IATROSCAN MK-6

The analysis of high boiling organic substances may cause Problems in many cases. The IATROSCAN MK-6s offers with the combination of thin layer Chromatography and FID (MK-6 additional with FPD) interesting perspectives. The MK-6 with the Flame Photometry Detector makes it possible to Analyze also Phosphorus and Sulphur.

The TLC/FID(-FPD) Analytical System IATROSCAN MK-6(s) can be used in many different application fields like Plant Breeding, Forestry, Fishery, Crude oil and carbon industry, carbon products, biochemistry, biotechnology, pharmaceutical industry, environmental pollution, food industry and so on.

The advantages of the IATROSCAN System are:

- it is possible to work with up to 10 Chromarods at the same time, many application fields,
- the Chromarods are reusable up to 100 times,
- 20-30 minutes analyzing time (depending on method).
THE IATROSCAN MK-6(S) ANALYSING SYSTEM FOR TLC WITH FID OR FPD DETECTOR

The **MK-6s TLC/FID**

The Separation is made with the **TLC** method on so-called **Chromarods** and the Detection with a Flame Ionization Detector (**FID**). With an additional FP-Detector it is possible to analyze sulphur and phosphorus too (**MK-6**). The analysis is made with different complementary accessories.

The spotting of the sample is made with a specially developed Application System (Autospotter or Full-Automatic-Sample Spotter) on the 10 Chromarods lying in the Rod Holder.

The **MK-6 TLC/FID-FPD**

The Chromarods are developed in a special Development Tank. After the separation of the substances the Holder is put in the IATROSCAN.

Chromarods are scanned through the Hydrogen flame. The collector, which is placed above the flame is generating an analogue signal, which is evaluated with a PC and the SES ChromStar Software.

The **TLC/FID IATROSCAN MK-6(s)** was developed for the Analyzing of Organic Substances, which show no UV Absorption and no Fluorescence, and give difficulties by analyzing with GC.
IATROSCAN MK-6

Standard Set:
1 IATROSCAN MK-6
1 Box Chromarods S4
1 Development Tank DT-150
1 Chromarod Holder
1 Spotting Guide
1 Cable (Power, Signal, Earth)
1 X 2m H2 Pipe
1 Fuse
1 Tweezers
3 Allen Keys (1.5; 2; 3 mm)
1 Micro-dispenser (Spotting Syringe)
1 Operating Manual (English)
Applications: Lipids; Bitumen; Crude Oil; Glyceride Isomers; Triglycerides; Food Dye; Cosmetics; etc.

Specifications:

- Principle of Separation: Thin layer Chromatography with the use of Chromarods (a special rod coated with a thin layer adsorbent)
- Detection: Hydrogen Flame Ionization Detector (FID) and Flame Photometer Detector (FPD) (Dual Detection) MK-6s FID only!
- Detection Time: 25, 30, 35, 40, 50, 60 sec. /scan
- Hydrogen flow monitor: Electronic flow meter (digital Display)
- Air flow Monitor: Air flow meter (float type)
- Chromarod Holder: Available for loading 10 Chromarods
- Measuring modes: Normal Scan / Blank Scan / Origin scan / Partial pyrolysis scan (PPS) / Manual PPS
- Power: AC 100, 120, 220 & 240 V, 50/60 Hz
- Power Requirement: ~ 50 VA
- Temp. / Humidity: 10 ~ 35 °C / 20 ~ 80 RH
- Dimensions: ~ 520 x 430 x 265 mm MK-6s ~ 520 x 430 x 260
- Weight: ~ 25 kg MK-6s: ~ 23 kg

The IATROSCAN MK-6 is similar to the MK-6s, with an additional Flame Photometric Detector FPD, which opens the possibility to Analyze Sulfur and Phosphorus.

The red curve describes the content of sulfur in Bitumen, the blue one the separation of the S.A.R.A. Group.

