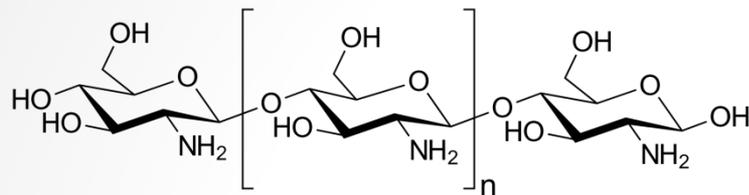


# Heteroaromatic polyphenolic systems based on chitosan

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# Aims



**Chitosan**



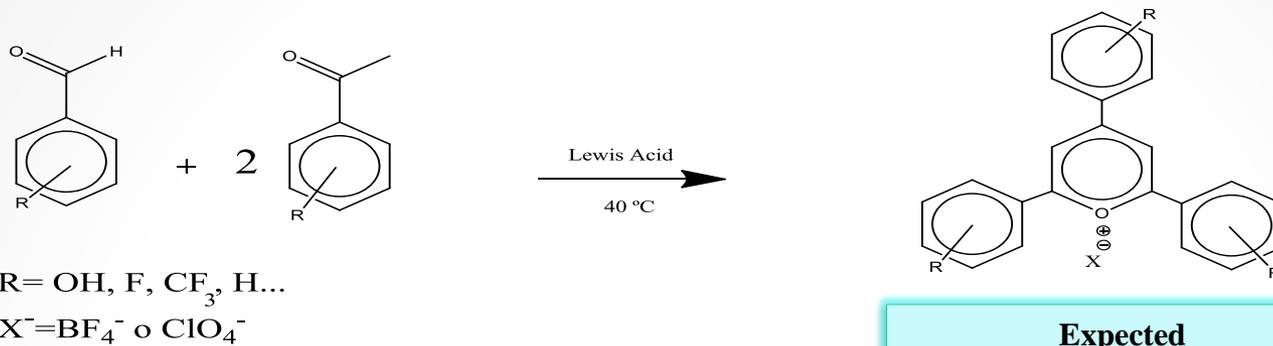
**Polyphenolic compounds**

## **POLYPHENOLIC SYSTEMS BASED ON CHITOSAN**

Compounds with expected...

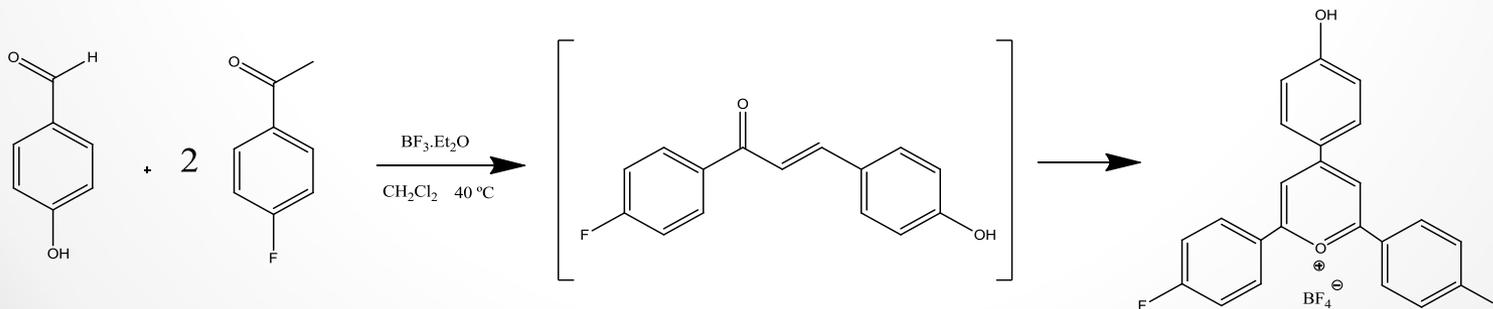
- High biological activity
- High photophysical properties
- Multivalent presentation of polypyphenolic systems through chitosan

