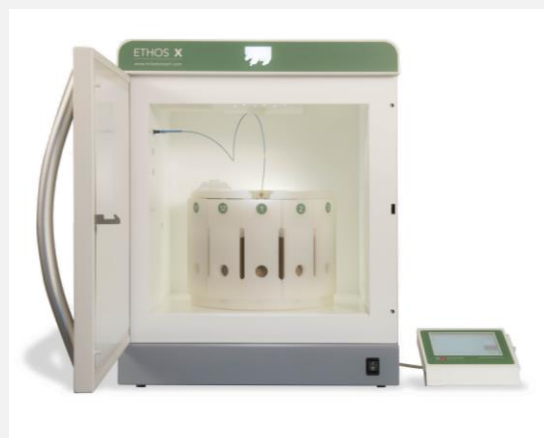


# Extraction of Total oil from Palm Fiber



## Introduction

This method provides the solvent extraction of Total oil from palm fiber in a closed vessel device using temperature control microwave heating for the subsequent gravimetric analyses.



## Instrumentation



Milestone Ethos X microwave extraction system with SK-12 medium pressure rotor.

The temperature performance specifications necessitate that the microwave extraction system may be capable of sensing the temperature to within  $\pm 2,5^{\circ}\text{C}$  and automatically adjusting the microwave field output power within 2 sec of sensing. Temperature sensors (fiber optic) should be accurate to  $\pm 2^{\circ}\text{C}$ . Temperature feedback control provides the primary performance mechanism for this method.

Microwave extraction vessels are needed. Vessels that are available can accommodate from 1g to 5g of sample. Vessels should be transparent to microwave energy, relatively inert to reagents and sample components and capable of withstanding  $200^{\circ}\text{C}$  and 200 psi.

It is also important to use the Weflon button (material created by the mix of TFM charged with graphite) in case that non-polar solvents are used. In addition, it is necessary to mix solvents and sample. Due to this reason it is required the use of a stirring bar in every vessel, since the Ethos X is equipped with a stirring motor. This stirring bar will homogenize sample and solvents during the process.



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## Sample weight and reagents

|               |                        |
|---------------|------------------------|
| Sample weight | 3g                     |
| Reagents      | Up to 40mL of n-Hexane |

## Procedure

1. Place a TFM vessel on the balance plate, tare it and weigh of the sample.
2. Introduce the TFM vessel into the HTC safety shield.
3. Add the solvents and the Weflon stirring bars.
4. Close the vessel and introduce it into the rotor segment, then tighten by using the torque wrench.
5. Insert the segment into the microwave cavity and connect the temperature sensor.
6. Run the microwave program to completion.
7. Cool the rotor by air or by water until the solution reaches room temperature.
8. Open the vessel and further manipulate the solution according to the analytical technique.

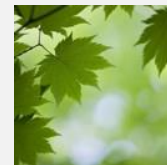
## Microwave Program

| Step | Time     | Stirring speed | T1   | Power*  |
|------|----------|----------------|------|---------|
| 1    | 00:10:00 | 60%            | 90°C | 1000 W* |
| 2    | 00:10:00 | 60%            | 90°C | 1000 W* |

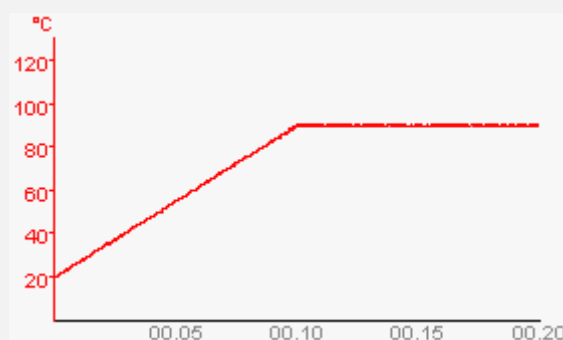
**\* Use up to 500 Watts for operations with 3 or less vessels simultaneously**



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## Temperature Profile



## Comments

Rapid heating in combination with temperatures in excess of the atmospheric boiling point of organic solvents, reduce sample extraction times. Small amounts of solvents (30ml) are used resulting in reduced sample preparation cost and time.