Sample: OIive oil

Conditions: Stationary phase: Chromarod S-III (AgNO3 mpregnation) Mobile Phase: Benzene:Ethyl Ether:Formic Acid 68:2:0.1

The IATROSCAN MK-6 is similar to the MK-6s, with an additional Flame Photometric Detector FPD, which opens the possibility to Analyze Sulfur and Phosphorus.

Sample: Bitumen

1. Saturates H.C. 2. Aromatics
3. Resins 3. Asphaltenes
**Procedure**

1. **Blank scanning**
   This effectively removes all organic impurities on the rods and optimizes activation conditions before sampling.

2. **Sample Spotting**
   The sample (normally about 1 μl) is spotted onto the rods by means of an automatic spotter.

3. **Separation**
   The rods in their rod holder are placed in the development tank and subjected to solvent development to effect sample separation.

4. **Solvent removal**
   After development the developing solvents adsorbent on the rods are evaporated.

5. **Measurement**
   After solvent removal, activate the START button to start the automatic measurement of the first of ten Chromarods and start SES ChromStar to collect the chromatographic data.
Application List
(if you are interested in application examples, tick and please ask for free copy)

IATROSCAN INSTRUMENT APPLICATION

- No.11 Analytical Patterns of heavy oil
- No.12 Analysis of Glyceride Isomers by Boric acid CHROMARODS
- No.13 Tracing of reaction with enzymatic Experimental reaction
- No.14 Analysis of Serum Lipids
- No. 5 Analysis of Lipids, physiological samples
- No. 5. - II. Analysis of Lipids, general
- No.16 Analysis of Triglyceride Molecular Species using silver nitrate Impregnated CHROMARODS
- No. 7 Precautions in Performing Analyses
- No.18 Determination of the phosphatidylcholine content in egg yolk lecithin
- No. 9 Separation of the Isomers and derivatives
- No.21 Analysis of surface activ agents
- No.22 Lipids Analysis by Copper Sulphate impregnated CHROMARODS
- No.23 Analysis of Lipids by the IATROSCAN (Marine Products)
- No.24 Analysis of Polymer additives
- No.20 Experimental analysis for infinitesimal components in the main Ingredients
- No. 25 Analyses of food additives
- Appendix III CHROMATOGRAMS

DYE:
- Food Dye, Naphthol quinone and Azo dye
- Hormones: Pregnandiol
- Ginseng Saponine
- Liquid Crystal
- Capsaicine
- Cosmetic Cream
- Rubber Antioxidant
- Polymer
- Analysis of Bitumen

Selective Detection of S-Compounds

Sample : Bitumen + Dibenzothiophene

1:Saturated H.C. 2:Aromatic 3:Resin 4:Asphaltenes

Stationary Phase : Chromarod-SIII
Mobile Phase 1st, n-Hexane 100% 10cm 2nd, Toluene 100% 6cm 3rd, Dichloromethane: Methanol 57:3 2.5cm

Conditions:
- Stationary phase: Chromarod S-III
- Mobile Phase: 1. Chloroform: Methanol: Water 48: 19 :3 9cm
- 2. n-Hexane: Ethyl Ether 95:5 10 cm

Fuel Oil (fingerprint)


Conditions:
- Stationary Phase: Chromarod S-III
- Mobile Phase: 1. n-Hexane 100% 10cm – 2. Toluene 100% 5cm 3. Dichloromethane: Methanol 95:5 2cm

Selective Detection of S-Compounds

Sample: Bitumen + Dibenzothiophene

1:Saturated H.C. 2:Aromatic 3:Resin 4:Asphaltenes

Stationary Phase : Chromarod-SIII
Mobile Phase 1st, n-Hexane 100% 10cm 2nd, Toluene 100% 6cm 3rd, Dichloromethane: Methanol 57:3 2.5cm

Selective Detection of S-Compounds

Sample: Bitumen + Dibenzothiophene

1:Saturated H.C. 2:Aromatic 3:Resin 4:Asphaltenes

Stationary Phase : Chromarod-SIII
Mobile Phase 1st, n-Hexane 100% 10cm 2nd, Toluene 100% 6cm 3rd, Dichloromethane: Methanol 57:3 2.5cm

