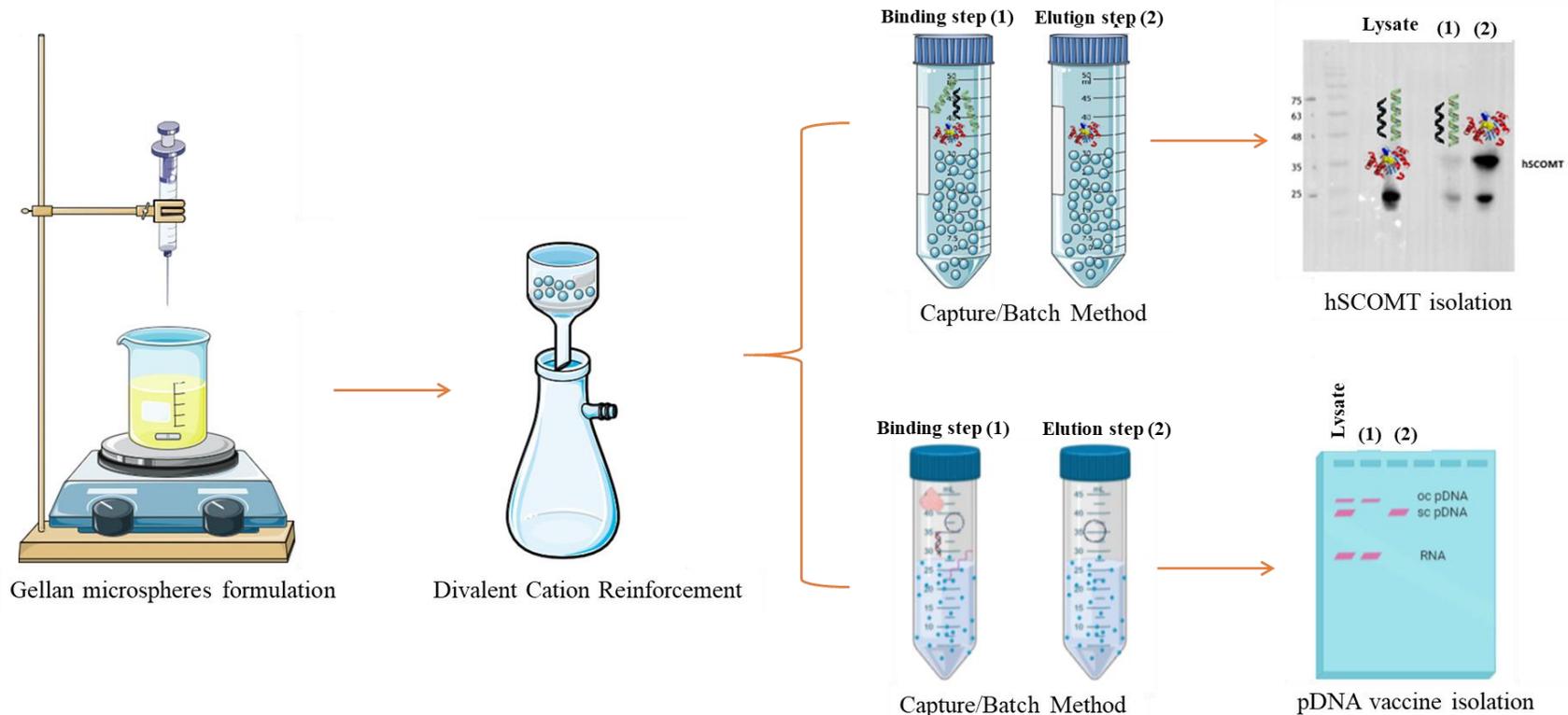


Gellan microspheres affinity towards biopharmaceuticals isolation from complex cell lysates

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1. Introduction

Biopharmaceuticals as plasmid DNA and human soluble catechol-O-methyltransferase (hSCOMT) represent a great value for the society since they are being used or targeted in the treatment of several diseases. Typical biotechnological process to obtain these biopharmaceuticals involves several steps, which becomes expensive to the pharmaceutical industry.

