PRELIMINARY STUDIES CONCERNING THE RHEOLOGICAL STABILITY OF CERTAIN PHARMACEUTICAL FORMULATIONS WITH CONTROLLED ACTION IN THE FIELD OF NANOMEDICINE

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Nanomedicine is a field which requires elaborated studies with a view to explaining, understanding and treating multiple diseases widely spread among humans.

The fundamental substance of the gum chorion, by its chemical composition and the polymerization degree of its macro-molecules favour cellular movement and the distribution of biologically active substances. This important characteristic of the fundamental gum substance allows us to use collagen gels mixed with active ingredients in the extracts from marine algae in innovative parodonthal biotherapy.

In order to obtain therapeutic effects at nanostructure level, it is important to know the rheological characteristics of the relevant mixtures of collagen gels and extracts from marine algae selected for use, [1,2,3].

In this survey we have studied mixtures made of non-denatured fibrillar collagen hydrogels where different concentrations of marine algae have been incorporated.

The gels studied are shown in table 1

Table 1. Collagen gels without/with prepared extracts from algae,

Alga extract	The gel's aspect	No. Samples
Without alga extract	Colourless, clear Colourless, clear Colourless, barely opalescent	SAMPLE 1 SAMPLE 2 SAMPLE 3
Brown alga CYSTOSEIRA BARBATA	Opalescent, yellowish green More opalescent, brownish yellow	SAMPLE 1 SAMPLE 2
Green alga ULVAE LACTUCA	Clear, barely green Barely opaque, barely green	SAMPLE 1 SAMPLE 2
Red alga CERAMIUM RUBRUM	Barely opalescent, yellowish green A degree more opalescent, brownish yellow	SAMPLE 1 SAMPLE 2

Gels in table 1 have been subjected to the rheological measurements at 25 ± 0.1^0C, after at least 15 minutes of thermostatic treatment at the above-mentioned temperature. To this effect, we have used a rotation viscosimeter Haake VT 550 with coaxial cylinders, which is capable of developing a shearing speed, $\dot{\gamma}$, with values between 0.6 and $3.0.10^4$ s^{-1}, of measuring shearing tensions, τ, with values between 1 and 10^5 Pa and, depending on the sensors system used, of measuring apparent viscosities, η^*, between 1 and 10^9 mPa.s.

Based on the data obtained for the shearing tensions, we have traced the rheograms – the diagrams for shearing tensions depending on the shearing speed values – from which we have calculated the apparent viscosities as ratios between shearing tension and speed values, which have been figured in relation to the shearing speed values, with a view to levelling dependency.

Table 2. Characteristics of 0.6 % collagen gels which contain extract of CYSTOSEIRA BARBATA

Extract content in gel, % (g/100g gel)	Viscosity at zero shearing speed, mPa.s	Rheological behaviour
5	2084,97	Pseudoplastic
10	2813,94	Pseudoplastic

Table 3. Characteristics of 0.6 % collagen gels which contain extract of ULVAE LACTUCA

Extract content in gel, % (g/100g gel)	Viscosity at zero shearing speed, mPa.s	Rheological behaviour
5	3248,96	Pseudoplastic
10	2978,05	Pseudoplastic

Table 4. Characteristics of 0.6 % collagen gels which contain extract of CERAMIUM RUBRUM

Extract content in gel, % (g/100g gel)	Viscosity at zero shearing speed, mPa.s	Rheological behaviour/Remarks
5	2386,59	Pseudoplastic
10	3065,66 2656,64	Pseudoplastic, with all points Value without the final point

The rheograms have shown the type of rheological behaviour for each gel. Tables 2, 3 and 4 show the characteristics of 0.6% collagen gels, with the selected marine algae types.

Based on the studies performed, we can reach certain conclusions as to the stability of mixtures in time, as well as certain associations concerning the possibility to transfer active ingredients to the affected tissues.

References

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