Selective Detection of S-Compounds

Sample: Bitumen + Dibenzothiophene

1:Saturated H.C. 2:Aromatic 3:Resin 4:Asphaltenes

Stationary Phase : Chromarod-SIII
Mobile Phase 1st, n-Hexane 100% 10cm 2nd, Toluene 100% 6cm 3rd, Dichloromethane: Methanol 57:3 2.5cm

Selective Detection of S-Compounds

Sample: Bitumen + Dibenzothiophene

1:Saturated H.C. 2:Aromatic 3:Resin 4:Asphaltenes

Stationary Phase : Chromarod-SIII
Mobile Phase 1st, n-Hexane 100% 10cm 2nd, Toluene 100% 6cm 3rd, Dichloromethane: Methanol 57:3 2.5cm

Selective Detection of S-Compounds

Sample: Bitumen + Dibenzothiophene

1:Saturated H.C. 2:Aromatic 3:Resin 4:Asphaltenes

Stationary Phase : Chromarod-SIII
Mobile Phase 1st, n-Hexane 100% 10cm 2nd, Toluene 100% 6cm 3rd, Dichloromethane: Methanol 57:3 2.5cm

Selective Detection of S-Compounds

Sample: Bitumen + Dibenzothiophene

1:Saturated H.C. 2:Aromatic 3:Resin 4:Asphaltenes

Stationary Phase : Chromarod-SIII
Mobile Phase 1st, n-Hexane 100% 10cm 2nd, Toluene 100% 6cm 3rd, Dichloromethane: Methanol 57:3 2.5cm
Sample- and Autospotter
(Designed for use with IATROSCAN TLC/FID/FPD Analyzer)

Semi-automatic Sample Spotter Model SES 3202/IS-02:
SES Model 3202 Autospotter for TLC/FID/FPD techniques is a precision instrument specially developed for applying sample solutions onto the sintered silica gel surface of a Chromarod. The smaller and more concentrated the sample spot, the better the resolution obtained after development of the Chromarod in a TLC chamber (3201).

The reproducibility of quantitative and qualitative analyses with the IATROSCAN is closely related to the accurate application of a known quantity of sample onto the surface of a Chromarod in the form of a micro spot. With the "Autospotter" it is possible to apply between 0.020 and 10 microliters of sample solution. The spotting is electronically controlled through a small external microprocessor module, with a precision better than 0.5 %.

Features:

- Quantity of sample is digitally controlled by a stepping motor, driving a precision syringe.
- Accurate, automatic indexing of the syringe to the next sample application position.
- Automatic dispensing of sample when each indexed position is reached.
- Automatic control of 2 wash-cycles using the "Wash-Button".
- Precise selection of sample quantity by pre-selection of syringe piston stroke.
- Constant controlled speed of pick-up and discharge of sample quantity prevents the formation of gas bubbles in volatile eluents.

The "Autospotter" can apply the sample in successive aliquots thus allowing the solvent to evaporate prior to dispensing the next measured sample. This avoids diffusion of the sample spot and prevents deterioration of resolution. In this way large amounts of sample can be applied on Chromarods to improve the sensitivity of analyses.

The "Autospotter" is a robust and reliable instrument that guarantees the precision and accuracy required in TLC/FID analysis.

The compact control unit allows flexible usage to individual needs. The spring-controlled syringe reduces the pressure of the syringe-needle against the Chromarod surface to a minimum, so that the TLC-layer remains damage free.

The "Autospotter" is delivered with a special frame to precisely align the position of Chromarods to the tip of the syringe.