Crucial to explore new alternatives

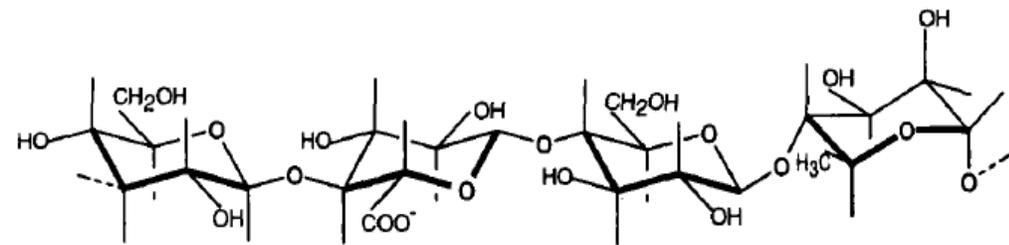
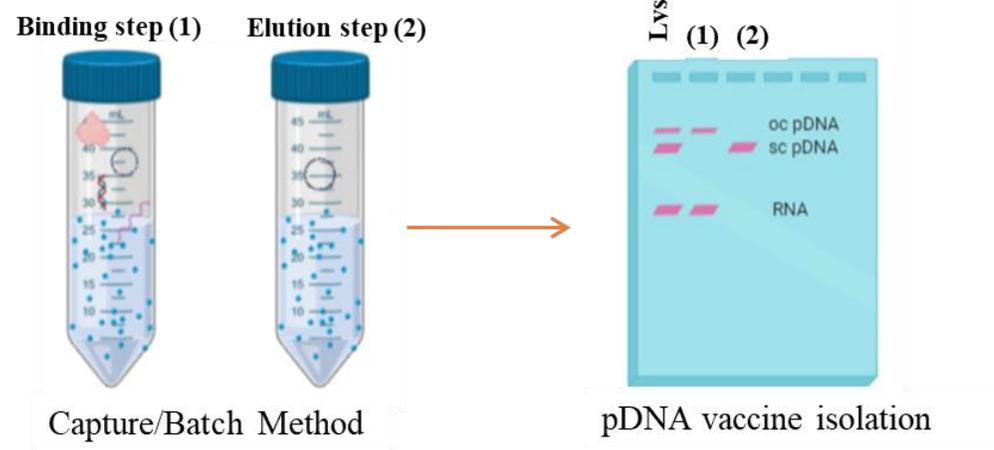
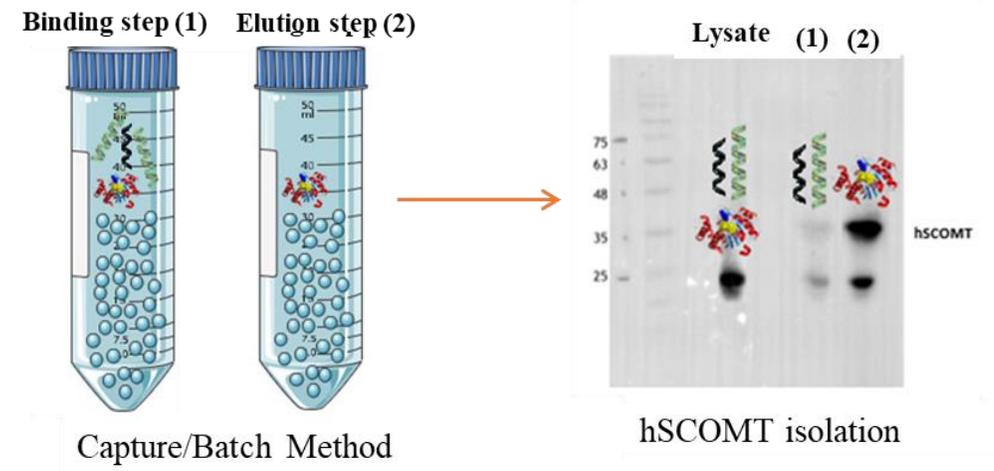
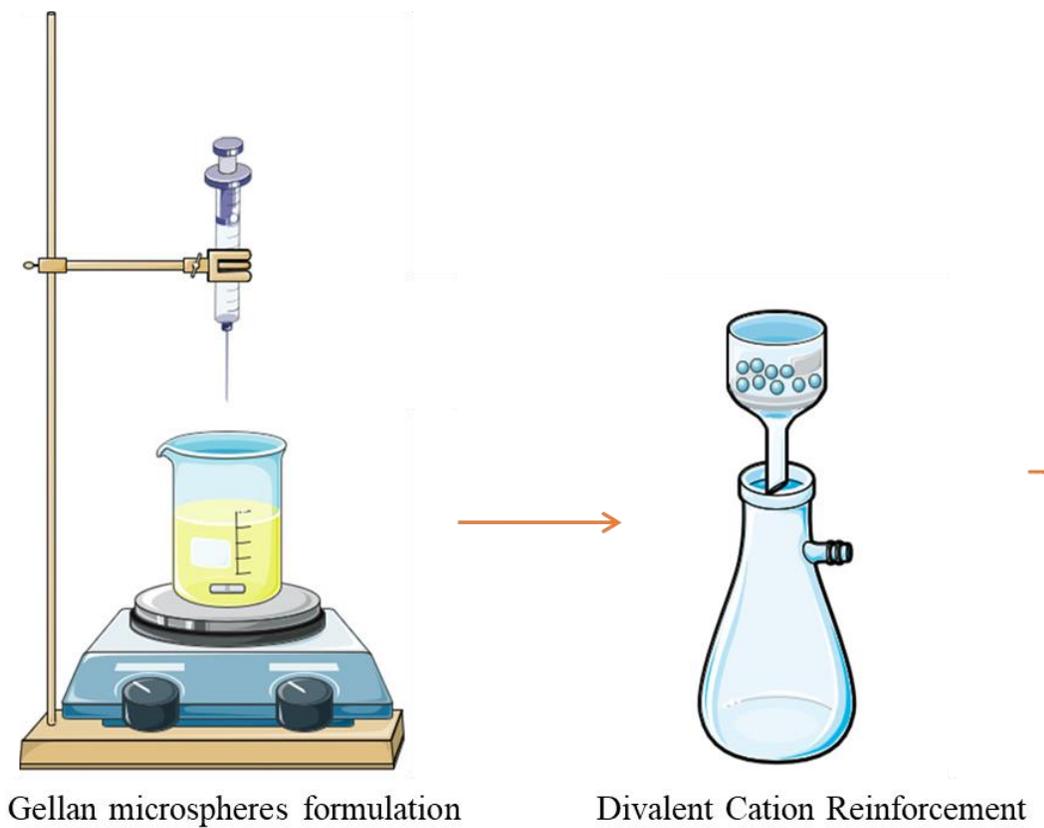
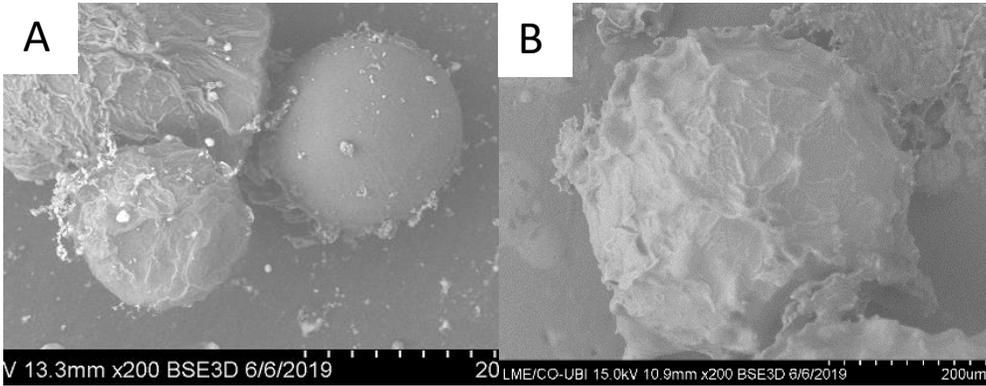


