

**Geno-Sen's**  
**MTC/MOTT**  
**Real Time PCR Kit**

**Qualitative**

For use with QIAGEN Rotor-Gene Q, Rotor-Gene 6000, ABI-7500, StepOne, StepOne Plus, QuantStudio™, Roche LightCycler®480, Bio-Rad CFX96™, I cyclor, Analytik Jena qTOWER 3, Exicycler 96 (Bioneer), AriaMx (Agilent Technology) & Slan 48, ALTA 48, INSTA Q 96, etc.,



**PACK INSERT**

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**Genome Diagnostics Pvt. Ltd.**  
(An ISO 13485:2012, 9001:2008 Certified Company)

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## Geno-Sen's MTC/MOTT Real Time PCR Kit

### MTC/MOTT Geno-Sen's Real Time PCR Kit

#### 1. Contents of the Kit:

Color Code	Contents	REF 9111304 100 rxns	REF 9111305 50 rxns	REF 9111306 25 rxns
R1 Blue	MTC/MOTT Super mix.	25 rxns x 4 Vials	25 rxns x 2 Vials	25 rxns x 1 Vials
R2 Yellow	Mg Sol RT.	1 Vial	1 Vial	1 Vial
MTC/MOTT-Positive Control Red	MTC/MOTT Positive Control	1 Vial of 300µl	1 Vial of 300µl	1 Vial of 300µl
W White	Molecular Grade Water.	1 Vials of 1 ml	1 Vial of 1 ml	1 Vial of 1 ml
IC-1 (R3) Green	IC-1 RG (R3)	1 Vial of 1 ml	1 Vial of 1 ml	1 Vial of 1 ml

R = Reagents

S = Quantitation Standards

W = Molecular Grade Water.

All Vials have Color Coder tops to distinguish between different reagents.

#### 2. Storage of the Kit.

All the reagents of the kit should be stored at -20°C and is stable till expiry at this temperature. Repeated thawing and freezing (> 3x) should be avoided, as this may reduce the sensitivity of the assay. If the kit is to be used only occasionally, the reagents should be frozen in aliquots. Storage at +4°C is not recommended & should not exceed a period of 2 hours in any case.

#### 3. MTC/MOTT Information

##### Application

**Tuberculosis** (commonly abbreviated as **TB**) is an infectious disease caused by the bacterium *Mycobacterium tuberculosis*, which most commonly affects the lungs (pulmonary TB) but can also affect the central nervous system (meningitis), lymphatic system, circulatory system (miliary tuberculosis), genitourinary system, bones and joints. Tuberculosis is one of the deadliest and most common major infectious diseases today. In 2004, the prevalence (number of existing cases) of active TB disease was 14.6 million people with an incidence (number of new cases) of 8.9 million people and mortality (number of deaths) of 1.7 million people mostly in developing countries. However, developing countries are not the only places with tuberculosis. There is a rising number of people in the developed world who contract

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tuberculosis because they have compromised immune systems, typically as a result of immunosuppressive drugs or HIV/AIDS. These people are at particular risk of tuberculosis infection and active tuberculosis disease. Most of those infected (90%) have asymptomatic latent TB infection (LTBI). There is a 10% lifetime chance that LTBI will progress to TB disease which, if left untreated, will kill more than 50% of its victims. TB is one of the top four infectious killing diseases in the world: TB kills 1.7 million, and malaria kills 2-3 million[footnote needed].

HIV/AIDS, the neglect of TB control programs, and immigration have caused a resurgence of tuberculosis. Multidrug-resistant strains of TB (MDR-TB) and Extreme Drug-Resistance in Tuberculosis (XDR-TB) are emerging. The World Health Organization declared TB a global health emergency in 1993, and the Stop TB Partnership proposed a Global Plan to Stop Tuberculosis which aims to save an additional 14 million lives between 2006 and 2015.

TB most commonly affects the lungs (75% or more), where it is called pulmonary TB. Symptoms may include a productive, prolonged cough of more than three weeks duration, chest pain, and hemoptysis. Systemic symptoms include fever, chills, night sweats, appetite loss, weight loss, and easy fatigability. The term consumption arose because sufferers appeared as if they were "consumed" from within by the disease. People from Asian and African descent may have lymph node TB more often than Caucasians. Lymph node TB is not contagious. Extrapulmonary sites include the pleura, central nervous system (meningitis), lymphatic system (scrofula of the neck), genitourinary system, and bones and joints (Pott's disease of the spine). An especially serious form is **disseminated**, or **miliary** TB, so named because the lung lesions so-formed resemble millet seeds on x-ray. These are more common in immunosuppressed persons and in young children. Pulmonary TB may co-exist with extrapulmonary TB.

### **Drug resistance**

Drug-resistant Tuberculosis is transmitted in the same way as regular TB. Primary resistance develops in persons initially infected with resistant organisms. Secondary resistance (acquired resistance) may develop during TB therapy due to inadequate treatment regimen, i.e. not taking the prescribed regimen appropriately or using low quality medication. Drug-resistant TB is an important public health issue in many developing countries, as treatment of drug-resistant TB requires the use of more expensive drugs and treatment is longer. Multidrug-resistant TB is defined as resistance to the two most effective first line TB drugs - Rifampicin and Isoniazid (INH).

Extreme drug resistant TB (XDR TB) is defined as resistance to the front-line drugs as well as three or more of the second-line drugs.

According to CDC classification its the Mycobacterium Complex which is the cause of Pathogenic Tuberculosis. And as per the classification Mycobacterium complex consists of the following strains of mycobacteria

Mycobacterium africanum, Mycobacterium bovis, Mycobacterium bovis AF2122/97, Mycobacterium bovis BCG, Mycobacterium canettii, Mycobacterium microti, Mycobacterium pinnipedii, Mycobacterium tuberculosis, Mycobacterium CDC 1551,

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Mycobacterium H 37Rv, Mycobacterium subsp. tuberculosis, Mycobacterium CHTN-E, Mycobacterium sp. N256, Mycobacterium sp. N 405 Mycobacterium sp. N 406, Mycobacterium sp. CIPT series.

Samples which can be processed: C.S.F., Pleural fluid, Synovial fluid, Sputum, Pus, tissue, bronchial lavage, urine, endometrium, Culture Cells, biopsy, Fine Needle Aspirations, ascites.

### **4. Precautions for PCR**

The following aspects should always be taken care of:

- Store positive material (Specimens, Standards or amplicons) separately from all other reagents and add it to the reaction mix in a separate facility.
- Thaw all components thoroughly at room temperature before starting the assay.
- When thawed, mix the components and centrifuge briefly.
- Work quickly on ice or in the Cooling Block.
- All the reagents including the NTC (except for standards & specimens) should be mixed & dispensed in pre-mix area.
- All the standards & specimens should be mixed & dispensed in extraction area.
- Use pipette tips with filters only.
- Always use disposable powder-free gloves

### **5. Additionally Required Materials and Devices**

- DNA isolation kit (see **8.a. DNA extraction**)
- 0.2 ml PCR tubes for use with 36-well rotor (Corbett Research, Cat.-Nr.: SE-1003F) alternatively 0.1 ml PCR tubes for use with 72-well rotor (Corbett Research, Cat.-Nr.: ST-1001)
- Micro Pipettes Variable Volume 2-20µl, 10-100µl, 100-1000µl,
- Sterile pipette tips with aerosol barrier 2-20µl, 10-100µl, 100-1000µl,
- Disposable powder-free gloves
- Vortex mixer
- Centrifuge Desktop with rotor for 1.7 ml reaction tubes
- *Rotor Gene™ 2000,3000* or *Rotor Gene™ 6000*, Corbett Research (The Real time PCR Instrument)

## 6. Principle of Real-Time PCR

The robust assay exploits the so-called Taqman principle. During PCR, forward and reverse primers hybridize to a specific sequence product. A TaqMan probe, which is contained in the same reaction mixture and which consists of an oligonucleotide labeled with a 5'-reporter dye and a downstream, 3'-quencher dye, hybridizes to a target sequence within the PCR product. A Taq polymerase which possesses 5' - 3' exonuclease activity cleaves the probe. The reporter dye and quencher dye are separated upon cleavage, resulting in an increase in fluorescence for the reporter. Thus, the increase in fluorescence is directly proportional to the target amplification during PCR.


## 7. Description Of the Product.

The **Geno-Sen's MTC/MOTT PCR** Reagents constitute a ready to use system for detection and differentiation of MTC/MOTT using Polymerase chain reaction (PCR) in the Rotor Gene 2000/3000/6000 (Corbett Research). *The Specific Master* mix contains reagents and enzymes for the specific amplification of MTC/MOTT and for the direct detection of the specific amplicon in fluorescence channel Cycling A.FAM(MTC), Cy5 (MOTT & MTC) of the *Rotor Gene 2000/3000/6000 & the Inhibition Control gene* on Cycling A. Joe. External Positive Control (MTC/MOTT) is supplied for confirmation of the assay is working. For further information, please refer to section 8.c Positive Control.

## 8. Procedure

### 8.a DNA Extraction

DNA Extraction kits are available from various manufacturers. Sample volumes for the DNA Extraction procedure depend on the protocol used. Please carry out the DNA Extraction according to the manufacturer's instructions. The recommended Extraction kits are the following:

Sample Material	Nucleic Acid Isolation Kit	REF Cat. Num.	
Whole blood, Sputum, CSF, other body fluids	<b>Geno Sen's® Genomic DNA Extraction Mini Kit — for DNA purification</b>	98021 or 98022	Genome Diagnostics Pvt. Ltd. India
For other samples.	QIAamp Blood DNA Mini extraction Kit (50)  Suitable Extraction kit which give a higher yield.	51104	QIAGEN

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Above Kits for evaluated in conjunction with the *Geno Sen's® MTC/MOTT Real Time PCR RG Kit on the RotorGene 3000/6000..* However the sample size was limited for this study hence for all practical purposes all the validations were conducted with the *Geno Sen's® Genomic DNA Extraction Mini Kit — for DNA purification.*

However the customer can use their own extraction systems depending on how good the yield is. Always use an extraction kit with a higher DNA yield.

Blood collection tubes coated with anticoagulants may inhibit the PCR, However these inhibitors will be eliminated by the use of the isolation kits given above. It is recommended to avoid the usage of heparin blood.

When using Extraction protocols with ethanol-containing washing buffers, please carry out an additional centrifugation step before the elution to remove any remaining ethanol. This prevents possible inhibition of PCR.

The *MTC/MOTT Rotor Gene PCR Reagents* should not be used with phenol based isolation methods.

### **8.b Inhibition Control:**

Inhibition Control Gene allows the user to determine & control possible PCR inhibition. The Inhibition Control gene reagents are in built in the premix provided and need not be run separately. There is need to add internal control Gene in the reaction mix which has been provided as IC-1 RG (R3). To add the IC Gene 0.5 µl/rxn of R3 is added to the premix as shown in the Figure 4 & 5. The results can be visualized in the Joe channel. . However if there is a need for the Internal control to be used as an extraction efficiency control, then 5 µl of R3 i.e. Inhibition control should be added to each sample before adding the Buffer MBD in the extraction process.

However in such a case, the IC-1 (R3) should not be mixed with the pre-mix as described above & instead 0.5 µl/rxn Molecular Grade water should be added to the pre-mix.

Also Note that in such a case there will be no amplification of Internal control in the Joe Channel in the NTC, & Standards. There will only be amplification in the Joe Channel in the Samples to which the IC-1 (R3) has been added before extraction.

Whereas if the IC-1 (R3) is added to the premix then there will be amplification in Joe Channel in all the samples, standards & NTC.

### **8.c Positive Control.**

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The Positive Control provided in the kit (*MTC/MOTT*) are treated in the same way as extracted samples and the same volume is used i.e. (10 $\mu$ l) instead of the sample. The positive Control is just provided as a reference and should not be used for generating a standard Curve. The same should also be defined as positive control while defining the samples etc. in the software. In case gene load is required then a different kit is available only for MTC. Please look at our Cat. No. 9111301, 9111302, 9111303.

### 8.d Preparation for PCR

### 8. e. Preparation for PCR amplification:

First make sure that the Cooling Block (accessory of the *Rotor Gene*<sup>™</sup>, Corbett Research) is pre-cooled to +4°C in a Refrigerator or Deep Freezer. Place the desired number of PCR tubes into the Cooling Block. Make sure that the tubes for standards & at least one negative control (*Water, PCR grade*) & the Positive Control is included per PCR run. Before each use, all reagents need to be thawed completely and mixed (by pipetting or by brief vortexing).

Please follow the pipeting scheme mentioned below for each sample depending upon the number of samples a mix can be prepared as follows. Each sample

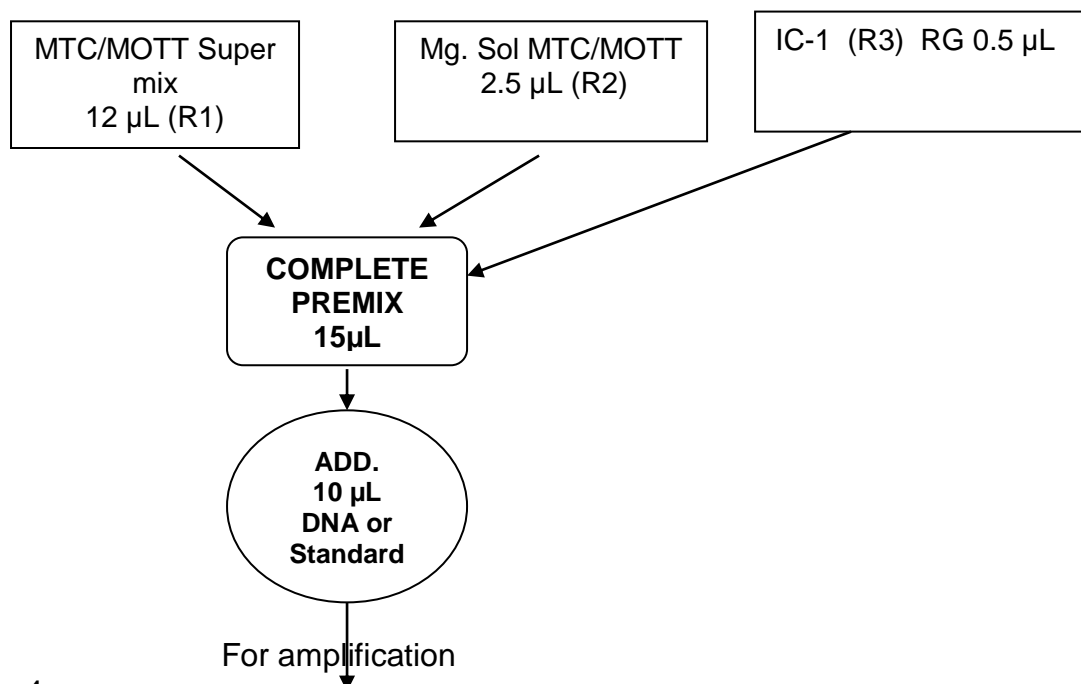


Fig. 4.