Technical Date:
- Mains 220 V to 250 VAC, 50 Hz, 5 VA
- Dimensions: Spotter: 250x250x350 mm
- Control unit: 140x100x40 mm
- Weight: 6 kg

Ordering information:
- Autospotter Model SES 3202 TLC/FID applicator/IS 02 for Chromarods
- Includes:
  - Spotter IS-02
  - Control Unit
  - Adjusting frame
  - 2 µl Syringe

The following syringes, not included in price, can be used with the "Autospotter":
- Hamilton syringe 0.5 µl (Model 7000.5N), 1 µl (Model 7101N), 2 µl (Model 7102N), 5 µl (Model 7105N), 10 µl (Model 7110N)
Full automatic and programmable Sample Spotter
MODEL SES A4250

We would like to ask your attention for our full-automatic sample spotter for Chromarods, which is also suitable for the spotting on TLC plates. As a user of IATROSCAN, you sure would like an improvement of sample spotting.

In the Analysis people aim at automation as much as possible. The targets are time saving, accuracy and the elimination of operating errors. This Spotter type makes the sample spotting on Chromarods and TLC-plates fully automatic.

The new Spotter reduces the time and work for spotting to the programming of the spotting methods and putting the solvent and sample vials into the associated racks respectively.

The spotting is made all automatic. The user can do other important jobs during this time. The Spotter makes the programmed sample spots unattended on its own and generates an acoustic signal when spotting is finished.

• The spotter reaches its accuracy by digital computer control and by four stepping motors with accurate spindles. So all needed movements for sample taking out of membrane closed bottles, up to exact guiding of the syringe to and on the Chromarods, can be made. There are 25 places in the sample array and some other arrays for standards and some for solvents to clean the syringe. The waste is automatically put into membrane closed vials.

• Rows of standard samples with falling or increasing concentration, and the selection of samples can be programmed. Unknown samples and known standards can be put on same rods etc.

• The Spotting speed and the different sample amounts can also be selected. The samples can be spotted in small aliquots, such that the spotting point will be as small as possible for best resolution after development.

• All parameters for the movements can be programmed prior to real spotting of the samples on Chromarods or TLC-Plates. A small jet of air, nitrogen or another inert gas would speed up the solvents evaporation. The tube for this is incorporated in the head for syringe movement a small air pump could be build in as an option. The template for the Chromarods is build in a way that it can also be used for TLC plates. The SES-A 4250 has a double use for the Laboratories which are analyzing with both techniques. So the investigation has a double advantage. This new automatic spotter is making the TLC/FID/FPD technique with IATROSCAN to a modern instrumentation. The Analyses with latroscan becomes favorable in maintenance and price with this full automatic spotting.
The Software – ChromStar was introduced as one of the first Windows based Chromatography Data Systems with Windows 2.0. Since this time it has been cultivated and brought to the highest technical standard at every time. Because of the great flexibility of SES ChromStar all assignments of Gas- and Liquid Chromatography can be solved under consideration of the GLP instructions. For special methods, such as Thin Layer Chromatography or Gel Permeation Chromatography are additional algorithms available. Varied supplementary programs take on assignments like Validations or put back calculations of series of Chromatograms and many more.

The Hardware - With the Analogue/Digital converter board, which is only plugged into the PC, the ChromStar System is build in a PC complete without any more external components. With a specially developed bus orientated System of control interfaces ChromStar can control a multitude of different manufacturers without having to look after a special conditions of this components. Integrated Converters with a resolution of 30 Bit are making the Chromatograms to be recorded with highest precision. Because of being treated as an Windows application by your PC, all advantages of Printer-Drivers and Networks can be used without any restriction.

The Advantages of SES ChromStar
- SES ChromStar is based on modern PC and Windows; it has a clearly arranged structure, and a short training time, high graphic resolution; all Printers with drivers under Windows are usable.

- Practical baseline operation: time dependent Parameters – manual baseline – baseline Subtraction – proximity functions

- extensive Chromatogram treatment: Addition/Substraction/Proportion with time shift smoothing by digital filter 1\textsuperscript{st} and 2\textsuperscript{nd} derivative.

