Soft chemistry at the service of cosmetology

A. Merouani

Ex. Researcher at Ferhat Abbas University –Sétif-ALGERIA

Email : amerouani2001@yahoo.fr

Abstract

We consider that scientific research has been behind the development of various branches of chemistry (organic, analytical, electrochemical...), for nearly two centuries. Among the activities rich in scientific and innovative potential, there is one concerning cosmetology. There are thousands of chemical recipes that cover the field of beauty and health. This does not prevent the emergence of new, more specialized branches, thanks to the social and economic changes that the world is currently experiencing. In our article, we propose a new technique for the preparation of various cosmetic solutions by the process of soft chemistry. The process of soft chemistry is based on the technique of preparation of solutions and chemical complexes, at low temperature and in a less humid and aerated environment. The main characteristic method of soft chemistry is the one known as the soil gel process.

Our work consists in preparing new natural organo-molecules by ground-gel which will be used as a basis in cosmetic compounds intended for the care of the human body in general. The basis of these compounds consists of colored plant extracts **[1]** , whose main ability is to focus photons and therefore to allow the dispersion of light within various chemical matrices.

Using poly (vinyl alcohol) (PVA) with highly hydrophilic properties as a membrane material and poly(ethylene glycol) (PEG) as an additive, as well as the Betacyanin dye we prepared ultrafiltration membranes (UF) PVA/Betacyanin with good anti dirt properties, disinfectant and vital for the skin, by a sol-gel method. PVA/Betacyanin UF membranes have been characterized by models of X-ray diffraction and Fourier transform infrared spectroscopy,. The morphology and permeation performance of the PVA/Betacyanin membranes varied with different Betacyanin loads and PEG content.

Key Words; Soft chemistry, PVA, Betacyanin, Health, Skin

Background

The main objective of this research is to demonstrate the potential for exploitation of organic dyes in protecting the skin from various nanometrical impurities.

Methodes

The study started in our work is based on the verification and certification of the protective qualities (physico -chemical) of plants with energy fibres. The preparation of the energy plant solutions is carried out by the soil gel method **[2];** by using additives and effficace diluents (PVA/PEG) for grinding results. All methods of analysis and characterization are spectroscopic. IR/UV).

Results

The important findings that we were able to note reveal ;

a-The selective quality of dye plants.

b-The enormous and varied possibilities of the handling of organic dyes and their derivatives.

Conclusion

The novelty in our research is the confirmation of the usefulness and efficiency of the preparation of colored organic solutions for health and beauty purposes.

Keywords: Betacyanin; Sol Gel; Protection; Health.

A- Introduction

This work is dedicated to basic research on medicinal vegetal products. In addition to the exploitation of the leaves of plants and their fruits, our research shows the enormous possibilities offered by chemistry in the treatment of the generated dyes of seasonal or annual plants. The treatment based on the example of the dye from the beet showed important medical and cosmetic characteristics, given its qualities of adsorption and diffusion of photons.

B- Materials and Methods

B-1 Preparation of PVA and PEG Mixture

In a 100 ml beaker, hot water is introduced at 60°C, to which 20g powder is added, of poly (vinyl alcohol) with highly hydrophilic properties as a membrane material [3] . Leave the solution under agitation for 30 minutes. Once the solution is homogeneous, 10g of poly(ethylene glycol) (PEG) is added as an additive. The solution is left a second time under agitation for 15 minutes.

B-2 Preparation of Betacyanin, ultrafiltration (UF) menbrane

The betacyanin dye extracted with ethanol was obtained by the following steps [4] .Fresh beetroot were washed with water and vacuum dried at 60°C. After crushing , these materials were immersed in absolute ethanol at room temperature in the dark for one week. Then the solids were filtred out, and the filtrates were concentrated in rotavapor at 40°C and these ethanolic extracts were refined by chromatogram method. The column was packed with sephadex G-25and an eluent of methanol in dichloromethane was required for maximum separation. The first eluted fraction was inter-mixed with yellow and red pigments and the last eluted fraction usually contained appreciable amounts of betacyanin, identified by UV-Vis Spectroscopy. After that, the natural betacyanin was used as adsorption interface of photons[5].