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Depending upon the number of samples the following pipetting scheme can be followed. e.g. for 10 rxns.

MTC/MOTT MASTER MIX	1 rxns.	10 rxns.
MTC/MOTT Super Mix (R1)	12 µL	120 µL
MTC/MOTT Mg Sol. (R2)	2.5 µL	25 µL
IC-1 (R3) RG	0.5 µL	5 µL
Total	15µL	150µL

Fig. 5.

Pipette 15 µl of the Master Mix into each labelled PCR tube. Then add 10 µl of the earlier extracted DNA to each sample tube and mix well by pipeting up and down. Correspondingly, 10 µl of the Positive Control must be used as a positive control and 10 µl of water (*Water, PCR grade*) as a negative control. Close the PCR tubes and transfer the MTC/MOTT tubes into the rotor of the *RotorGene™* instrument. The *RotorGene™* software versions 5.0.53 and higher require a Locking Ring (accessory of the *RotorGene™*, Corbett Research) to be placed on top of the rotor to prevent accidental opening of the tubes during the run.

### **8.f. Programming the *RotorGene™* 2000/3000**

The *RotorGene™* 2000/3000 PCR program for the detection of MTC/MOTT can be divided into following steps:

- A. Setting of general assay parameters & reaction volume
- B. Thermal Profile & Calibration
- C. Cycling profile/ & Initial activation of the Hot Start enzyme
- D. Cycling for Amplification of DNA
- E. Adjustment of the sensitivity of the fluorescence channels
- F. Starting of the *Rotor Gene™* run

Program the *RotorGene™* 2000/3000 for these 5 steps according to the parameters shown in Fig. 6-20. All specifications refer to the *RotorGene™* software version 6.0.33. Please find further information on programming the *RotorGene™* in the *RotorGene™* 2000/3000 *Operator's Manual*,. In the illustrations these settings are shown by arrows

### **Setting of general assay parameters & Reaction volume.**

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First, confirm whether the PCR tubes used are No Domed PCR tubes by clicking in the box as shown in the figure. Please note that tubes with domes cannot be used in Rotor gene hence click in the box as shown below.

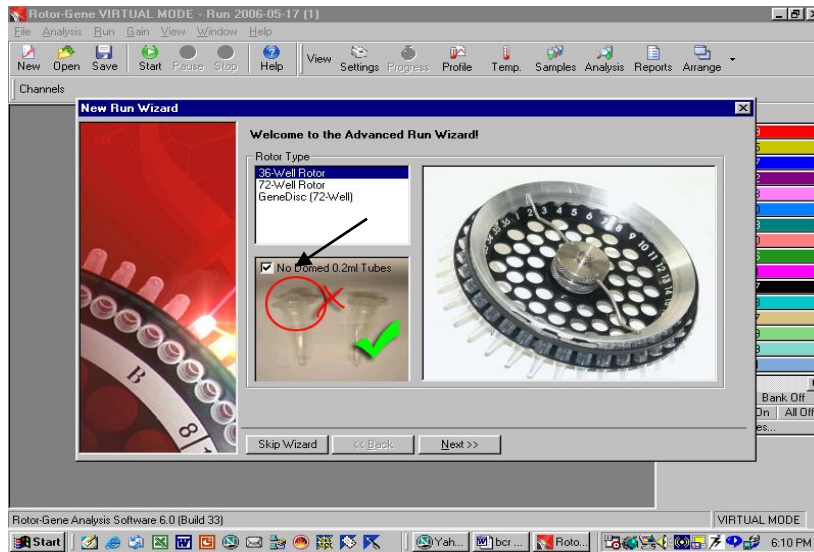


Fig. 6.

### Confirmation of Reaction Volume as follows.

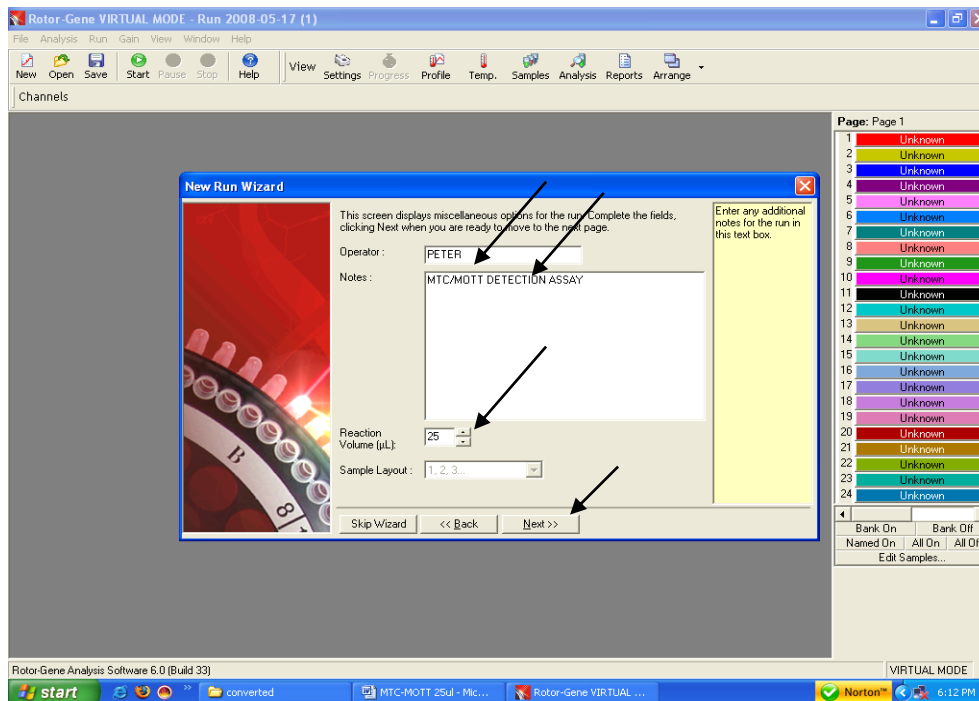


Fig. 7. Setting of general assay parameters.

- Please click on the volume buttons to make sure that 25 $\mu$ l is reflected in the window as shown above.
- Then click next and a new window will open as shown below.

## THERMAL PROFILE & CALIBRATION:

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Here the thermal profile for the assay will be defined.

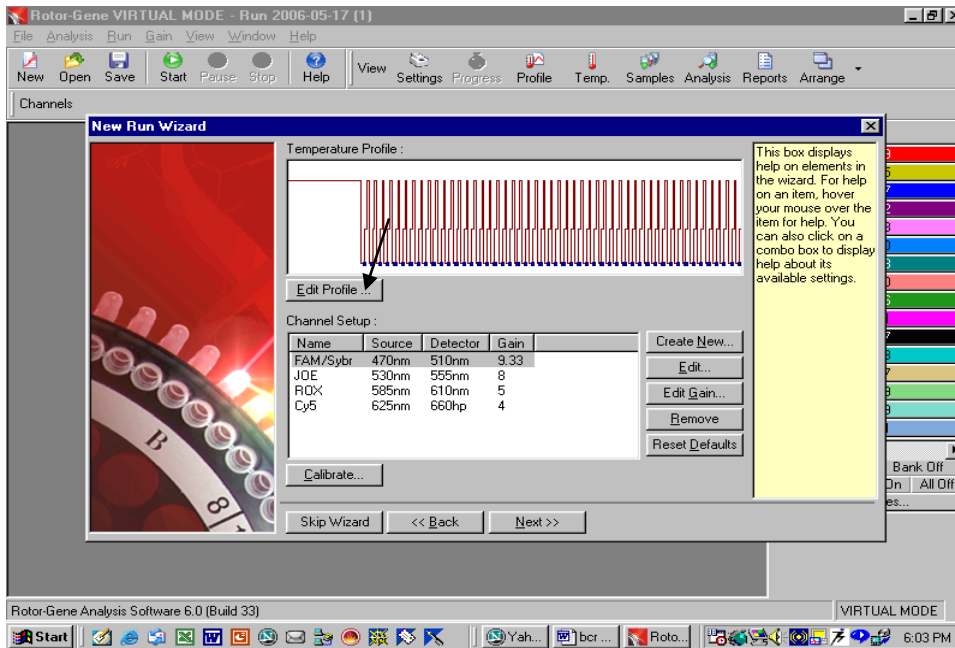


Fig. 8.

Programming the temperature profile is done by activating the button *Edit Temperature Profile* in the next *New Experiment Wizard* menu window as shown above.

**CYCLING PROFILE: First hold 95°C for 10 minutes as below**

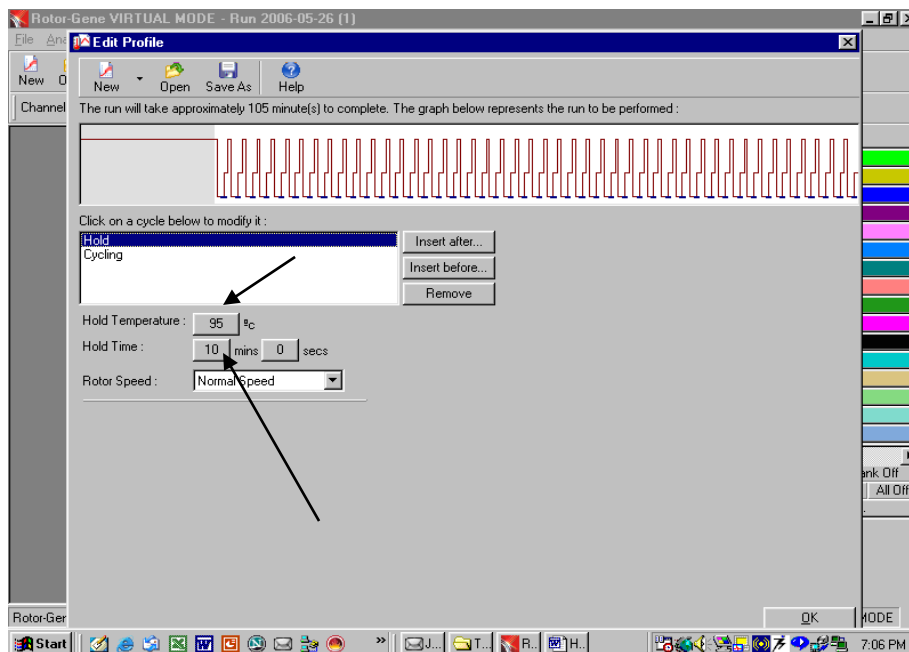


Fig. 9. Initial activation of the Hot Start enzyme.

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Setting up of denaturation step in the cycling profile as depicted below i.e. 95°C for 15 seconds.

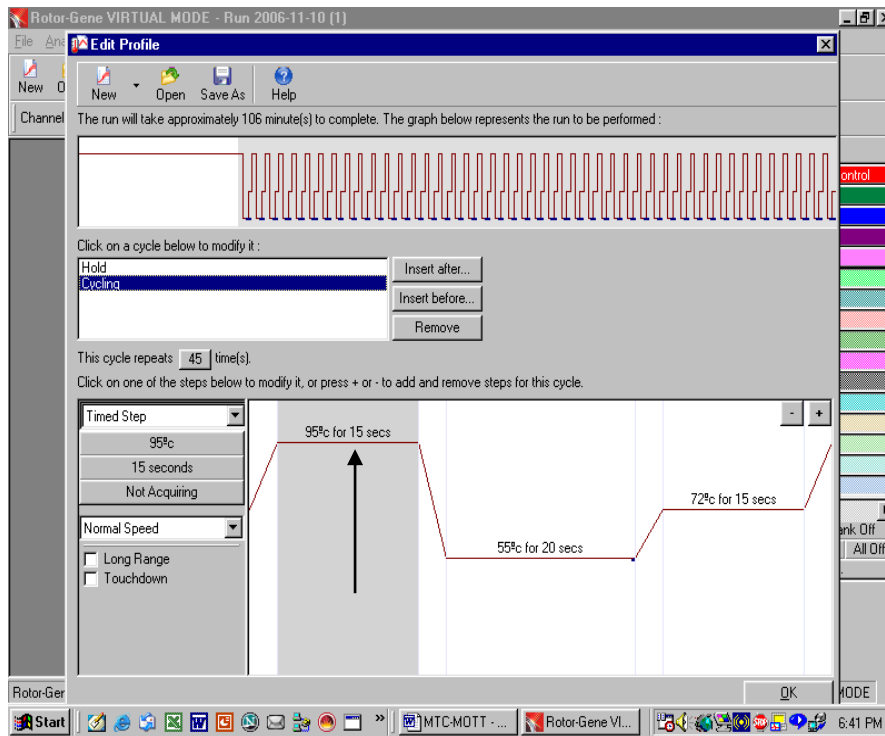


Fig. 10.