- 3 dimensional display of up to 10 chromatograms in one plot

- varied Methods of calibration: one-point-calibration, multi-level-calibration, percent-method, normalization, external-standard method, internal-standard-method, external-standard-method with non linear regression, internal-standard method with non linear regression

- Sample table for use with auto sampler

- User Manual available in English or German language

- Chromatograms and reports can be transferred to other Windows programms without problems with Networks worldwide usable
Information about a new analysing method analysis of BITUMEN and CRUDE-OIL with IATROSCAN MK-6(s)

We are constantly endeavoring to offer the best Service to our customers. For this we are looking to develop new Methods and Examples for Analyses, to be able to give you a good impression of the work with the TLC/FID Analytical System IATROSCAN MK-6. We want to offer this service also to the customers which already work with the analyzing system, and want to introduce the latest results of our research on new Methods about the analyzing of Bitumen and Crude oil. This results are certainly interesting for your analyses of Bitumen.

After a long period of research Mr. Vreven and an especially engaged scientist for Analysis of Bitumen could make a better separation of Bitumen on the S.A.R.A.- groups. We developed a new Method of separation, which makes it possible to separate the Aromatics into three groups, corresponding nearly to Mono-, Di- and Polyaromatics. During the research the results of the TLC/FID /FPD analyzing System IATROSCAN MK-6 have been compared with the results of the classical column chromatography. We found much better resolution and separation on Chromarods as with column chromatography. This is an important step to make the Analysis of Bitumen more effective. With this Method it is possible to get a better overview of the composition and the quality of the analyzed Bitumen such as for optimal linkage to polymers.

If you are interested in this new results and methods of analyses, we would like to share the knowledge in offering the Method and conclusions of this research with the delivery of the apparatus. So that you could save the high costs for developing your own methods.
Accessories for the "IATROSCAN® MK-6(s)"-Analyser

Development Tank DT-150
After the sample is spotted on the Chromarods with the Autospotter or the Full-automatic Sample Spotter, the Chromarods in their Holder are brought in the Development tank DT-150 for separation of the substances by the solvent mixtures.

Chromarods™
A Chromarod is a specially designed quartz rod coated with a thin layer of silica or aluminium-oxide on which the sample is developed and separated. The rods have a uniform layer thickness and are resistant to acids and weak bases. It is possible to change the separation properties by impregnating the Chromarods with silver nitrate, boric acid or copper sulphate.

Chromarod Storage Chamber SD-5
Preserving good conditions of Chromarods is assured by their immediate transfer from their carton into the Chromarod Holder SD-5. Throughout their usable life, the Chromarods can remain protected in these holders without being touched. An essential part of their conditioning process however, is also, keeping them in good chemical condition and in a dust free and clean state. The Chromarods can be humidified when not in use, and so a storage chamber was designed to store up to 5 Holders above a level of distilled water. Permanent storage in this manner reduces the variables in development as well as preserving the mechanical life of the Chromarods.

Chromarod Dryer TK-8
Is a "micro" bench top oven specially designed to contain a Chromarod 'set' in a SD-5 Rod Holder The TK-8 should be located next to the IATROSCAN, and close to the development processes in order to reduce the risk of contaminating the Chromarods with external solvent vapours and dust particles. The oven is used to dry rods before applying samples; to evaporate the mobile phase from the rods after development before scanning; and to remove excess water from Chromarods, after they have been acid-washed and rinsed in distilled water. The lack of an oven located close to the IATROSCAN can produce a source of error arising from baseline signals unrelated to the separation process (e.g. cigarette smoke, laboratory solvents, etc.)

Power: 100/110V, 220/240V, 50/60Hz, 300W
Indicator: LED three digits, 1 °C graduation
Setting: Analogue 1°C in range
Number of Rod Holder: One
Net Weight: 8.5 kg

Dimensions: 215(w) x 254(d) x 240(h) mm
Temperature control range: 60~150 °C
Temperature accuracy: 2 °C
Air Venting: Build-in Air Pump