MILESTONE
HELPING
PATIENTS

JFC Solution

Operator Manual

MM077

Thank you for having selected our system and welcome to the ever growing world club of users for Milestone laboratory instrumentation.
We are sure that you will be completely satisfied with this new tool entering your laboratory.
We invite you to read carefully this operator manual and to keep it in reach for convenient and fast consulting.
For any possible clarification or any request for assistance please contact either our Representative in your country:

Or contact

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Please read the user manual before using the device.

MM077-002 – JFC Solution – Operator Manual
2015-05

SUMMARY

1. INTRODUCTION

1.1. Symbols used

An instruction accompanied by this symbol provides important information and requires more attention.

An instruction accompanied by this symbol provides a cautionary statement: failure to follow the instruction may endanger the operator or cause damage to the instrument.

Biohazard: be careful when you execute the procedure marked with this symbol: danger of biohazard contamination.

CE logo: this instrument complies to European Community directives.

IVD medical device according to 98/79/EC directive.

WEEE European directive symbol (2002/96/EC):
Electric/electronic device do not throw out in the environment.

Manufacturer.

Expiration date.

Storage temperature.

Lot number.

Catalog number (reference).

Flammable liquid.

Respiratory sensitization.

Hazard to the aquatic environment.

Notice, read the sentences on the label.

1.2. Intended uses

JFC Solution is a dehydration/clearing reagent of tissues, patented xylene-free alcohol-based.
JFC Solution is ready to use, therefore it does not require dilutions involving the laboratory personnel.

Its formulation of low toxicity overcomes the drawbacks commonly associated with the xylene, hazardous product for the human nervous system. JFC Solution also provides optimal preservation of fat cells structure, nuclear and cytoplasmic morphology.

DO NOT USE THE REAGENT FOR DIFFERENT USES FROM THOSE LISTED ABOVE.
In case of doubts please contact: application@milestonemedsrl.com.

1.3. Transport and storage conditions

Handle with care and store in a cool dry space using a tightly closed container.

1.4. Warning information

Use gloves before manage the reagent.

Processing “mirror blocks” during the evaluation/changing period should be adopted for a better acquisition of the new dehydration/clearing solution.

1.5. Waste disposal

Disposal of JFC Solution (exhausted): after the use, treat it as hazardous. Waste material should be disposed in an approved incinerator in compliance with all federal, provincial and local government regulations.

Disposal of expired JFC Solution (not yet used): disposal must be done according to official regulations.

2. SETTING UP

2.1. Introduction to JFC

The JFC Solution is an innovative solution composed by a mixture of alcohols and a long chain hydrocarbon patented by Milestone srl. With the effect of the microwaves this solution becomes highly effective in the extraction of water and lipids from biological tissue, in a single step, without the need for further dehydration or clearing.

The miscibility of the three components of the JFC Solution lets perform in a single step dehydration and clearing, thus representing a significant advantage over the conventional processing method.
The action of the mixture can be explained by the polarity of the molecules.
In general for an optimal extraction, the polarity of the solvent should be similar to that of impurity you want to remove. In histoprocessing such impurities are generally water and lipids.
Fatty tissue is of two classes:

The **triglycerides** are formed by esterification of long chain fatty acids (C12-C18) with glycerin: the aliphatic part of fatty acids is not polar, while the glycerin is highly polar, with consequent formation of a fat moderately polar.
The **phospholipids**, the other class of fatty tissues of greater importance, are the major constituent of cell membranes, formed by incorporation of phosphate groups in lipid molecules: as a result, the entire molecule has a high polarity.
The *isopropanol*, a polar molecule, contributes to dehydration and also improves the extraction of polar fatty.
Ethanol, also a polar molecule, primarily serves to dehydrate.
The action of both alcohols will be highly efficient under the stimulation of microwaves.
The third component of the JFC Solution, an *organic solvent*, is chemically inert, and not polar. Although it has relatively low affinity with fats in normal conditions, its clearing activity is highly reinforced by the action of the microwaves on ethanol and isopropanol.

2.2. Unpacking

JFC SOLUTION: **Code 51408** 5 liters tank

Ready to use solution.

For better security, if you have the tissue processor LOGOS or LOGOS ONE, you can directly load the tank JFC Solution 5 liter. This is very useful to eliminate further spillage and passages between canisters.
For further information please refer to MM082 – LOGOS- Operator Manual/MM098 – LOGOS ONE – Operator Manual.

