

MICROWAVE FREEZE-THAW TREATMENT OF INJECTABLE DRUGS: A REVIEW OF THE LITERATURE FROM 1980 TO 2014

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Background

Microwave freeze-thaw treatment (MFTT) of injectable drugs can support the development of centralized intravenous admixtures services (CIVAS). The aim of the review is to collect information and results about this method.

Methods

A systematic review of the scientific literature about drug stability studies was made. The data are presented in a table and describe name of the drug, producer, final concentration, temperature and time of freezing storage, type of microwave oven, thawing power, method of dosage and results after treatment or final long-term storage at 2-8°C.

Results

From 1980 to 2014, 63 drugs (anti-infectious, cytotoxics, antiemetic, pain treatment, ...) were studied by MFTT and the results were presented in 52 publications. 41 papers were presented by 8 teams (2 to 21 by team). The temperatures of freezing storage vary from - 70°C to - 10°C, the time storage from 4 hours to 12 months, the thaw from low to full power. Dosage are mainly made by High Performance Liquid Chromatography. Most of the 63 drugs are stable during and after treatment. However, ampicilline needs very low storage temperature from - 30°C to - 70°C, cefuroxime temperature storage lower than - 20°C and mitomycine - 30°C. Only 3 teams have tested the long term stability after MFTT, the first for ganciclovir after 7 days, the second for ceftizoxime after 30 days and the third for 28 drugs after 11 To 70 days.

References

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Table 1 : Microwave Freeze Thaw Treatment : Review of Literature 1980-2014

NOM	Mfg	mg by ml	Solution	Volume (ml)	Container	Time	Oven	Caractéristiques	Thawing cycle	Rem	Stability	Long-term stability	Re
ACYCLOVIR GSK		5,00	s	100	polyolefine	- 20 c 21 days	Panasonic NND998C	Rotating carousel	13 min + 7 min at 270 W		Yes, by HPLC	21 days	
ACYCLOVIR HOSPIRA		5,00	s	100	polyolefine	- 20 c 21 days	Panasonic NND998C	Rotating carousel	13 min + 7 min at 270 W		Yes, by HPLC		
FAZAPRIDE HCL		0,50	s	100	pvc	- 20 c 150 days	Faure 56-45	Rotating carousel	Position 6, 9 minutes for 6 bags		stable d1, by hplc : + 1.6 %	?	
FAZAPRIDE HCL		3,00	s	100	pvc	- 20 c 150 days	Faure 56-45	Rotating carousel	Position 6, 9 minutes for 6 bags		Yes, by hplc : + 1.6 %	?	
AMOXICILLINE + CLAVULANIC ACID		12,00	WFI	100	pvc	- 20 c 4 hrs					INCOMP		
AMPICILLINE SODIUM		20,00	d5	50	pvc	- 20 c 30 days	Sharp SKR-6705	Carousel rotatif	1.5 minutes full power for 1 x 50 ml + 30 sec by additional bag		INCOMP, by microbiological assay		
AMPICILLINE SODIUM	WYE	20,00	s	50	pvc	- 30 c 30 days	Sharp 9750 modified	Rotating carousel	1.5 min full power for 1 x 50 ml + 30 sec by additional bag				
AMPICILLINE SODIUM		20,00	s	50	pvc	- 70 c 30 days	Sharp 9750 modified	Rotating carousel					

All the data are available on the CD-rom "Stabilité des médicaments injectables en perfusion", edition 2015.



Conclusion

- This review can help CIVAS to take in charge the productions of ready-to-use injectable drugs.