Setting up of Annealing step in the cycling profile as depicted below i.e. 55°C for 20 Seconds and defining the Data acquiring channel i.e FAM, Cy5 & JOE

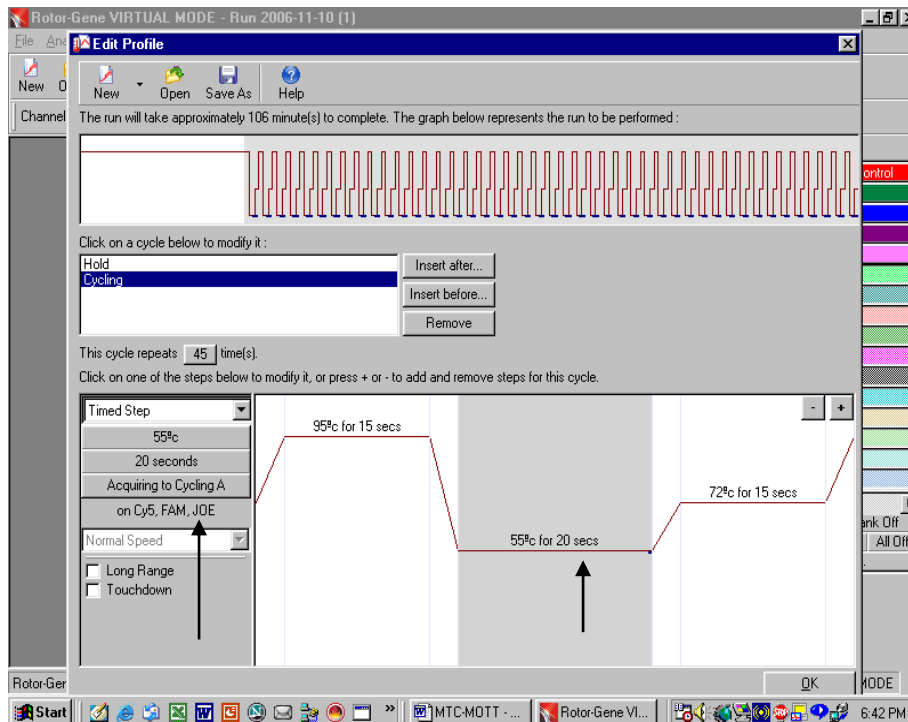


Fig. 11.

**Setting up of Extension step in the cycling profile as depicted below i.e. 72°C for 15 Seconds**

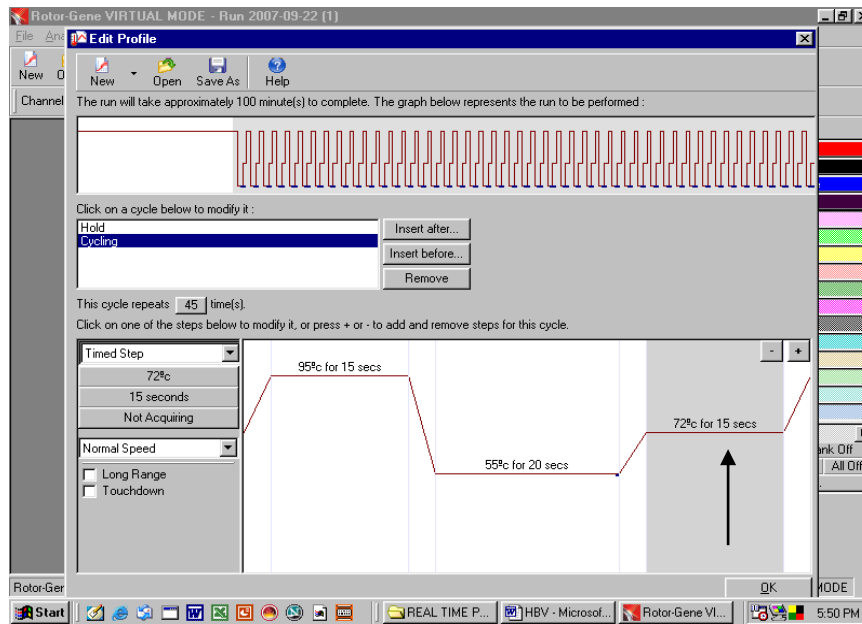


Fig. 12.

**Setting up of Number of Cycles to 45 cycles in the cycling profile as depicted below.**

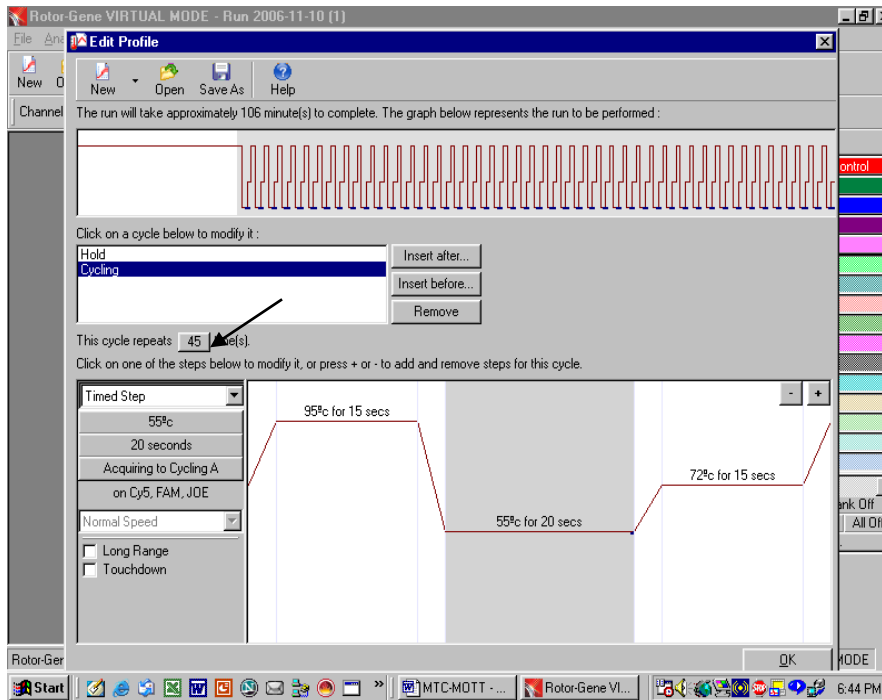


Fig. 13.

**Final Confirmation of the Thermal profile by pressing OK button as shown below.**

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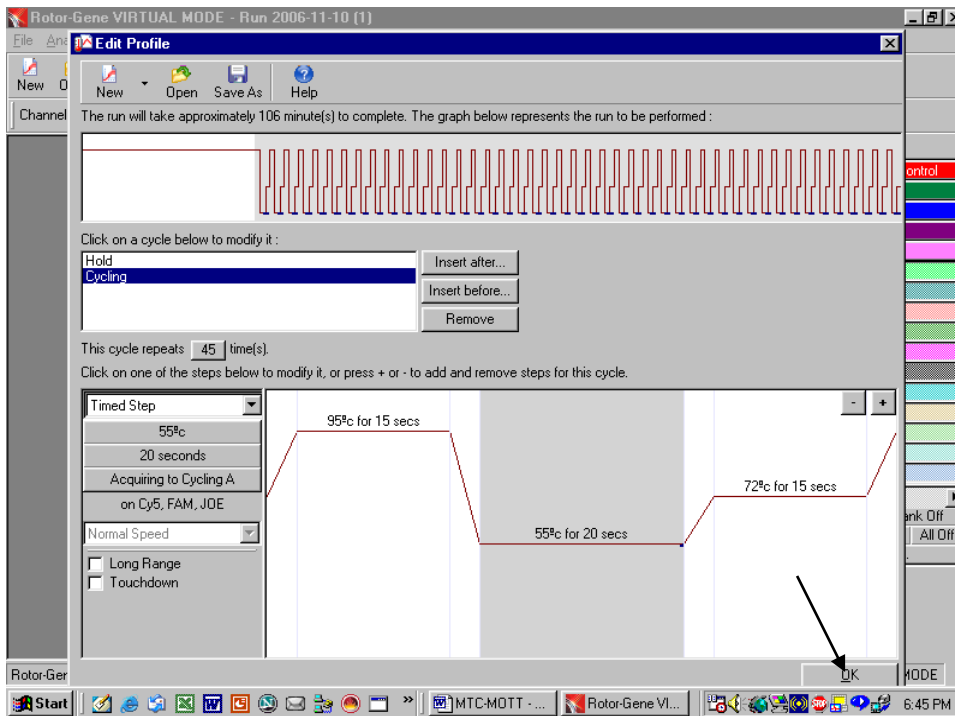


Fig. 14.

**Setting the gains for the acquiring channel by clicking at the Calibrate button as shown below.**

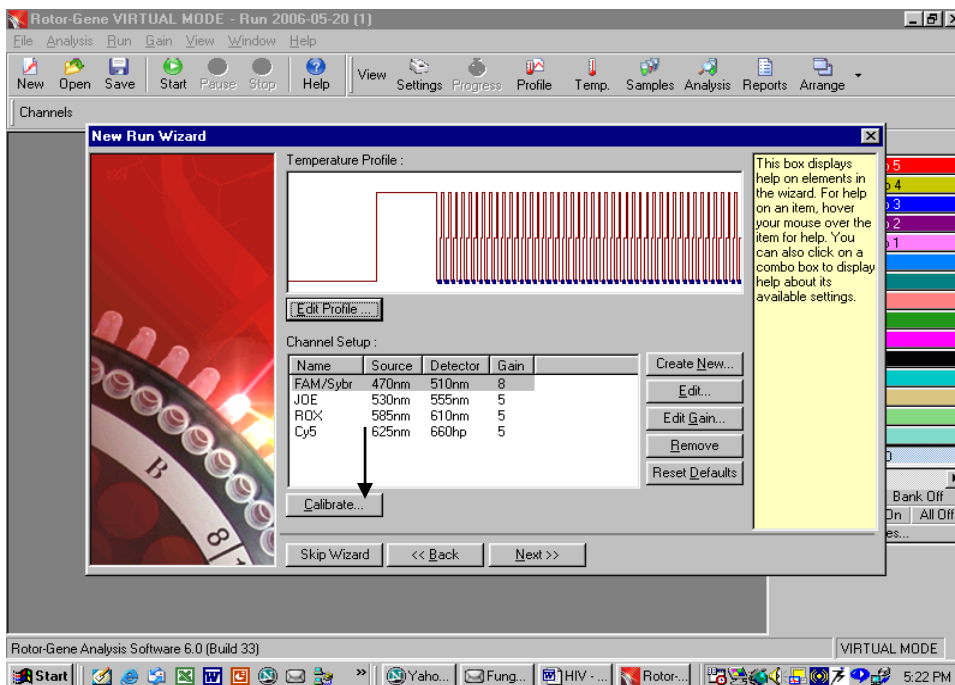


Fig. 15.

The detection range of the fluorescence channels has to be determined according to the fluorescence intensities in the PCR tubes. This adjustment is done in the menu window *Auto Gain Calibration Setup* (activation in menu window *New Experiment Wizard* under *Calibrate*). Please set the calibration temperature to the annealing temperature of the amplification program (compare Fig. 16).

**Adjustment of the fluorescence channel sensitivity as shown below.**

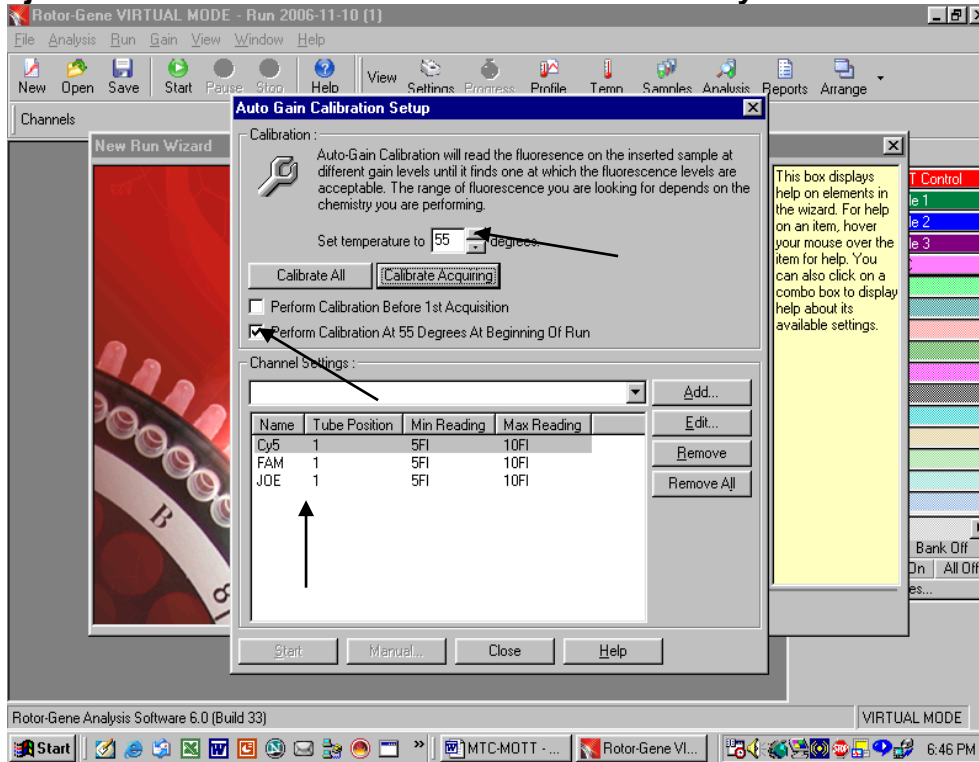


Fig. 16.

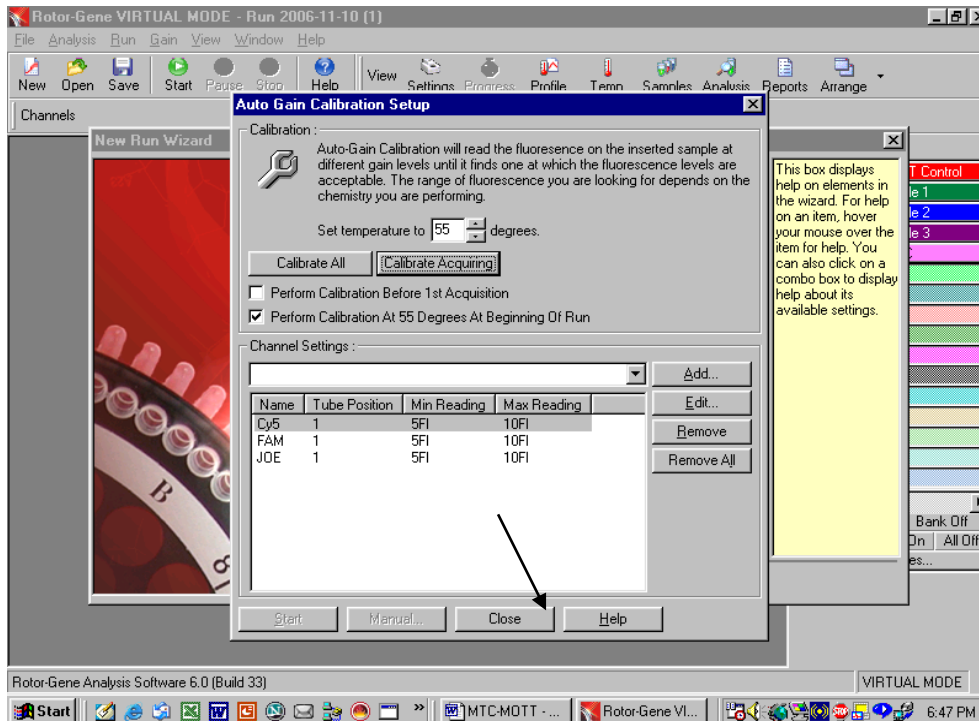


Fig. 17.