Figure 1: Molecular structure of gellan gum.

2. Methods

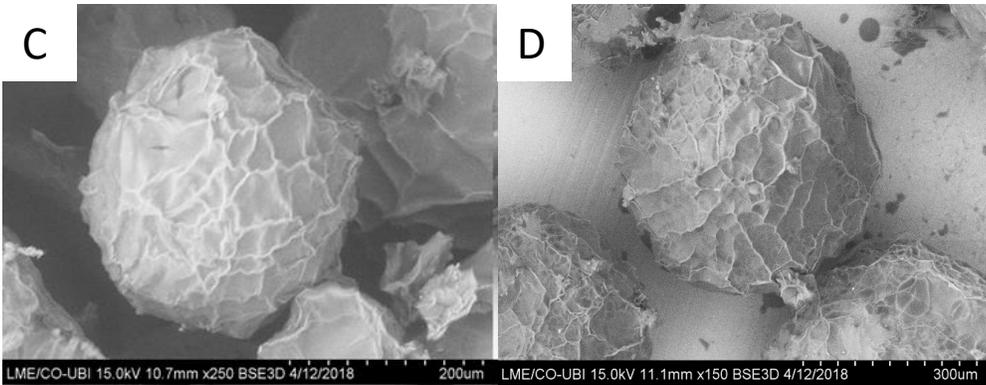


3. Results and Discussion



A: Copper-crosslinked microspheres (365 μm)

B: PEI-functionalized microspheres (304 μm)



C: Nickel-crosslinked microspheres (240 μm)

D: Magnesium-crosslinked microspheres (300 μm)



pDNA capture strategies

All formulations present a spherical shape.

The reinforcement of microspheres with divalent cations was successful (EDX).