# Synthesis of polyhydroxysubstituted heteroaromatic complexes



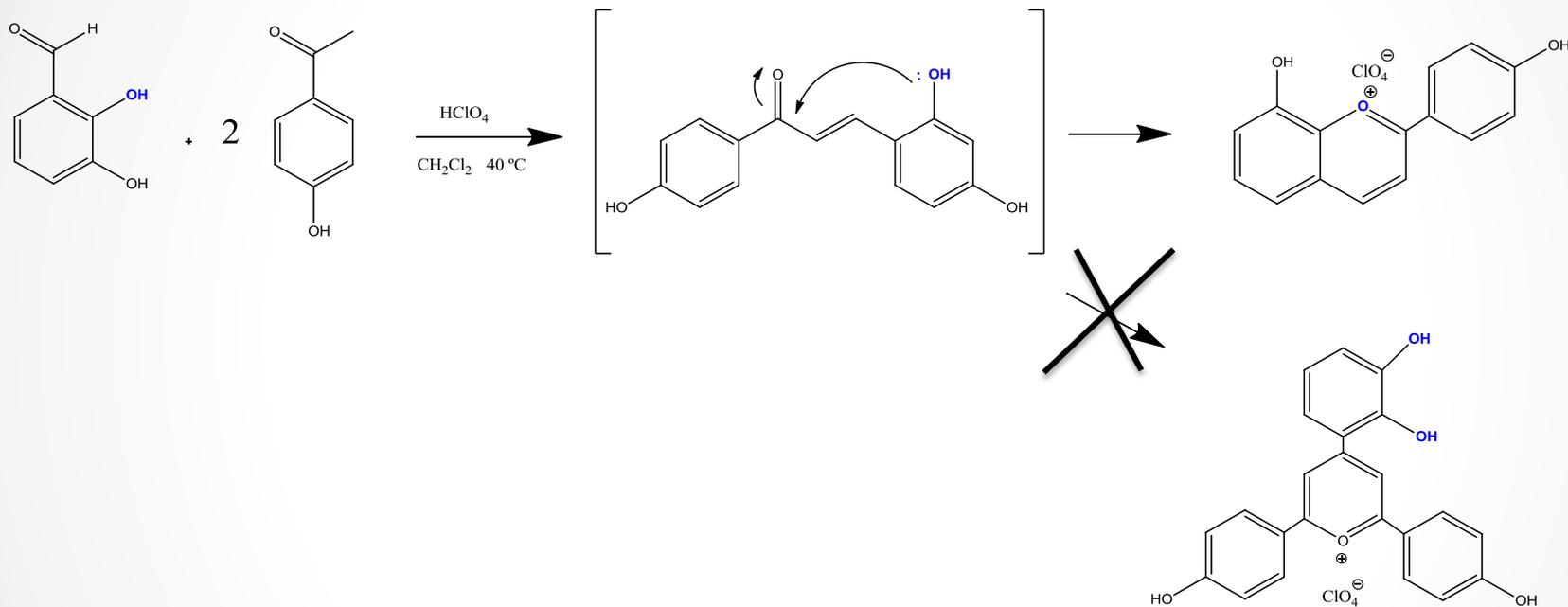
- ❖ Methodology used was previously optimized for this laboratory to obtain ***p*-substituted pyrylium salts**
- ❖ First aim was the synthesis of polyphenolic pyryliums salts, but the presence of any other kind of compounds was detected in some cases by RMN and HRMS: 3-desoxyanthocyanins and flavonoids