Please do not forget to click on the box against " Perform calibration at 55°C at beginning of the run." After that press Close and a new window will open as shown below.

The gain values determined by the channel calibration are saved automatically and are listed in the last menu window of the programming procedure.

**PRESS NEXT**

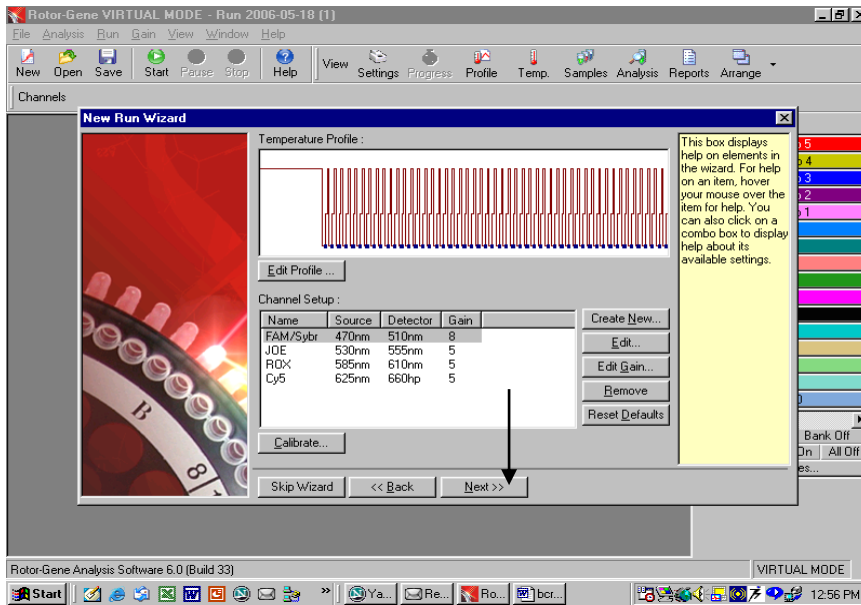


Fig. 18.

Starting of the *Rotor Gene*<sup>TM</sup> run.

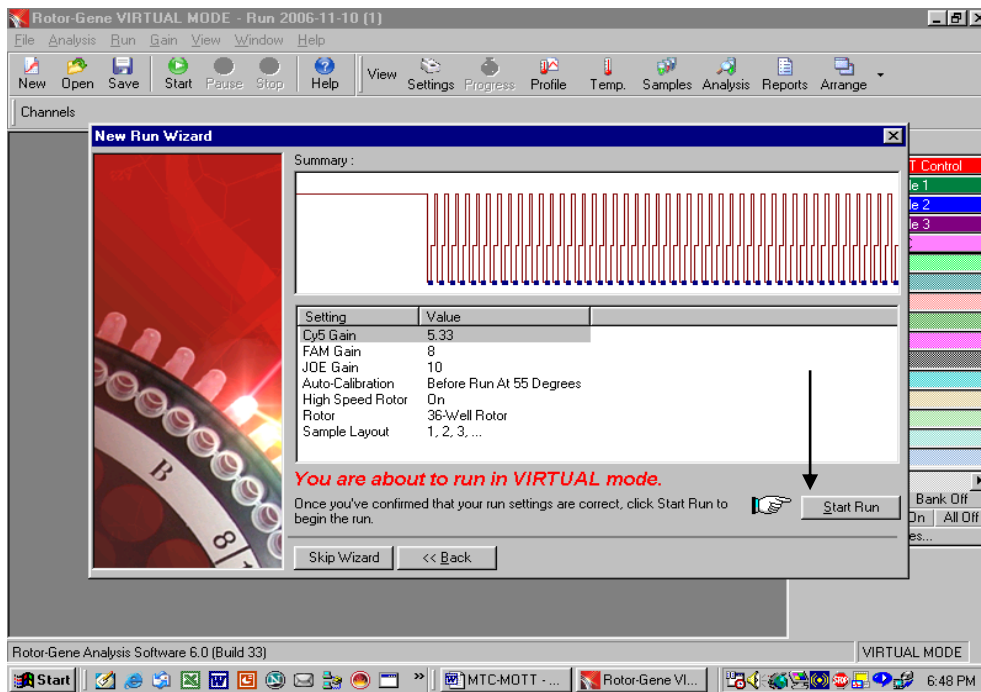


Fig. 19:  
**Press Start Run Button.**



## Geno-Sen's MTC/MOTT Real Time PCR Kit

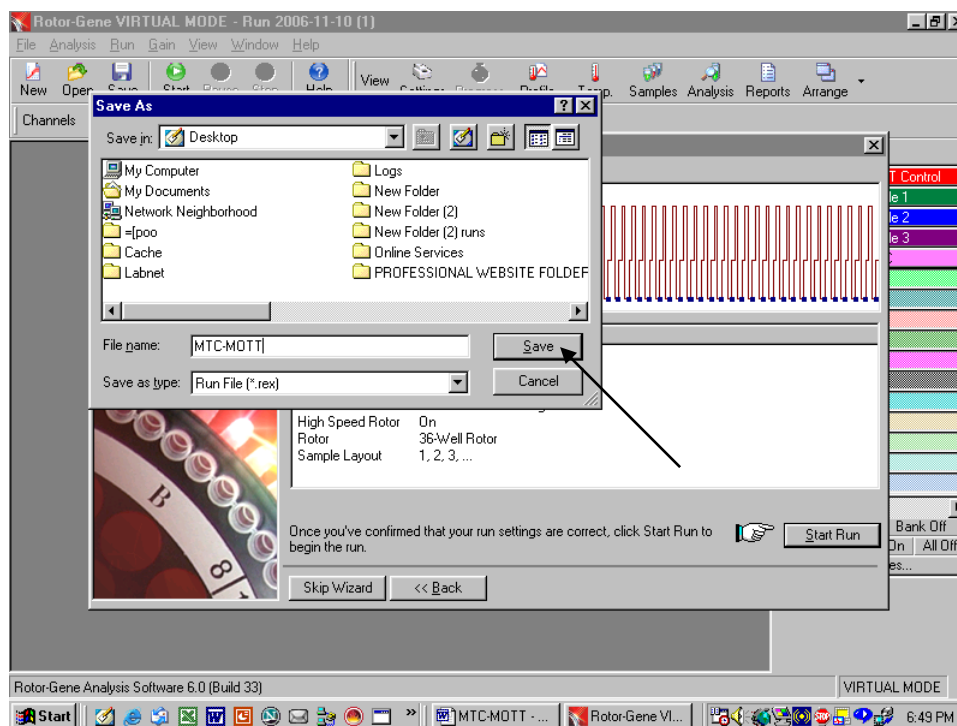


Fig. 20.

### **SAVING THE RUN FILE AS ABOVE**

Store the run file either in my documents or a designated folder as shown above. The moment save button is clicked after the file name, machine will start.

## **8.g. Programming the *RotorGene*™ 6000**

The *RotorGene*™ 6000 PCR program for the detection of MTC/MOTT can be divided into following steps:

- G. Setting of general assay parameters & reaction volume
- H. Thermal Profile & Calibration
- I. Cycling profile/ & Initial activation of the Hot Start enzyme
- J. Cycling for Amplification of DNA
- K. Adjustment of the sensitivity of the fluorescence channels
- L. Starting of the *Rotor Gene*™ run

Program the *RotorGene*™ 6000 for these 5 steps according to the parameters shown in Figures 21-36 below All specifications refer to the *RotorGene*™ 6000 software version 1.7 Please find further information on programming the *RotorGene*™ in the *RotorGene*™ 6000 *Operator's Manual*,. In the illustrations these settings are shown by arrows

## g) Setting of general assay parameters & Reaction volume.

Please see to it that you in advanced mode and then click Hydrolysis Probes. On a double click the software will automatically go to the next function. If there is just a single click then click new after highlighting the Hydrolysis Probes.

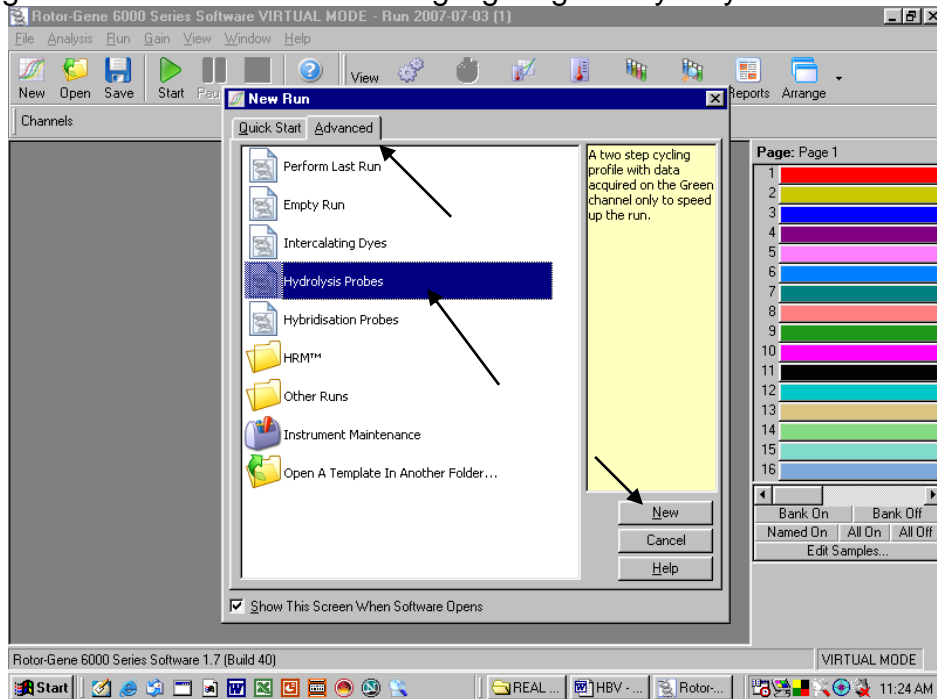


Fig. 21.

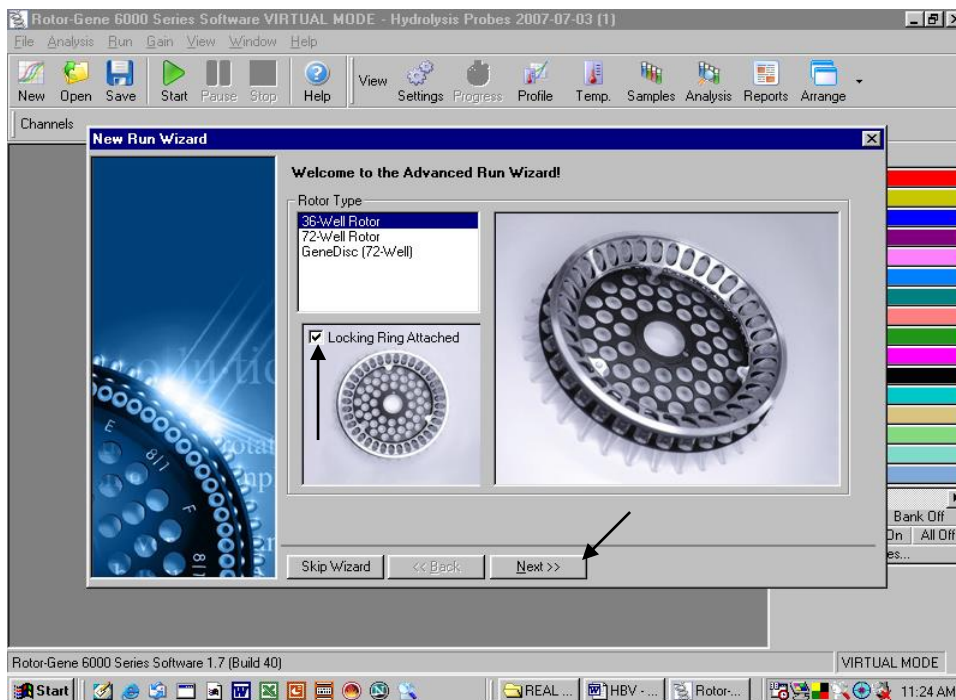


Fig. 22.

First, confirm by clicking in the box as shown in the figure above whether a locking ring has been attached. Then click next to proceed to the next step.

**Confirmation of reaction Volume as follows.**

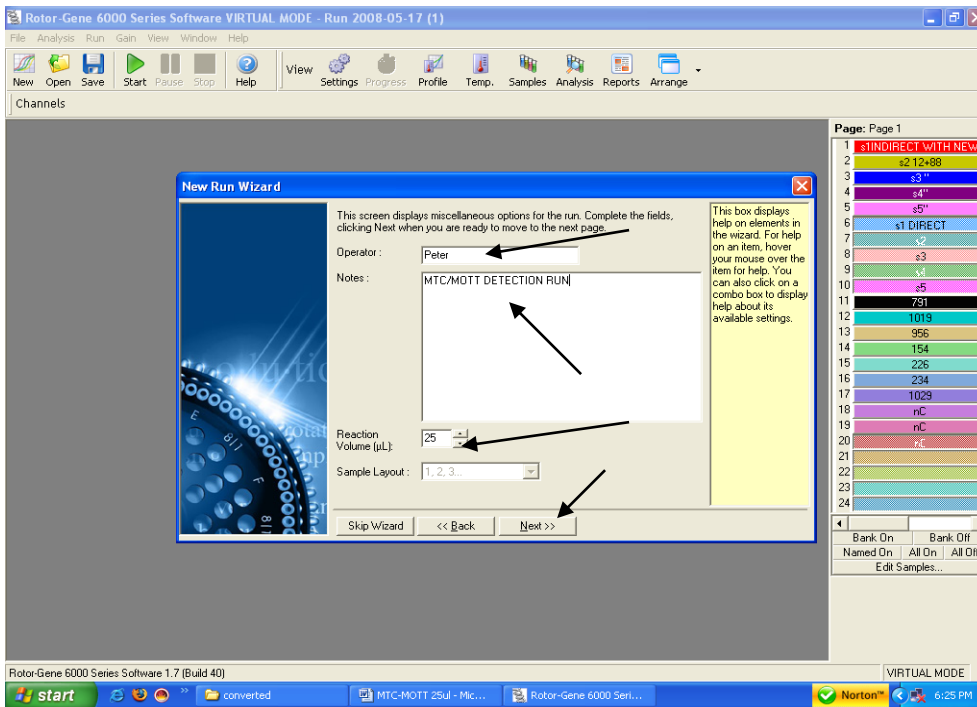


Fig. 23.