All formulations have a stability higher than 20 days.



hSCOMT capture strategies

3. Results and Discussion

pDNA capture strategies

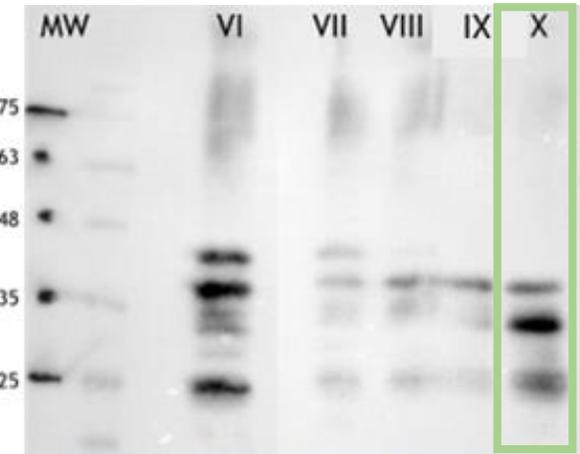
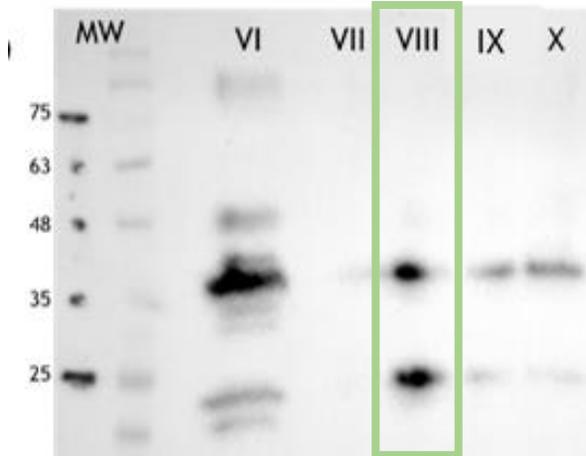
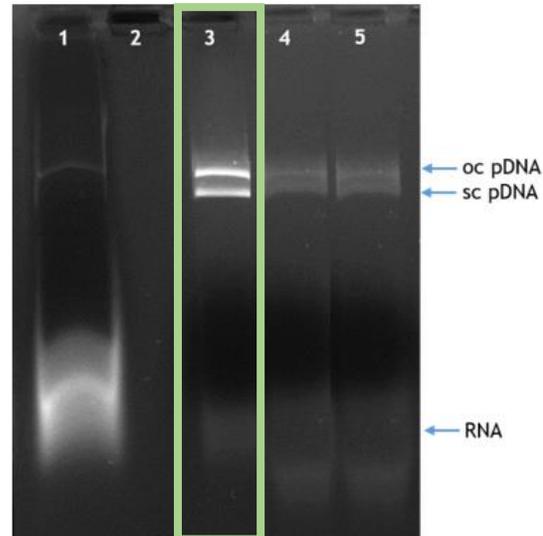
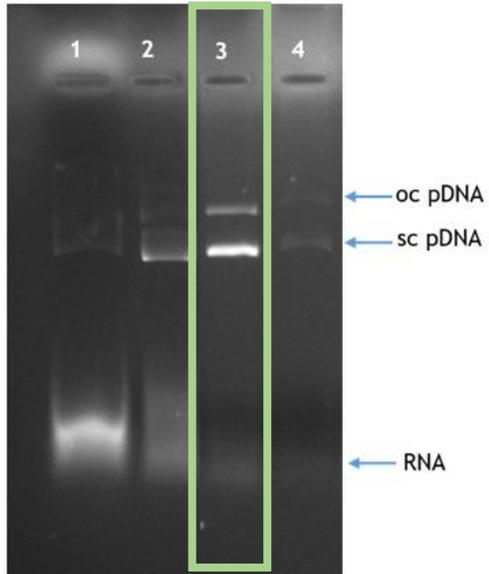
hSCOMT capture strategies

Copper-crosslinked microspheres

PEI-functionalized microspheres

Nickel-crosslinked microspheres

Magnesium-crosslinked microspheres



Elution: 200 mM NaCl in Tris-EDTA, pH 8.0

Elution: 200 mM NaCl in Tris-EDTA, pH 10.5

Elution: 100 mM NaCl in 10 mM MES, pH 6.2

Elution: 250 mM NaCl and 500 mM MgCl₂ in 10 mM MES, pH 5.2

3. Results and Discussion

Table 1 - Recovery yield and purity degree of the pDNA and hSCOMT elution steps with the respective gellan microspheres formulations.

Gellan Microspheres Formulation	pDNA elution step		hSCOMT elution step	
	Recovery yield (%)	Purity Degree (%)	Bioactivity recovery (%)	Purification (fold)
Copper-crosslinked microspheres	15.61	2.42	-	-
PEI-functionalized microspheres	88.09	3.18	-	-
Nickel-crosslinked microspheres	-	-	200	77.37
Magnesium-crosslinked microspheres	-	-	19	0.73

Demonstrated the versatility of gellan microspheres in clarifying biopharmaceuticals complex samples, which can be applied in biotechnological platforms, reducing the time, costs and manipulations associated with following purification steps.