## 1) Pyrylium salts



# Synthesis of polyhydroxysubstituted heteroaromatic complexes

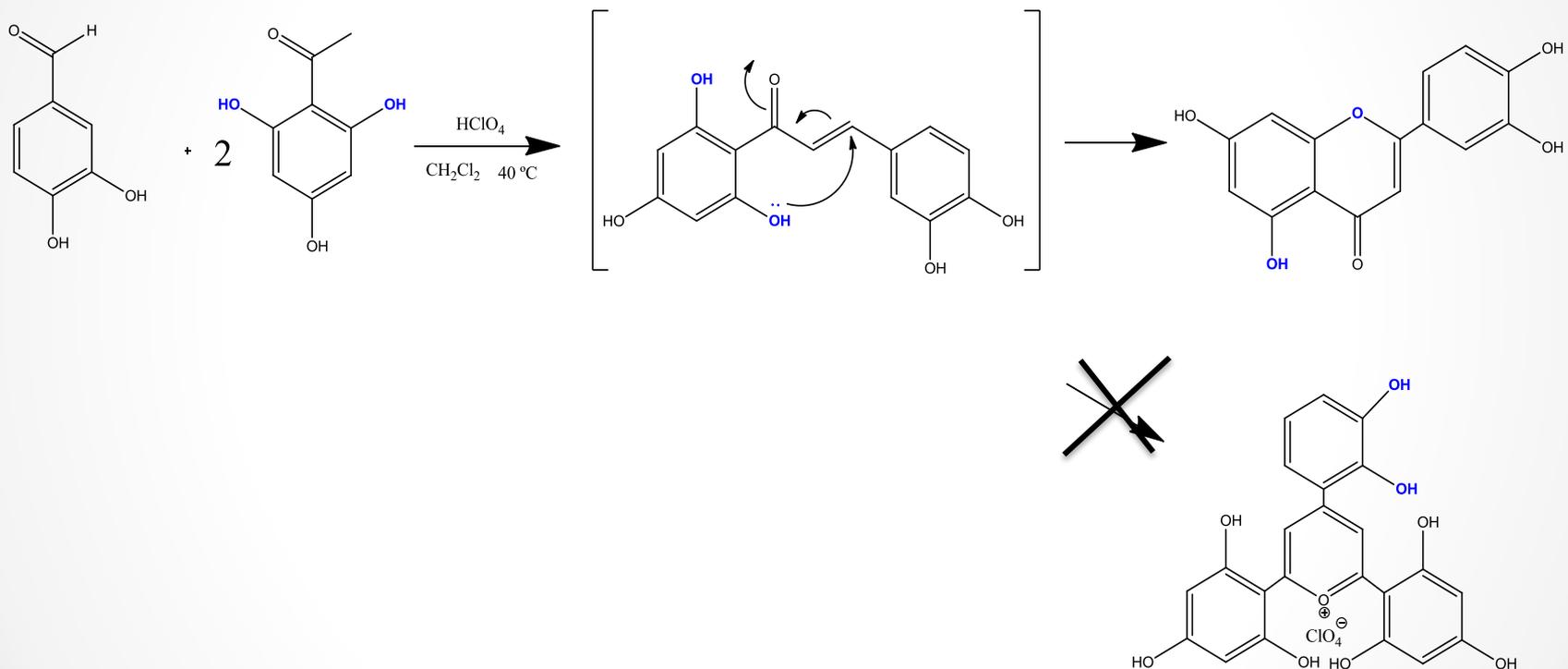
## 2) 3-desoxyanthocyanins



Intramolecular reaction occurs due to the presence of an hydroxy group in ortho-position of benzaldehyde

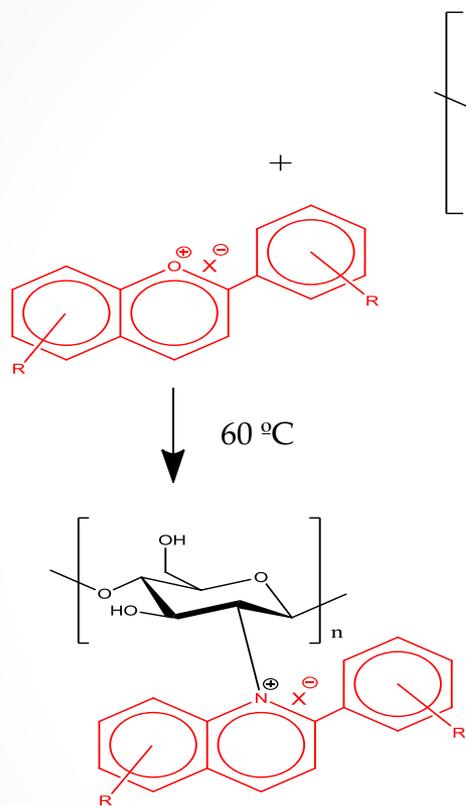
# Synthesis of polyhydroxysubstituted heteroaromatic complexes