- Please click on the volume buttons to make sure that 25µl is reflected in the window as shown above.
- In case required Operators Name can be Fed into the system.
- Any Notes which need to be either printed into the Report can be typed out in the Box of Notes.
- Then click next and a new window will open as shown below.

**h) THERMAL PROFILE & CALIBRATION:**

Here the thermal profile for the assay will be defined.

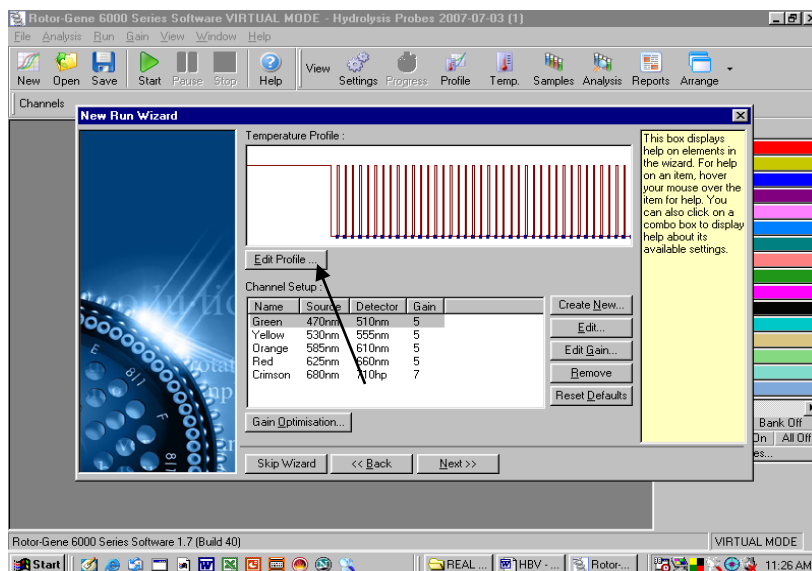


Fig. 24.

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Programming the temperature profile is done by activating the button *Edit Profile* in the next *New RUN Wizard* menu window as shown above.

### **i) CYCLING PROFILE: First hold 95°C for 10 minutes as below**

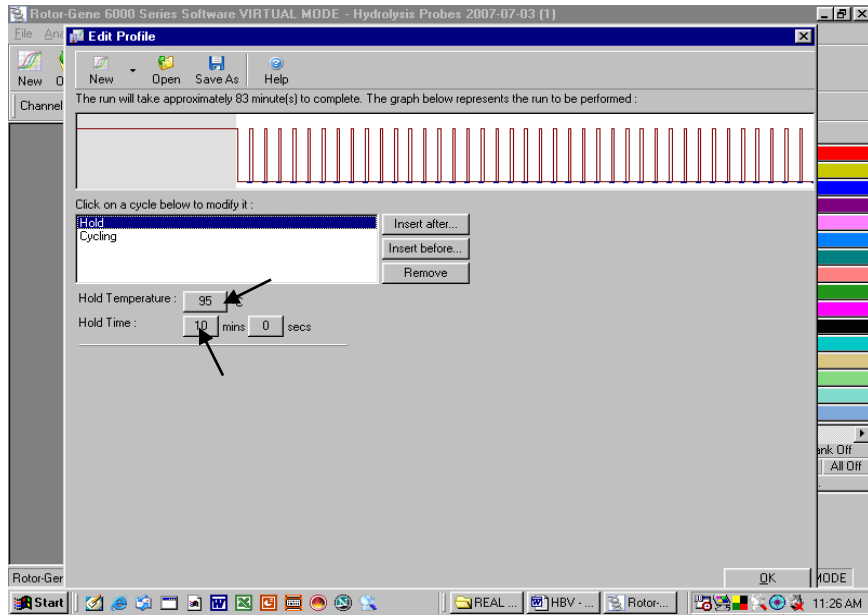


Fig. 25. Initial activation of the Hot Start enzyme. Generally the window will open with the Hold Temp as 95°C and the Hold Time as 10 minutes. In case it is different then set the same to as shown above.

### **j) Setting the Cycling and acquisition.**

When clicked on Cycling the window will open as below.

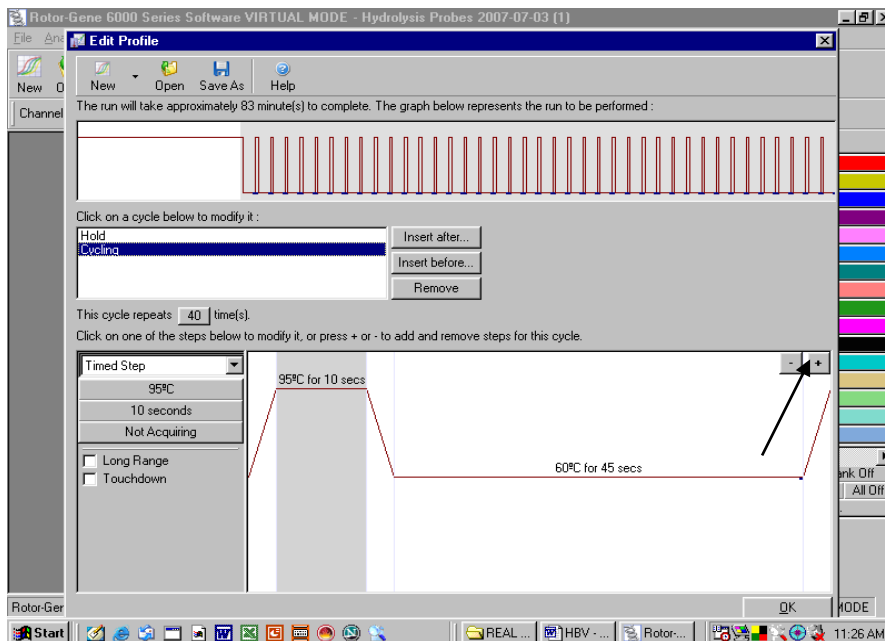


Fig. 26.

## Geno-Sen's MTC/MOTT Real Time PCR Kit

Click on the Plus sign at the right hand as shown in the figure to make the Cycling a three step process. A new window as shown below will be there.

Setting up of denaturation step in the cycling profile as depicted below i.e. 95°C for 15 seconds.

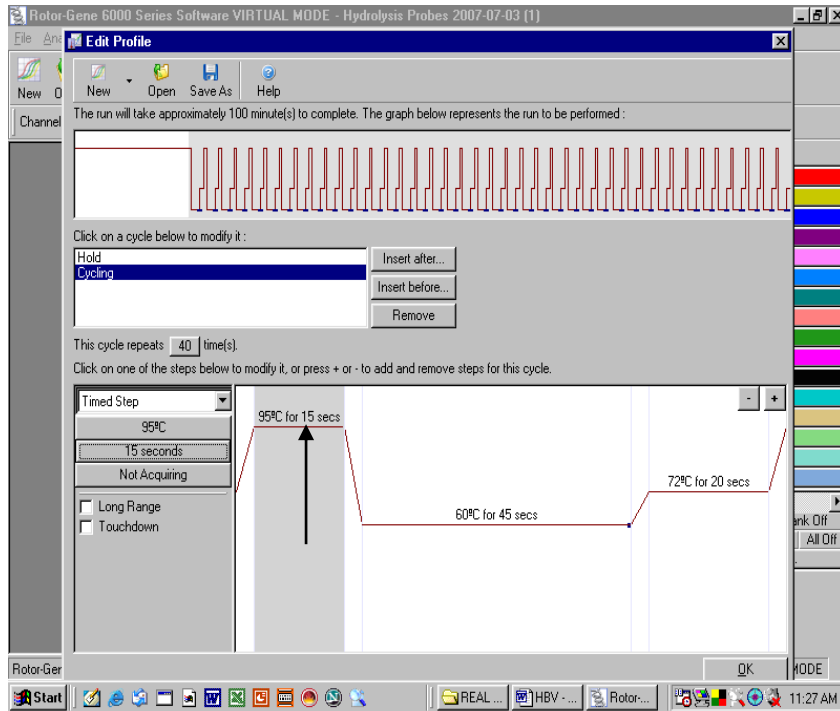


Fig. 27.

Setting up of Annealing step in the cycling profile as depicted below i.e. 55°C for 20 Seconds

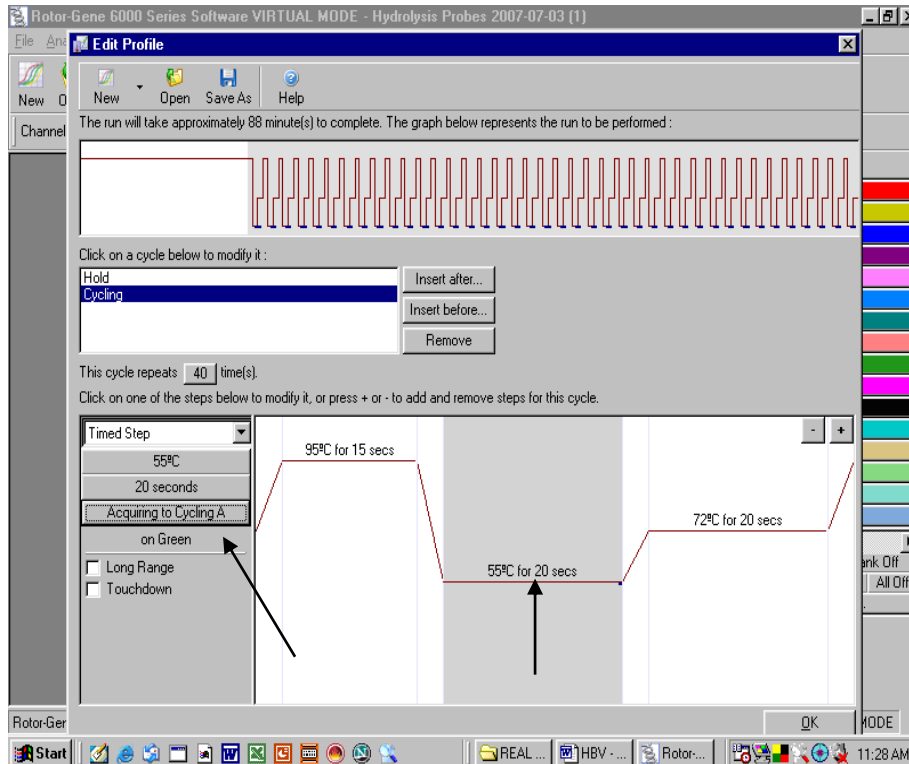


Fig. 28.

## Geno-Sen's MTC/MOTT Real Time PCR Kit

After setting the Anneling temperature and the time for anneling click on the “Acquiring to Cycling A” as shown by arrow. A New window will open as shown below.

Defining the Data acquiring channel i.e Green (FAM), Red (Cy5) & Yellow (JOE)

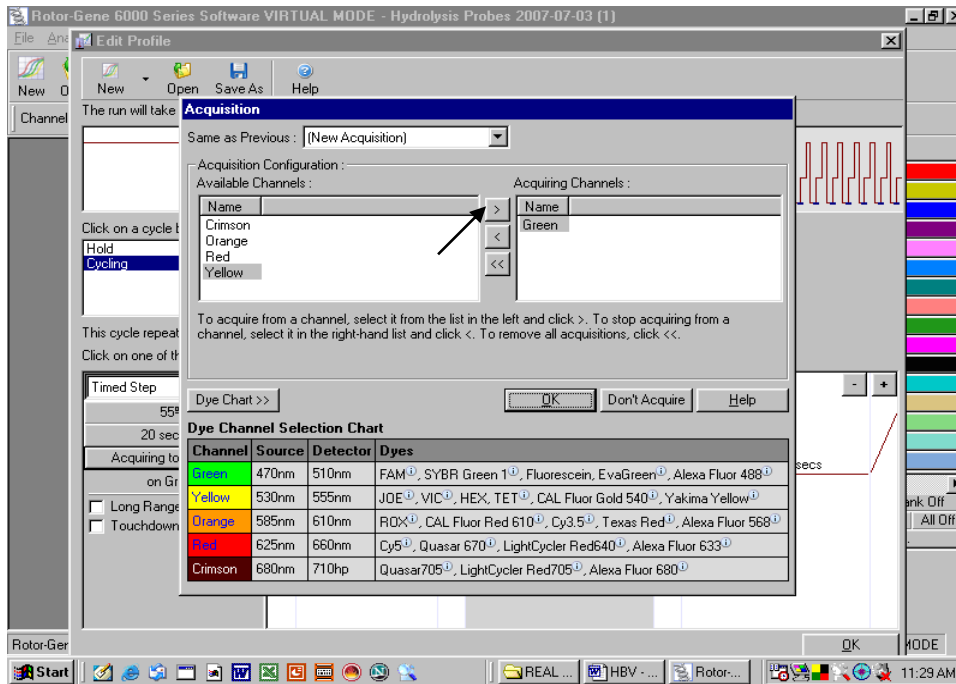


Fig. 29.

Highlight the Yellow and then press the right arrow. Just see before shifting the yellow to right that there is no other channel in the right except for Green. In case any other Channel appears besides Green on the right then the same be shifted to the left.