Any bottle of JFC Solution concentrate is identified by a lot number; we suggest to completely use a bottle before opening a new one identified by a different lot number with a more recent date. However it is possible to mix different quantities of JFC Solution concentrate from different lots; in this case it is responsibility of the user to assure the correct management and traceability of the lot numbers used.

3. OPERATE WITH JFC

The processing is historically based on the use of xylene as a routine reagent for clearing of fatty tissues during processes with traditional method, generally carried out during the night.
However, the lack of safe and effective alternatives that have the same properties of fat removal, but without the side effects highly toxic, is persistent and applies to all those who continue to use it in tissue processing.
The development by Milestone s.r.l. of the JFC Solution has opened a crack in the opportunity to replace xylene, in particular in the processing with the microwave.
In order to understand when to use the JFC Solution, you must know and understand the properties of the reagent.
Below we will give the essential information regarding the reagent, thanks to which the user will be able to decide how to use, compared to the fat content in the tissue that you want to process.

3.1. Processing

The Milestone processors provide a combination of microwave and vacuum essential to exploit the properties of the JFC Solution, making it possible to reach the step of dehydration and clearing at 68° C.
The interaction of ethanol with polar molecules of water within tissues results in an accelerated dehydration.
The clearing activity of long hydrocarbon chains on chains of fatty-polar, combined with the action of isopropanol on the polar portion of the lipid molecules, results in highly effective extraction of all the fatty tissues.
The next step of vaporization (when present) prepares tissues for impregnation with paraffin. This is achieved with the removal of residues from the JFC Solution present in the tissue, through the application of vacuum at 0.6 bar. The latter lowers the boiling temperature of the JFC Solution. There is thus narrowing macroscopic blocks and therefore no interruption of their structural integrity.

Milestone processors with vacuum: Histos 5, Pathos Delta, LOGOS, LOGOS ONE.
The VAPORIZATION phase is present.

Milestone processors without vacuum: Histos 3, KOS, LOGOS J.
The VAPORIZATION phase is not present.

For further information contact: medical@milestonesrl.com or your local representative.

3.2. Particular notes

An important element to note is that the JFC Solution contains a hydrocarbon, therefore it is not recommended to use on tissues which have not been properly fixed (generally overnight), although well fixed with microwaves: would be like to put a poorly fixed tissue in xylene, in this case you might have artifacts such as "spotty" nucleic color, nuclear pyknotic appearance (lack of details chromatin) and severe distortions in the tissue (narrowing).

3.3. Guidelines

The processing using JFC Solution is particularly recommended for tissues that have high fat content such as: breast, lipoma, omentum, colon.

The processing sequence recommended in Milestone processors is the following:

Samples UP TO 1 mm: Small biopsy cylinders of about 1mm diameter

FASE	STEP No.	TEMPO (minutes)	PRESS./VAC. (mBar)	TEMPERATURE (°Centigrade)
1. FIXATION	1	15min	N/A	50°C
	2	5min	N/A	50°C
2. FLUSHING (ETOH 70%)	1	1min	N/A	N/A
3. RINSING 1 (ETOH 100%)	1	2min	N/A	N/A
4. RINSING 2 (ETOH 100%)	1	2min	N/A	N/A
5. JFC SOLUTION	1	15min	N/A	68°C
	2	5min	N/A	68°C
6. ISOPROPANOL	1	15min	N/A	68°C
	2	5min	N/A	68°C
7. VAPORIZATION	1	1min30sec	N/A	N/A
8. WAX IMPREGNATION	1	30sec	995mBar	66°C
	2	5min	400mBar	66°C
	3	5min	300mBar	70°C
	4	3min	200mBar	70°C
	5	10min	150mBar	65°C

Samples UP TO 2 mm: 10 x 5 x 2mm

PHASE	STEP No.	TIME (minutes)	PRESS./VAC. (mBar)	TEMPERATURE (Centigrade)
1. FIXATION	1	15min	N/A	50°C
	2	10min	N/A	50°C
2. FLUSHING (ETOH 70%)	1	1min	N/A	N/A
3. RINSING 1 (ETOH 100%)	1	2min	N/A	N/A
4. RINSING 2 (ETOH 100%)	1	2min	N/A	N/A
5. JFC SOLUTION	1	15min	N/A	68°C
	2	5min	N/A	68°C
6. ISOPROPANOL	1	15min	N/A	68°C
	2	5min	N/A	68°C
7. VAPORIZATION	1	1min30sec	N/A	N/A
8. WAX IMPREGNATION	1	30sec	995mBar	70°C
	2	10min	500mBar	70°C
	3	10min	400mBar	70°C
	4	2min	300mBar	70°C
	5	2min	200mBar	70°C
	6	28min	150mBar	70°C