## 3) Flavonoids



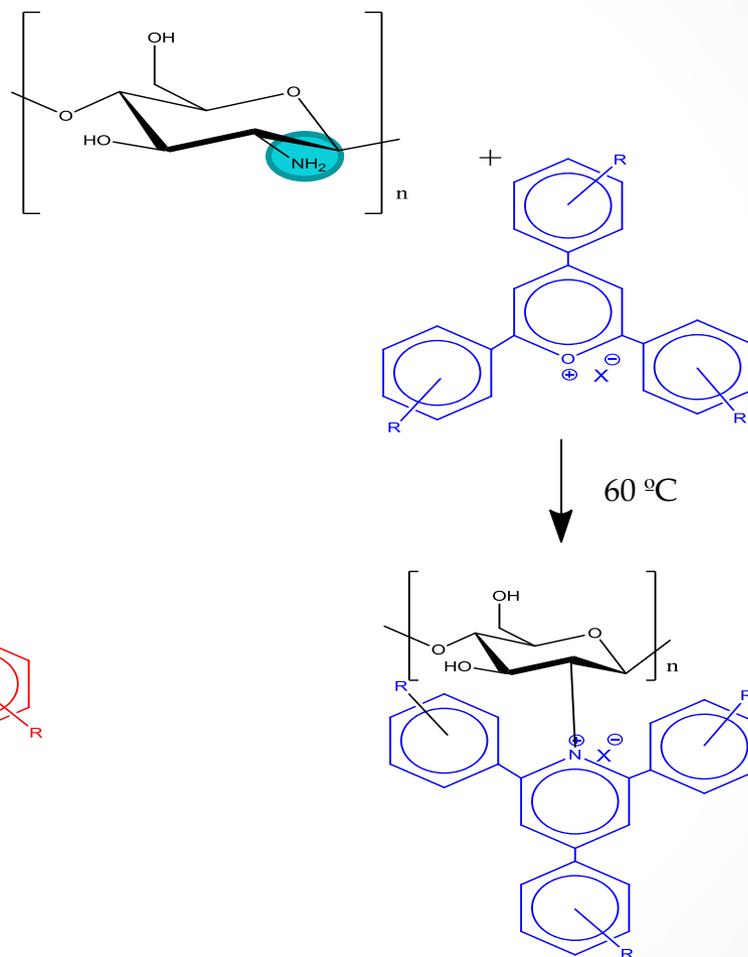
Intramolecular reaction occurs due to the presence of an **hydroxy group in ortho-  
position of acetophenone**

# Chitosan Cromylum and Pirylium derivates



R = OH, F, CF<sub>3</sub>, H...  
X<sup>-</sup> = BF<sub>4</sub><sup>-</sup> o ClO<sub>4</sub><sup>-</sup>