### Confirmation of Channels as shown below.

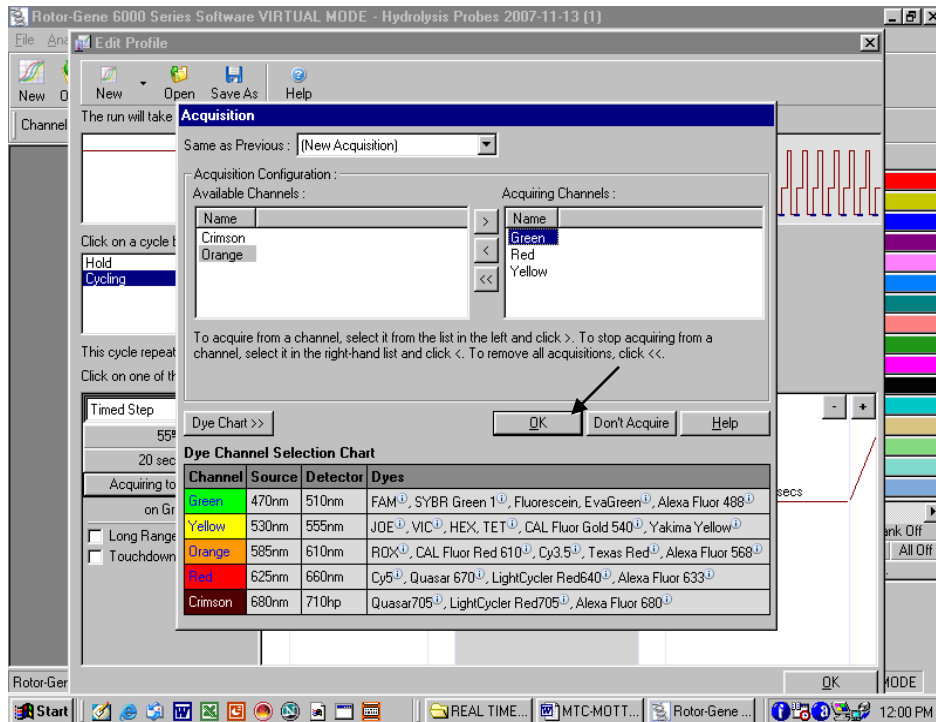
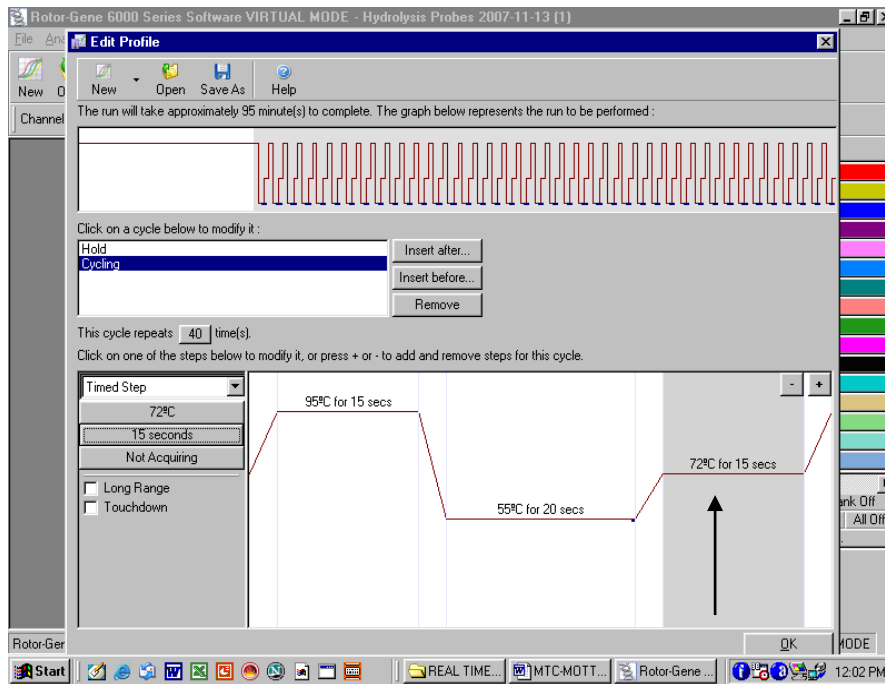


Fig. 30.

Once the Yellow, Green & Red Channels are on the Right side then press OK as shown by the arrow.

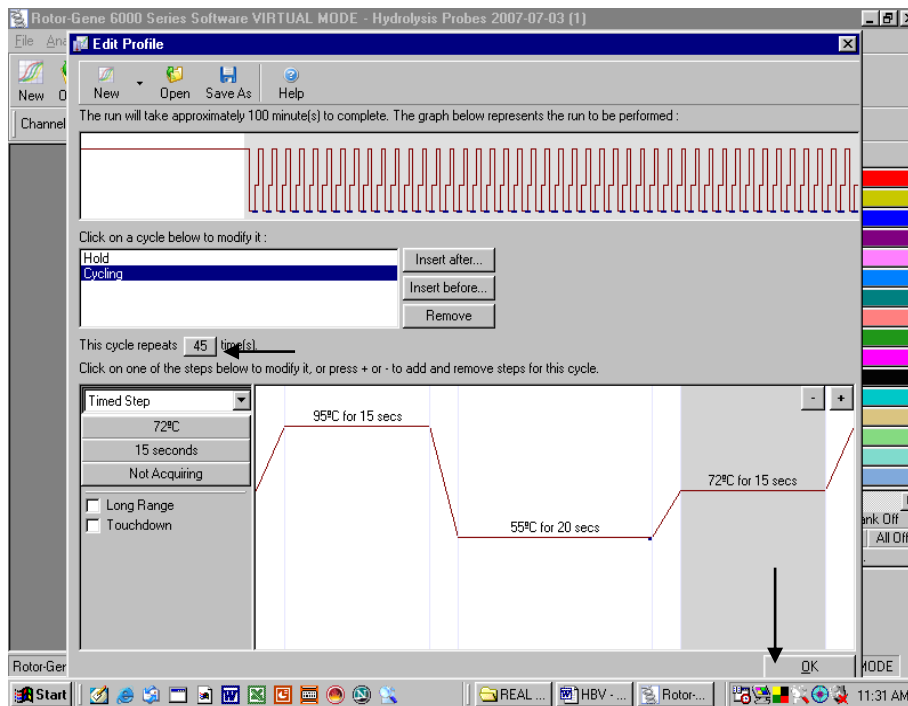
## Geno-Sen's MTC/MOTT Real Time PCR Kit

Setting up of Extension step in the cycling profile as depicted below i.e. 72°C for 15 Seconds



**Fig. 31.**

Setting up of Number of Cycles to 45 cycles in the cycling profile as depicted below.

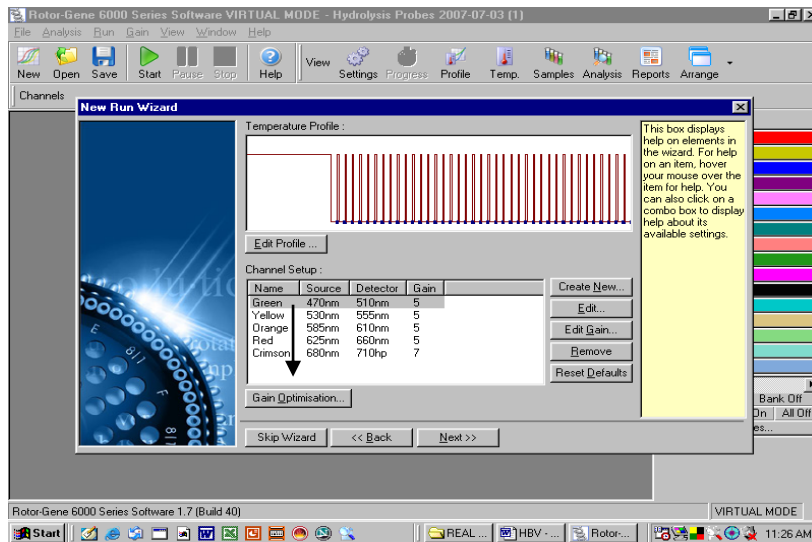


**Fig. 32.**

After setting the number of Cycles Press OK.

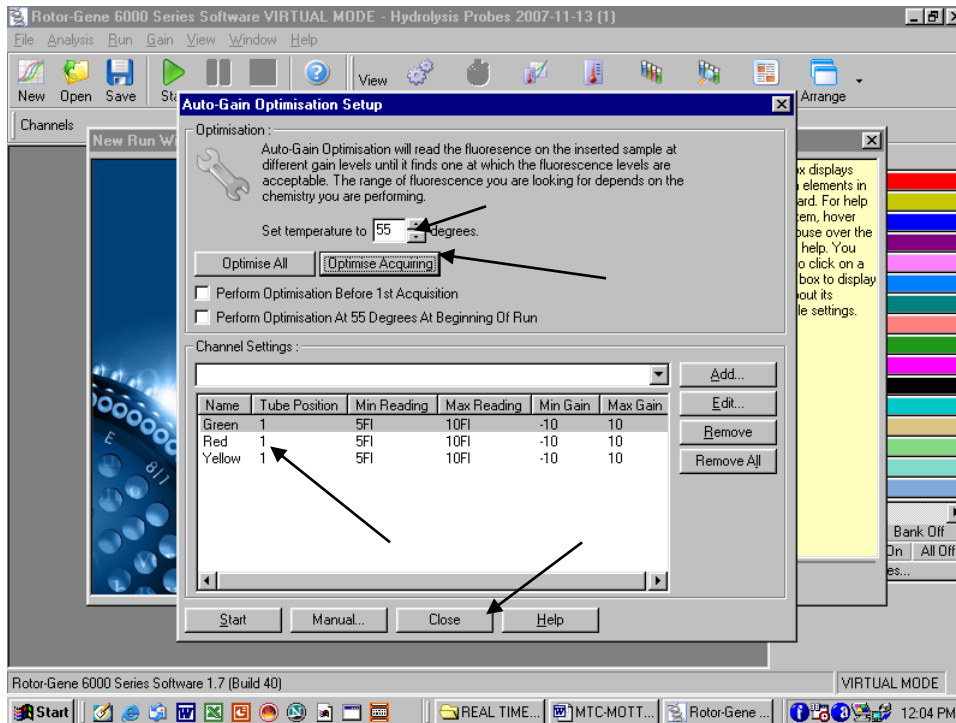
- k) Setting the gains for the acquiring channel by clicking at the Gain Optimisation button as shown below.

## Geno-Sen's MTC/MOTT Real Time PCR Kit



**Fig. 33**

The detection range of the fluorescence channels has to be determined according to the fluorescence intensities in the PCR tubes. This adjustment is done in the menu window *Auto Gain optimization Setup* (activation in menu window *New Experiment Wizard* under Gain Optimization). Please set the temperature to the annealing temperature of the amplification program (compare Fig.34).



**Fig. 34.**

**The following needs to be done.**

- Click on the Optimise Acquiring
- Click on Set temperature To Adjust the Temperature to 55°C.
- Click on the Box Perform Optimisation At 55 degree At beginning of Run.



## Geno-Sen's MTC/MOTT Real Time PCR Kit

- Just see that below the channel settings there appear only two channels i.e. Green and Yellow. In case it is different then the channels have not been set properly. Close the window and reset the channels.
- Then Press Close.

### L) PRESS Start RUN

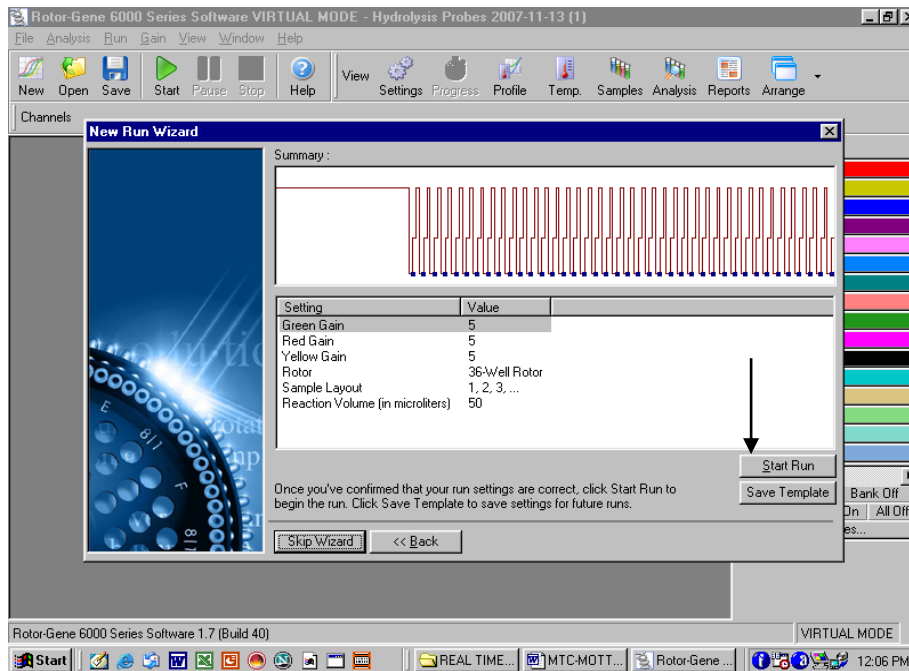


Fig. 35.

### Saving the RUN File.

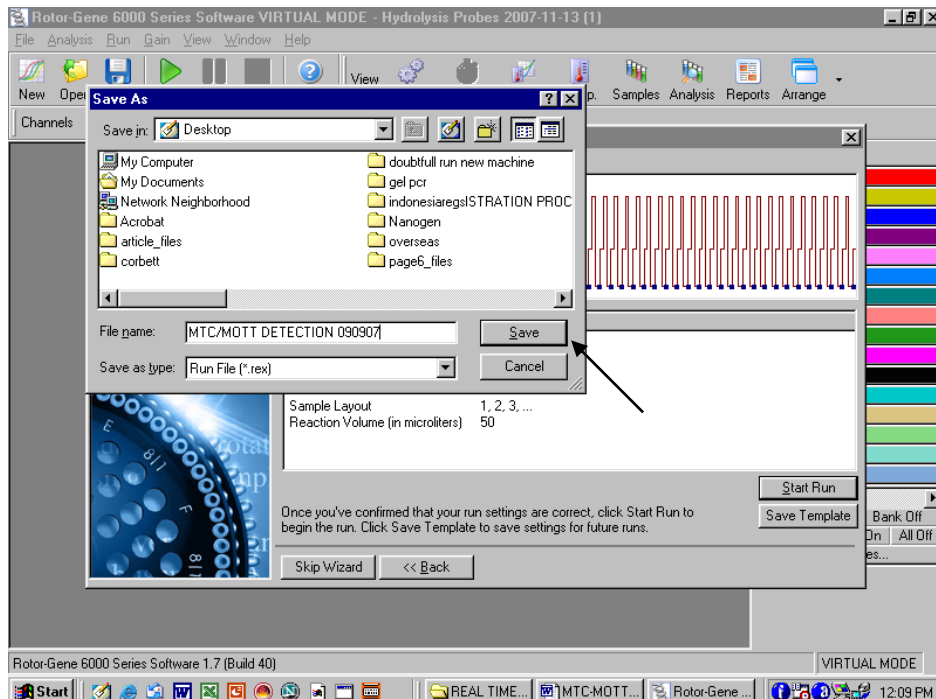


Fig. 36.