Samples UP TO 3 mm: 15 x 10 x 3mm

PHASE	STEP No.	TIME (minutes)	PRESS./VAC. (mBar)	TEMPERATURE (Centigrade)
1. FIXATION	1	15min	N/A	50°C
	2	15min	N/A	50°C
2. FLUSHING (ETOH 70%)	1	1min	N/A	N/A
3. RINSING 1 (ETOH 100%)	1	2min	N/A	N/A
4. RINSING 2 (ETOH 100%)	1	2min	N/A	N/A
5. JFC SOLUTION	1	15min	N/A	68°C
	2	40min	N/A	68°C
6. ISOPROPANOL	1	15min	N/A	68°C
	2	5min	N/A	68°C
7. VAPORIZATION	1	1min30sec	N/A	N/A
8. WAX IMPREGNATION	1	30sec	995mBar	70°C
	2	10min	500mBar	70°C
	3	10min	400mBar	70°C
	4	2min	300mBar	70°C
	5	2min	200mBar	70°C
	6	2min	150mBar	70°C
	7	37min	150mBar	65°C

Samples UP TO 4 mm: 20 x 25 x 4mm

PHASE	STEP No.	TIME (minutes)	PRESS./VAC. (mBar)	TEMPERATURE (Centigrade)
1. FIXATION	1	15min	N/A	50°C
	2	25min	N/A	50°C
2. FLUSHING (ETOH 70%)	1	1min	N/A	N/A
3. RINSING 1 (ETOH 100%)	1	2min	N/A	N/A
4. RINSING 2 (ETOH 100%)	1	2min	N/A	N/A
5. JFC SOLUTION	1	15min	N/A	68°C
	2	1hr40min	N/A	68°C
6. ISOPROPANOL	1	15min	N/A	68°C
	2	10min	N/A	68°C
7. VAPORIZATION	1	1min30sec	N/A	N/A
8. WAX IMPREGNATION	1	30sec	995mBar	70°C
	2	10min	500mBar	70°C
	3	10min	400mBar	70°C
	4	4min	300mBar	70°C
	5	4min	200mBar	70°C
	6	3min	150mBar	70°C
	7	1h16min30sec	150mBar	65°C

Samples UP TO 5 mm: 30 x 25 x 5 mm

PHASE	STEP No.	TIME (minutes)	PRESS./VAC. (mBar)	TEMPERATURE (Centigrade)
1. FIXATION	1	15min	N/A	50°C
	2	45min	N/A	50°C
2. FLUSHING (ETOH 70%)	1	1min	N/A	N/A
3. RINSING 1 (ETOH 100%)	1	2min	N/A	N/A
4. RINSING 2 (ETOH 100%)	1	2min	N/A	N/A
5. JFC SOLUTION	1	15min	N/A	68°C
	2	1hr45min	N/A	68°C
6. ISOPROPANOL	1	15min	N/A	68°C
	2	15min	N/A	68°C
7. VAPORIZATION	1	1min30sec	N/A	N/A
8. WAX IMPREGNATION	1	30sec	995mBar	70°C
	2	10min	500mBar	70°C
	3	10min	400mBar	70°C
	4	4min	300mBar	70°C
	5	4min	200mBar	70°C
	6	3min	150mBar	70°C
	7	1h48min30sec	150mBar	65°C

In base al processatore di cui si dispone alcune fasi o impostazioni possono non essere presenti.

Processatori Milestone senza vuoto: Histos 3, KOS, LOGOS J.
La fase di VAPORIZATION non è presente.
L'impostazione del vuoto non è presente.

Il tempo per il raggiungimento della temperatura varia a seconda del processatore e della quantità di reagente utilizzato.

Per maggiori informazioni contattare: application@milestonemedsrl.com o il vostro rappresentante locale.

L'utilizzo di JFC Solution in altri processatori non è sotto la responsabilità di Milestone s.r.l., che declina ogni responsabilità in caso di danneggiamento.

CE IVD

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