After that, the preparation of the ultrafiltration menbrane is started by the Gel soil process. To do this, take 50 ml of betacyanin thus prepared and add it to the PVA/PEG mixture. The mixture is left at the ambient temperature under agitation for a duration of 45mn. . The yellow gel obtained in the form of a viscous solution is used as PVA/ PEG/ Betacyanin ultrafiltration (UF) membranes with good anti soiling, disinfectant and vital properties for the skin [Fig01].

***Fig01**. The yellow Gel/Menbrane (UF)*

C-Result

The viscous and dense structure as well as the colored surface of the ultrafiltration menbrane (UF) was characterized by IR spectroscopy, X ray and SEM analyses.

Figure 02 shows the IR spectrum of the menbrane UF. Several absorption bands are noted. The most important are those relating to nitrogen bonds around 1800 cm-1 , present in betacyanin , as well as the OH bonds, and those of C-H , present successively in the PVA as well as the PEG around1700 and 3200 cm-1.

In Fig 03.it's show that the particles f UF in seconde spectra are very nanocrystalline and we can appreciate the important amount of reactive particles of Betacyanin in UF .

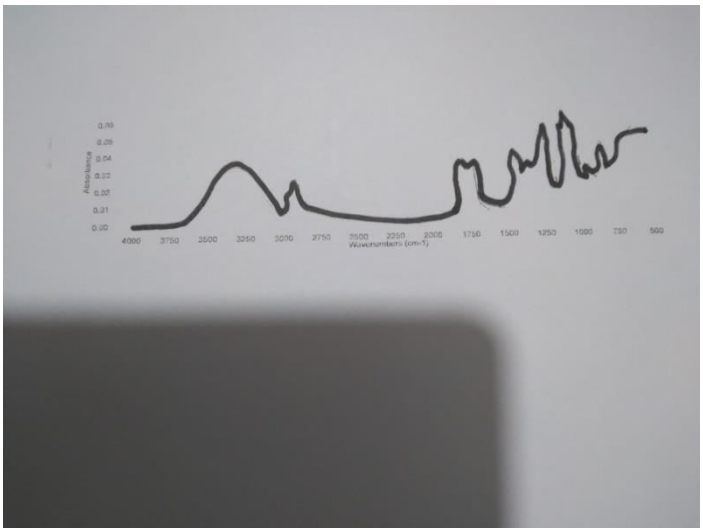

***Fig02**. IR spectra of The yellow Gel/Menbrane (UF)*

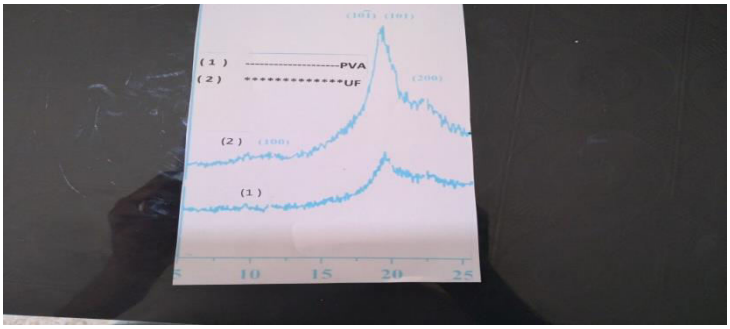

***Fig03**. DRX spectra of The yellow Gel/Menbrane (UF)*

D-Discussion

Through the results obtained by IR and DRX analysis, we were able to confirm the purity and crystallinity of our ultrafiltration menbrane. This originality of result is due to the existence within our molecule (UF) of solid and energetic inter-atomic chemical bonds between the different chemical elements, C, H, N and O.

E-Conclusion

Our research on new materials intended for the field of cosmetics, allowed us to present a new natural molecule based on betacyanin, as an energy dye and high light absorption index; which allows it to protect the skin from any waste from the body or from the external environment.

References

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