Store the run file either in my documents or a designated folder as shown above. The moment save button is clicked after the file name, machine will start.

## **9. a) Generated Data Interpretation & Analysis for Rotor gene 2000/3000**

Data analysis is performed with the *RotorGene*<sup>™</sup> software according to the manufacturer's instructions (*RotorGene*<sup>™</sup> 3000 Operator's Manual).

The following results are possible:

### **1. A signal is detected in fluorescence channel Cycling A.FAM & Cy5 for the same sample.**

The result of the analysis is : The sample contains Mycobacterium Tuberculosis Complex DNA.

### **2. A signal is detected only in fluorescence channel Cycling A.Cy5.**

The result of the analysis is : The sample contains Mycobacterium DNA.

#### **COMMENTS:**

For a sample to qualify for being MTC Positive, it should amplify in both the FAM & Cy5 channel.

Those samples which amplify only in Cy5 Channel and do not amplify on FAM Channel are Mycobacterium of other origin i.e. other than Mycobacterium Tuberculosis Complex.

Examples of the same are shown in the Figures 37 & 38 below.

### **3. In fluorescence channel Cycling A.FAM & Cy5 no signal is detected.**

**No MTC/MOTT DNA detectable. It can be considered negative if there is amplification in the Joe Channel. Please refer for details on PCR inhibition in the section PCR inhibition.**

## Geno-Sen's MTC/MOTT Real Time PCR Kit

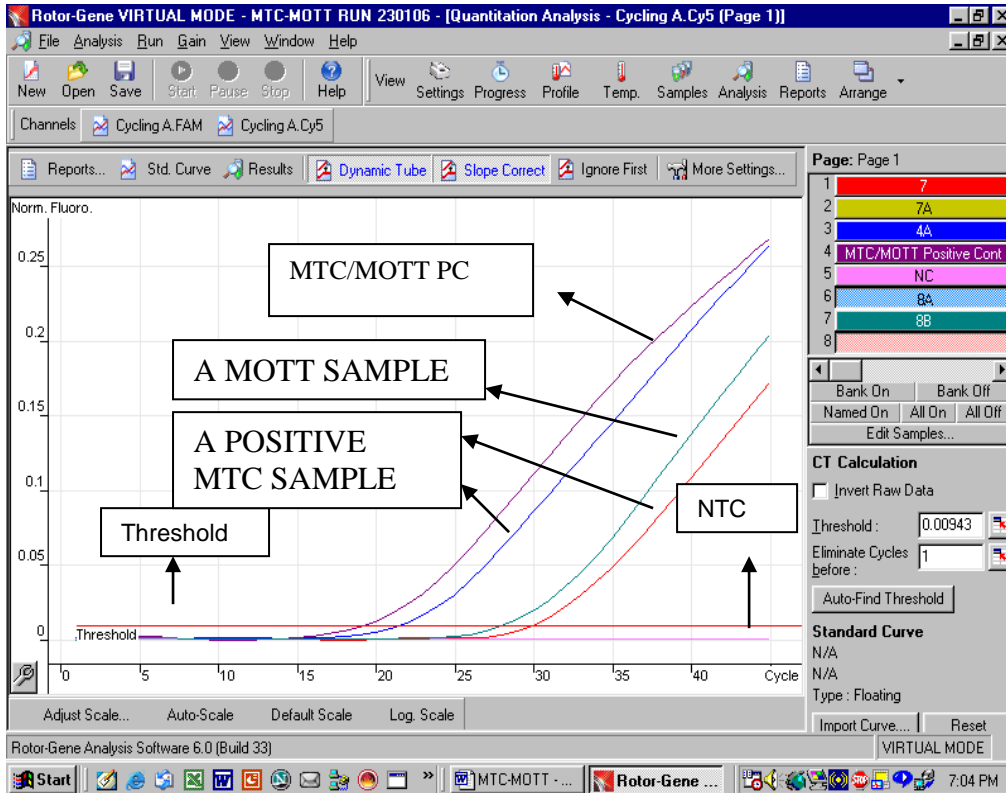


Fig. 37: Detection of the positive Control and samples of Mycobacterium in fluorescence channel Cycling A. Cy5. NTC: non-template control.

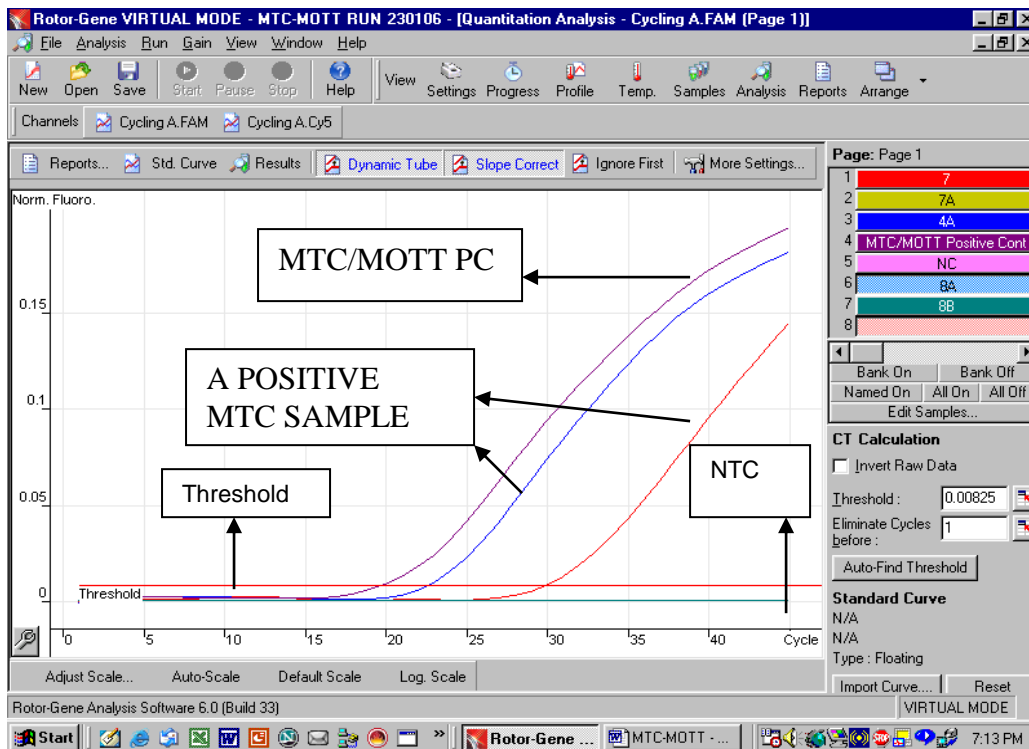


Fig. 38: Detection of the positive Control and samples of MTC in fluorescence channel Cycling A. FAM. NTC: non-template control.

Examples of positive and negative PCR reactions are also given in the above figure's

### ***Inhibition Control gene amplification.***

#### ***Analyze the Joe Channel***

#### ***PCR Inhibition***

A signal is detected in fluorescence channel Cycling A. Joe: **No PCR inhibition**

In fluorescence channel Cycling A. Joe no signal is detected.

**But signal detected in FAM & Cy5: The sample is positive for MTC DNA.**

**But signal detected in Cy5: The sample is positive for MOTT DNA.**

In fluorescence channel Cycling A. Joe no signal is detected.

**No signal detected in FAM & Cy5 as well: A possible PCR inhibition has occurred.**

## **9. b) Generated Data Interpretation & Analysis for Rotor gene 6000**

Data analysis is performed with the *RotorGene*<sup>™</sup> software according to the manufacturer's instructions (*RotorGene*<sup>™</sup> 6000 Operator's Manual).

The following results are possible:

**A signal is detected in fluorescence channel Cycling A.Green & RED for the same sample.**

The result of the analysis is : The sample contains Mycobacterium Tuberculosis Complex DNA.

**A signal is detected only in fluorescence channel Cycling A.RED.**

The result of the analysis is : The sample contains Mycobacterium DNA.

COMMENTS:

## Geno-Sen's MTC/MOTT Real Time PCR Kit

For a sample to qualify for being MTC Positive, it should amplify in both the Green & RED channel.

Those samples which amplify only in RED Channel and do not amplify on Green Channel are Mycobacterium of other origin i.e. other than Mycobacterium Tuberculosis Complex.

Examples of the same are shown in the Figures 39 & 40 below.

In fluorescence channel Cycling A.Green & RED no signal is detected.

**No MTC/MOTT DNA detectable. It can be considered negative if there is amplification in the Yellow Channel. Please refer for details on PCR inhibition in the section PCR inhibition.**

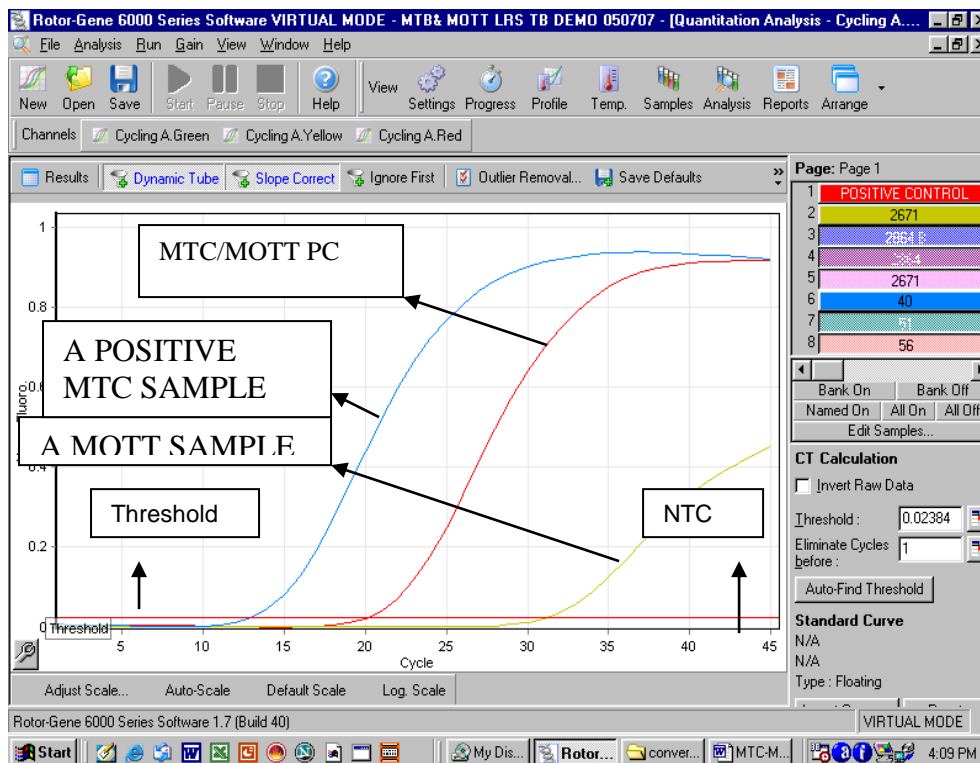
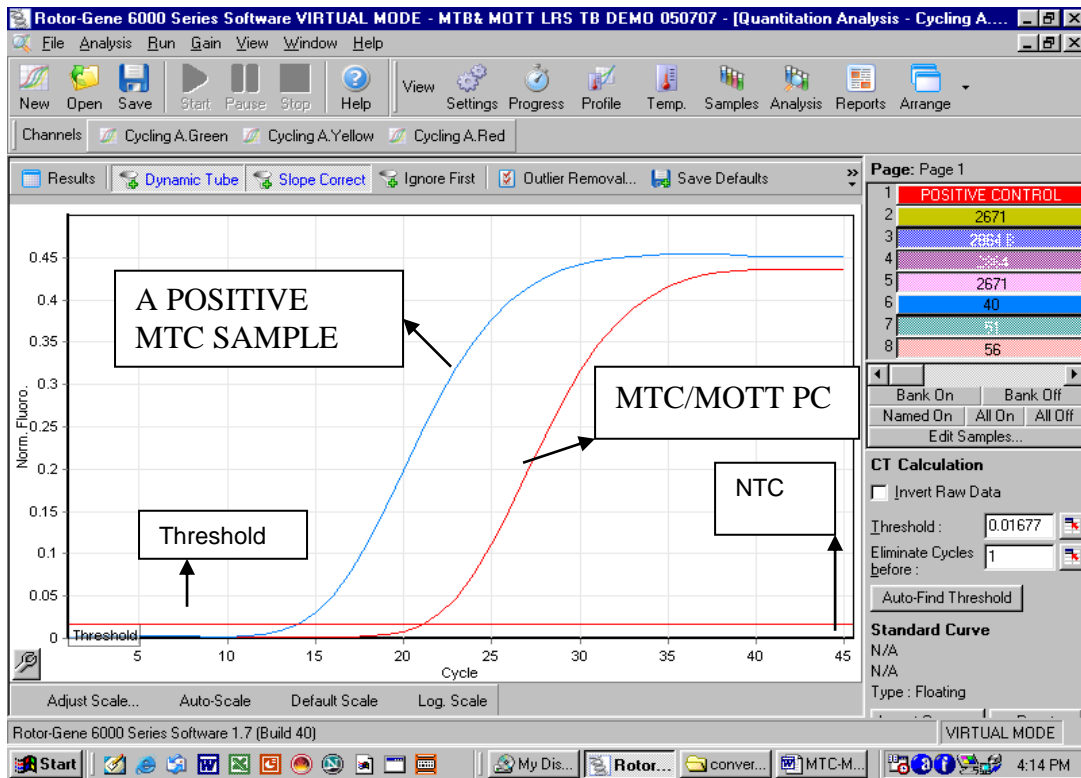


Fig. 39: Detection of the positive Control and samples of Mycobacterium in fluorescence channel Cycling A. RED. NTC: non-template control.