**Pyridium**

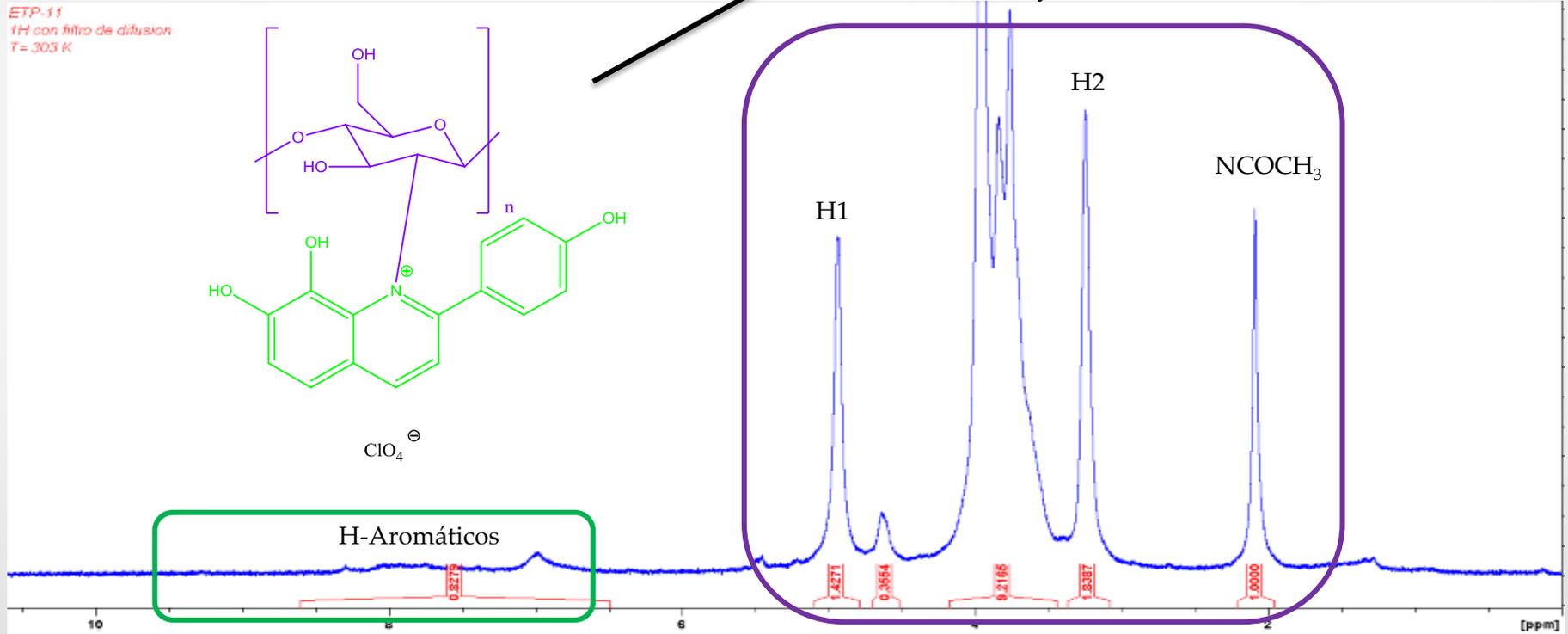


**Quinolinium**

# Degree of Substitution (DS)

$$DS (\%) = \frac{\frac{I(H-Aromatic)}{n(Aromatic)}}{\frac{I(H2-H6)}{6}}$$

DS (%) (Example) = 10,3 %



<sup>1</sup>H-RMN (500 MHz) of chitosan derivate solved in CD<sub>3</sub>COOD/D<sub>2</sub>O:

# Conclusion and future work

- ❖ Reaction of polyhydroxysubstituted acetophenones with substituted benzaldehydes not only lead to pyrylium salts as expected, but 3-desoxyanthocyanins and flavonoids are also obtained.
- ❖ Benzaldehydes with an hydroxy group in ortho position lead to 3-desoxyanthocyanins while acetophenones with an hydroxy group in same situation originate flavonoids. On the other hand, when there is no exist *ortho* hydroxy group neither in benzaldehyde nor acetophenone, chalcone or pyrylium salt is obtained.
- ❖ New quaternized derivatives of chitosan have been synthesized, specifically pyridinium and quinolinium salts derived from chitosan by reaction of the biopolymer with the corresponding salts of pyrylium and cromylium, respectively.
- ❖ Photophysical properties and antioxidant capacity of these new compounds must be studied.