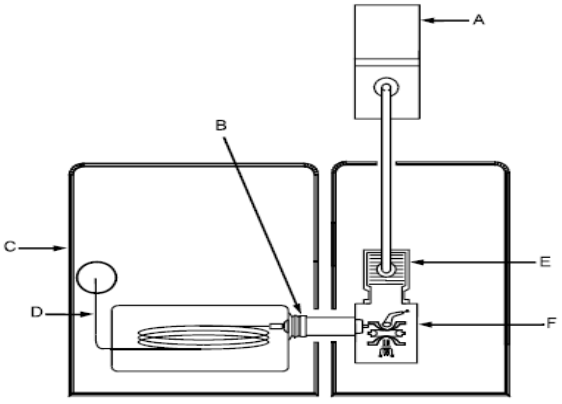
dry from April to August. African soil is already rich enough spontaneously, the soil is exceedingly enriched with chemical nourishments, except that at the end of the growing season, the plants are cut and burnt directly in an area that allows direct recirculation of most nutrients, but also reduces the accessibility of phosphorus. But at maturity cotton plant deshice rapidly, exposed to sun and air, water contains diminished and give the twist form to cotton fiber which is very significant characteristic for spinning.

## IV. METHODOLOGY AND WORKING PRACTICES

### *A. Detection of Pesticide in Organic and Conventional Cotton Using Gas Chromatography GC / MS:*

As revealed earlier, there are numerous chemicals in large quantities, which are not responsive to the environment, but also hazardous for physical chemical method is based on decisive the mass of atoms, molecules and their trashes after transfer to the completely and negatively charged ions. It is an ideal method for conclusion the chemical structure of pesticides present in cotton fibers. Gas mobile phase is used here only for analysis and belongings on the stationary phase. GC-MS personifies especially operative and rapid separation of complex mixtures and works with small amounts of samples, using moderately simple equipment. Gas chromatography with mass spectrum retains priority status for the analysis of pesticides. There is necessity of ahigh selectivity of the separation process, the separation should occur as little as conceivableto analyze ions, at present, gas chromatography with a mass spectrum is widely used. The amalgamation of GC-MS represents a very gifted combination of effective separation method with highly sensitive detection used in the detection of pesticides in cotton samples from Senegal, from Egypt, Russia and Indie. Auto analyst is placed on top of the GC capillary column of fused silica. GC converts straightly to the assembly line, in ion traps, where the examples are presented or injected either physically or by using the auto sampler people. Gas chromatographic method is used for the departure and resolve of gases, liquids and constituents. The method is based on the spreading of components between the two phases, the mobile and inactive phase. In gas chromatography, the mobile phase is a gas, called the carrier gas phase and is placed in a chromatographic column. The stationary phase in packed bed columns can be solid that is activated carbon, silica, alumina, polymeric adsorbents, etc.

Every component of the sample complete the column progresses on the dissemination component and the equilibrium attentiveness of the component in old stationary and mobile phase occurs. Progressively deposited on the column in order of increasing values of distribution constants and enters the detector. The mass spectrometer is very part of this experience place where takes place transfer line connected to GC ,ion trap assembly associated to vacuum assembly and electronic assemblies. The electronics assemblies then can be related to personal computer or to computer interface.

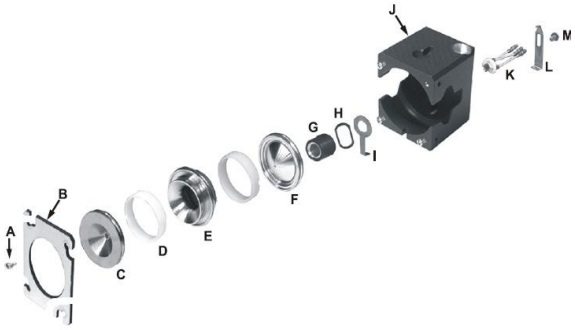



A - Vacuum pumpB - Interface unit
C -Gas chromatographyD -Capillary columns
E - Turbo molecular pumpF - Ion trap

**Fig 1. Scheme GC- mass spectrum**

***B. The Saturn 2000 GC/MS has four principal components:***

-Gas chromatograph (GC)
-Mass spectrometer (MS)
- Data system (DS)
- Auto Sampler (optional)




A - Screw 6/32H - Washer
B - Mounting plateI - Input conductor
C - End electrodes J - Furnace

D - Quartz or silicaK - Filament Assembly
E - RF electrodes Ring L - Filament
F - End Cap Screw electrodes M - Screw
G - Electron Gateway

**Fig 2. Ion Trap**

A short line-of-sight transmission line joins the GC and mass spectrometer. TheAutoSampler sits on top of the GC. A fused silica vesselcolumn in the GC passes finished the transfer line directlyinto the ion trap assembly. Illustrations are injected either manually or via the AutoSampler onto thevessel column over the GC injection port.The gas chromatograph then splits the sample molecules. Effluent from the GC passes through the transfer line and into the ion trap. The example moleculesnext undergo electron or chemical ionization before being examinedconferring totheir mass-to-charge ratios.The ions are perceived by an electron multiplier, which products a signalproportional to the number of ions detected. The electron multiplier passes theion current signal to the system electronics, which in turn intensify the signal, digitize the result, and pass it on to the data system for further processing and display.

