

# INFLUENCE OF PHYSICAL PERTURBATIONS (FILTRATION PROCESSES) ON WATER ABSORPTION PATTERN (WAP)

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## INTRODUCTION

Water is a universal solvent with unique properties as very high boiling point, particular density variation with temperature and heat capacity at constant pressure.

These properties have been interpreted as the result of the existence of water as a liquid in which molecules are subjected to strong intermolecular attractions essentially represented by hydrogen bonds.

Studies on extremely dilute solutions have highlighted the existence of physicochemical properties of the solvent water requiring an in-depth structure knowledge to be explained. [1-2]

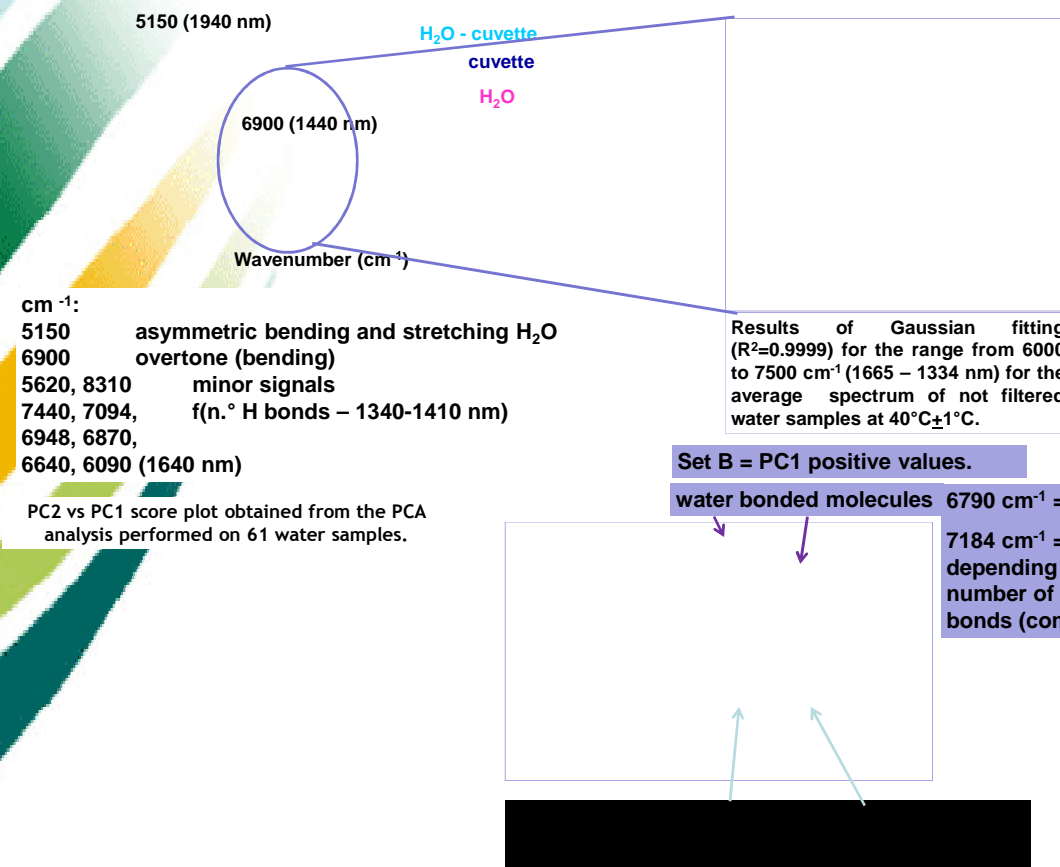
## MATERIALS & METHODS

### AIM

The aim of the present study was to investigate, by NIR spectroscopy, changes induced in pure water by filtration processes

These processes seem to induce the formation of aqueous nanostructures as recently suggested by the Nobel Laureate Luc Montagnier and by Vittorio Elia who suggested the formation of dissipative structures. [3-4]

## RESULTS AND DISCUSSION



Maxima of the Gauss functions:

- 6569 ± 47 cm<sup>-1</sup>: four hydrogen bonds (HB)
- 6735 ± 84 cm<sup>-1</sup>: three hydrogen bonds
- 6855 ± 41 cm<sup>-1</sup>: two hydrogen bonds
- 6978 ± 15 cm<sup>-1</sup>: one hydrogen bond
- 7092 ± 2 cm<sup>-1</sup>: no hydrogen bond
- 7143 ± 71 cm<sup>-1</sup>: combination of symmetric stretching, bending and rotational mode.

In agreement with literature data, [5] a redistribution of water species with different numbers of hydrogen bonds was also expected in samples of water undergone to different filtration processes.

Samples of sets A1-A2 showed to contain the greatest number of water species with three hydrogen bonds:

- 6736 cm<sup>-1</sup> = three HB
- 7110 cm<sup>-1</sup> = no HB

## CONCLUSIONS

It has been difficult to clearly establish in which measure iterated filtration processes can lead to the formation of water nano-structures.

The presence of significant differences between filtered and not filtered samples was detected.

These results suggested to continue to study the fascinating field of structural variations occurring in water "aggregates", when subjected to physical perturbations.

....water is not just water.... it's always in evolution!

Sets A1-A2 = distribution along PC2

## REFERENCES

- <sup>1</sup> Vittorio Elia et al. *J. Mol. Liq.*, 130, 15-20 (2007)
- <sup>2</sup> Shui Yin Lo, Xu Genq and David Gann. *Physics Letters A*, 373, 3872-3876 (2009)
- <sup>3</sup> Luc Montagnier et al., *Interdiscip Sci Comput Life Sci* 1, 81-90 (2009)
- <sup>4</sup> V.Elia, E.Napoli and M.Niccoli, *Journal of Molecular Liquids*, 149, 45-50 (2009)
- <sup>5</sup> H. Maeda et al. *J. Near Infrared Spectroscopy*, 3, 191-201 (1995)