## Geno-Sen's MTC/MOTT Real Time PCR Kit



**Fig. 40:** Detection of the positive Control and samples of MTC in fluorescence channel Cycling A. Green. NTC: non-template control. Examples of positive and negative PCR reactions are also given in the above figure's

### ***Inhibition Control gene amplification.***

#### ***Analyze the Yellow Channel***

#### ***PCR Inhibition***

A signal is detected in fluorescence channel Cycling A. Yellow: **No PCR inhibition**

In fluorescence channel Cycling A. Yellow no signal is detected.

**But signal detected in Green & RED: The sample is positive for MTC DNA.**

**But signal detected in RED: The sample is positive for MOTT DNA.**

In fluorescence channel Cycling A. Yellow no signal is detected.

**No signal detected in Green & RED as well: A possible PCR inhibition has occurred.**

## 10. Troubleshooting

### a) FOR ROTOR GENE 2000/3000

#### 1. No signal with Positive Control in fluorescence channel Cycling A.FAM & Cy5

- Incorrect programming of the *Rotor-Gene*<sup>™</sup> 2000/3000.
  - ➔ Repeat the PCR with corrected settings.

#### 2. Weak or no signal in fluorescence channel Cycling A. FAM & Cy5

- The PCR conditions do not comply with the protocol.
  - ➔ Repeat the PCR with corrected settings.
- The MTC/MOTT Super Mix *R1* has been thawed and frozen too often.
- The MTC/MOTT Super Mix *R1* has been kept at +4°C for longer than 5 hours.
  - ➔ Please mind the storage conditions given in the **Storage**.
  - ➔ Repeat the assay using a new MTC/MOTT super mix (*R1*).
- **The PCR was inhibited.**
  - ➔ Make sure that you use a recommended extraction method (see **8.a. DNA extraction**) and stick closely to the manufacturer's instructions.

### b) FOR ROTOR GENE 6000

#### 1. No signal with Positive Control in fluorescence channel Cycling A.RED & Green

- Incorrect programming of the *Rotor-Gene*<sup>™</sup> 6000.
  - ➔ Repeat the PCR with corrected settings.

## 2. Weak or no signal in fluorescence channel Cycling A. Green & RED

- The PCR conditions do not comply with the protocol.
  - ➔ Repeat the PCR with corrected settings.
- The MTC/MOTT Super Mix R1 has been thawed and frozen too often.
- The MTC/MOTT Super Mix R1 has been kept at +4°C for longer than 5 hours.
  - ➔ Please mind the storage conditions given in the **Storage**.
  - ➔ Repeat the assay using a new MTC/MOTT super mix (R1).
- **The PCR was inhibited.**
  - ➔ Make sure that you use a recommended extraction method (see **8.a. DNA extraction**) and stick closely to the manufacturer's instructions.

## 11. Specifications

### 11.a Sensitivity and Reproducibility

In order to determine the sensitivity of the **Geno-Sen's MTC/MOTT Real Time PCR Kit**, a dilution series has been set up from  $10^6$  down to  $10^0$  Copies/ $\mu$ l of MTC/MOTT DNA and analyzed with the **Geno-Sen's MTC/MOTT Real Time PCR Kit**. The assays were carried out on three different days in the form of 8-fold determinations. The results were determined by a probit analysis. The detection limit as determined for **Geno-Sen's MTC/MOTT Real Time PCR Kit** is consistently 80 copies/ml. This means that there is 95% probability that 80 copies/ml will be detected.

Analytical Sensitivity in Conjunction with the Geno Sen's® **Genomic DNA Extraction Mini Kit — for DNA purification (Cat . No. 98021)** of the **Geno Sen's® MTC/MOTT Real Time PCR RG Kit on RotorGene 3000/6000** was determined by Spiking a known negative Serum to a nominal 90 copies/ml. This was subjected to extraction using the **Geno Sen's® Genomic DNA Extraction Mini Kit — for DNA purification (Cat . No. 98021)** eight times with starting volume of 200 $\mu$ l & elution volume of 60 $\mu$ l.

**All the Eight extractions were then analyzed with the Geno Sen's® MTC/MOTT Real Time PCR RG Kit along with the standards & the NTC.**

**All the eight extractions were amplified correctly & the mean value obtained for the eight replicates was 89 copies/ml.**



## Geno-Sen's MTC/MOTT Real Time PCR Kit

Hence Analytical Sensitivity in Conjunction with the Geno Sen's.® **Genomic DNA Extraction Mini Kit — for DNA purification (Cat . No. 98021) of the Geno Sen's.® MTC/MOTT Real Time PCR RG Kit on RotorGene 3000/6000 was determined to be 90 copies/ml.**

### 11.b Specificity

In order to check the specificity of the **Geno-Sen's** MTC/MOTT Real Time PCR kit, different DNA & DNA listed below were analyzed with **Geno-Sen's** MTC/MOTT Real Time PCR Kit. None of these led to a positive signal with the **Geno-Sen's** MTC/MOTT Real Time PCR kit. Besides which utmost care has been taken in selection of the primers & probes being used in the kit.

To further Validate the stringent data In order to check the specificity of the **Geno Sen's.® MTC/MOTT Real Time PCR RG Kit**, different RNA & DNA listed below were analyzed with **Geno Sen's.® MTC/MOTT Real Time PCR RG Kit**. None of these led to a positive signal with the **Geno Sen's.® MTC/MOTT Real Time PCR RG Kit**.

Varicella Zoster Virus	Hepatitis B Virus	N. Meningitis
Human Herpes Virus 1 & 2	Hepatitis C Virus	S. Pneumonia
Epstein barr Virus	Hepatitis E Virus	JEV
Cytomagalovirus	HIV-1	H. Pylori
Chlamydia pneumonia	HIV-2	Hepatitis A
Parvovirus B 19	West Nile Virus	Staphylococcus aureus
Dengue Virus 1-4	H. Influenza	Salmonella enteritidis
Leprosy	Malaria	Scrub typhus
B.pseudomallie	Enterovirus	Leptospira interrogans.

In order to validate the Specificity further with wet lab testing the following Known clinical samples were analyzed using the **Geno Sen's.® MTC/MOTT Real Time PCR RG kit on RotorGene 3000/6000**. The extraction was carried out with the **Geno Sen's.® Genomic DNA Extraction Mini Kit — for DNA purification (Cat . No. 98021)**

The run was carried out with the known set of standards in order to quantiate the MTC/MOTT DNA Gene.

Sample Type	SPUTUM	P.FLUID	CSF
High +ve's	2		2
Medium +ve's	4	3	3
Low +ve's	3	2	3
Extremely low +ve's	3	2	1
Negative samples.	4	4	3
	16	11	12

All the above samples were correctly identified by the **Geno Sen's.® MTC/MOTT Real Time PCR RG kit** & all the 6 extremely low samples were accurately detected by the **Geno Sen's.® MTC/MOTT Real Time PCR RG kit** & exhibited copies around 90 copies /ml or less than 90 copies/ml.

Further studies are underway on this aspect.

## 12. Warranty::

Products are guaranteed to conform to the quality and content indicated on each vial and external labels during their shelf life. Genome Diagnostics Pvt. Ltd. obligation and purchaser's rights under the warranty are limited to the replacement by Genome Diagnostics Pvt. Ltd of any product that is shown defective in fabrication, and that must be returned to Genome Diagnostics Pvt. Ltd Freight prepaid, or at Genome Diagnostics Pvt. Ltd. option, replacement of the purchasing price. Any complaint on damaged goods during transport must be directed to the handling or transport agent.

*In Vitro* Diagnostic Medical device, as per the Directive 98/79/EC specifications. This product must be used by qualified professionals only. It is the responsibility of the user to ascertain that a given product is adequate for a given application. Any product not fulfilling the specifications included in the product sheet will be replaced. This warranty limits our responsibility to the replacement of the product. No other warranties, of any kind, express or implied, including without limitation, implicit warranties of commercialization ability or adequacy for a given purpose, are provided by Genome Diagnostics Pvt. Ltd. Genome Diagnostics Pvt. Ltd will not be responsible for any direct, indirect, consequential or incidental damage resulting of the use, misuses, results of the use or inability to use any product.

## 13. Limitations of product use:

- a.) All reagents may exclusively be used for *in vitro* diagnostics.
- b.) The product is to be used by personnel specially instructed and trained in for the *in-vitro* diagnostics procedures only.
- c.) It is important to pipet the indicated quantities, and mix well after each reagent addition. Check pipettes regularly.
- d.) Instructions must be followed Correctly in order to obtain correct results. If the user has any questions, please contact our Technical Dept. ([dharam@vsnl.com](mailto:dharam@vsnl.com) or at [pbpl@vsnl.net](mailto:pbpl@vsnl.net) ).
- e.) This test has been validated for use with the reagents provided in the kit. The use of other Reagents or methods, or the use of equipment not fulfilling the specifications, may render equivocal results. User is responsible for any modifications done in any of the indicated parameters. Compliance with the kit protocol is required.
- f.) Detection of bacterial DNA depends on the number of DNA present in the sample, and can be affected by sample collection methods, patient-related factors (e.g. age, symptoms), or for infection stage and sample size.
- g.) False negative results may be obtained due to polymerase inhibition. It is recommended to perform control reactions to distinguish between inhibition and true negatives. This is achieved by the inhibition Control included in the kit.
- h.) Cross contamination between samples and exogenous DNA can only be avoided by following good laboratory practice. Instructions in this document must be strictly followed.
- i.) Attention should be paid to expiration dates printed on the kit box and labels of

[Geno-Sen's MTC/MOTT Real Time PCR Kit](#)

all components. Do not use expired components.

If you have any further questions or problems, please contact our technical support at [dharam@vsnl.com](mailto:dharam@vsnl.com) OR [pbpl@vsnl.net](mailto:pbpl@vsnl.net).

14. Publication and reference;

- i) Bilateral choroidal tuberculoma in miliary tuberculosis -  
report of a case

Radha Annamalai and Jyotirmay Biswas

*Journal of Ophthalmic Inflammation and Infection*20155:4

DOI: 10.1186/s12348-014-0032-x

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Received: 9 July 2014, Accepted: 1 December 2014, Published: 13 February 2015

- ii) **Assessment of Status of *rpoB* Gene in FNAC Samples of Tuberculous Lymphadenitis by Real-Time PCR**

Amita Raoot\* and [Geeta Dev](#)

**15. LIST OF GENO-SEN'S RANGE OF REAL TIME PCR KITS**

S.NO.	PRODUCT
1	HIV-1 RG quantitative Real time PCR kit.
2	HBV RG quantitative Real time PCR kit.
3	HCV RG quantitative Real time PCR kit.
4	HCV Genotyping 1/2/3/4 RG qualitative Real time PCR kit.
5	HEV RG quantitative Real time PCR kit.
6	HAV RG quantitative Real time PCR kit.
7	JEV RG quantitative Real time PCR kit.
8	ENTEROVIRUS RG quantitative Real time PCR kit.
9	DENGUE RG quantitative Real time PCR KIT
10	HSV 1 & 2 RG quantitative Real time PCR kit.

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11	<b>CMV RG quantitative Real time PCR kit.</b>
12	<b>Hanta Virus RG quantitative Real time PCR kit.</b>
13	<b>Measles Virus RG quantitative Real time PCR kit.</b>
14	<b>West Nile Virus RG quantitative Real time PCR kit.</b>
15	<b>H5 N1 (Bird Flu) RG quantitative Real time PCR kit.</b>
16	<b>Chikungunya RG quantitative Real time PCR kit.</b>
17	<b>TTV RG quantitative Real time PCR kit.</b>
18	<b>SARS RG quantitative Real time PCR kit.</b>
19	<b>JC/BK Virus RG quantitative Real time PCR kit.</b>
20	<b>MTb Complex RG quantitative Real time PCR kit.</b>
21	<b>MTb Complex /MOTT RG quantitative Real time PCR kit.</b>
22	<b>Chlamydia pneumonia RG quantitative Real time PCR kit.</b>
23	<b>Streptococcos pneumonia RG quantitative Real time PCR kit.</b>
24	<b>N. Meningitis RG quantitative Real time PCR kit.</b>
25	<b>H. Influenza RG quantitative Real time PCR kit.</b>
26	<b>Leprosy RG quantitative Real time PCR kit.</b>
27	<b>Helicobacter Pylori RG quantitative Real time PCR kit.</b>
28	<b>Scrub Typhus RG quantitative Real time PCR kit.</b>
29	<b>B. Pseudomalle RG quantitative Real time PCR kit.</b>
30	<b>Filaria RG quantitative Real time PCR kit.</b>
31	<b>Leptospira(pathogenic) RG quantitative Real time PCR kit.</b>
32	<b>CCL3-L1 RG quantitative Real time PCR kit.</b>
33	<b>Malaria (P. Vivax) RG quantitative Real time PCR kit.</b>
34	<b>Bcr/abl Major RG quantitative Real time PCR kit.</b>

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<b>35</b>	<b>Bcr/abl Minor RG quantitative Real time PCR kit.</b>
<b>36</b>	<b>PML/RARA RG quantitative Real time PCR kit.</b>
<b>37</b>	<b>RARA/PML RG quantitative Real time PCR kit.</b>
<b>38</b>	<b>GAPDH RG quantitative Real time PCR kit.</b>
<b>39</b>	<b><math>\beta</math>-Actin RG quantitative Real time PCR kit.</b>
<b>40</b>	<b><math>\beta</math>-Globin RG quantitative Real time PCR kit.</b>
<b>41</b>	<b>Abl gene RG quantitative Real time PCR kit.</b>
<b>42</b>	<b>Rabies RG quantitative Real time PCR kit.</b>
<b>43</b>	<b>Factor V Leiden detection RG Real time PCR kit.</b>



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Version : 005

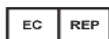
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