Mass spectroscopy is one of the chemist's tools in their collection. Through mass spectroscopy (MS), one can define the molecular weight, molecular formula, and the practical groups present on a compound (Skoog 524). The molecular weight can be resolute by identifying the molecular ion peak (Skoog 525). Looking at the mass to charge ratio (m/z) and the distribution of isotopes, one is able to regulate an average mass for a composite. The mass involvement of each isotope is 2 resolute by each isotope's mass and relative abundance. Adding all of the isotopes' mass contributions will then result in an average mass for the compound (Robinson 723). The molecular formulation for a compound can then be established from the relative peak heights of the isotopes (Skoog 525). Peak areas and heights can also be useful because they can indicate the absorption of various components present in the sample (Skoog 531-532). When looking at mass spectra, the popular of peaks that appear are attributed to fragments; these fragments are pieces of the innovative compound that have separated from the compound. The presence of these fragments makes explanation slightly more problematic, which is why the use of a library can become advantageous. By associating your sample to knowns, a positive identification is possible.

So how does mass spectroscopy work? Upon transitory through the column the elements continue on to the frame spectrometer where the sample is "shelled by highenergy electrons" (Silberberg 54). These electrons collide with the atoms in the mockup and, as a result, knock an electron off of the sample's atoms, convincing a positively charged particle (Silberberg 54). The elements are then separated by a variation of means depending upon the type of mass spectrometer used. For example, in an ion trap mass spectrometer the particles are deflected depending upon their mass/charge ratio (Skoog 517-518). A detector determines the particles' "relative positions and abundances" which can then be used to determine the identity of the compound (Silberberg 54). The largest peak in the spectrum is called the base peak. The heights of all the additional peaks in the spectrum are then unrushed as a percent relative to the base peak (Skoog 499). The central advantage of interfacing a gas chromatograph witha mass spectrometer is its productivity. With combined composition, only one sample needs to be prepared. This saves on both time and materials. The physical bench space taken up is decreased as well. The GC/MS/MS allows one to obtain more detailed information about unknown compounds faster and more easily than the gadgets separately. Merging these technologies allows one to investigate more composite compounds faster than a GC, MS, or GC/MS (Skoog 531).

1) ***Ion trap*:** Trap boiler generates heat for thermal control; it is dubious that two fibers will have the same net inflow of electrons in the ion trap, so that the plenty of the signal from two dissimilar fibers was the same.

2) ***Electron gate*:** Electron gate is a cylinder-shaped electrode that switches the entry of electrons into the ion trap and its ion trap group has three stainless steel electrodes.

3) ***Electron multiplier*:** Itis secure in a stipulated position on the defensive metal clip that can be easily removed and replaced.

4) ***Stable reading*:** Fore line pump has two resolves. The pump is associated to the rear panel socket marked voltage - pump on the back of power supply side is outlet, which is meticulous by a switch.

5) ***Rear panel*:** Fore line pump recycled on the Saturn GC / MS is a two-stage rotary pump with a pumping speed of 90 ml/min and vacuum probable of 1.5 x 10-2 torr (2 x10-2 torr). RF producer assembly consists of a plate circuit detector link and shielded with coils under vacuum manifold housing, which environments the detector coil and the circuits. Hard ionization performance is used in the gaseous phase. The most collective and most advanced ionization system is well reproducible

spectra production process. The interaction of the material with shock-accelerated electrons in high vacuum is favorite. Ionization of the source, transfer of materials to ionized state, the destruction of chemical bonds primarily resulting in ion formation and fragments. Analysis after separation in ion analyzer is circulated in space or time. A mixture of ions is produced in the ion source.

6) ***Detection:*** The recognition is made from a direct stream of detached ions which is a signal proportional to the number of ions. It is relocated to a computer and processed using the software in the form of weight spectra.

7) ***Registration and inspection*****:** Also, the computer registers the analytical data, manages and reins the operating conditions of the device. Ionization is done in mass spectrum. Ionization of substances is important for analysis as the material achieved appliesonly to stimulating particles or ion. Energy necessary for ionization depends on the substances.

## V. CONCLUSIONS

Some argue that modestly pesticides do not happen on cotton as established by Institute in Bremen Germany. It is confirmed that it is incredible to detect pesticides on cotton, but the developed methodology perceived pesticide in cotton fiber; it gives the chemical of insecticide and the name of the pesticide. Constructed on their tests on examples of cotton from Senegal, but under the proposed discovery methodology that was developed in department of mechatronics, Institute of nanotechnology, and Applied Informatics, the chemical pesticides can be detected. The pesticides tests were conducted also with the old cotton samples (15 years) of cotton. The methodology developed in this text, today confirms that this method can detect pesticide for cotton.

Based on this work, one can detect traces of pesticides in conservative and organic cotton through the proposed method using the apparatus GC-MS gas chromatography with mass spectrum variant 3800/2000, based on the attitude that is proposed in this work. It established the presence of pesticides that were used in Senegal (con-1, con-2), in Egypt ( a-1), in Russia ( b-1), in China ( c-1). That is why it is recommended for the certification of organic cotton and all natural fibers from plants, gives better determination of the presence of pesticides in cotton fiber. In terms of the properties, the organic and conventional cotton is not very different. This method to detect pesticides in cotton samples, which was an intention, to distinguish among organic cotton and conventional cotton is acceptable. Standing of promoting organic plants underlines issues and physiognomies of organic cotton and conventional cotton and how to regulate pesticides in cotton fiber and thus certified as organic cotton and naturals plants. I hope my research going to help for better sympathetic the detection of pesticide on cotton fiber and all naturals' fibers.

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