

# Comparison of synthetic polymeric disintegrants mainly used for orodispersible tablets manufacturing

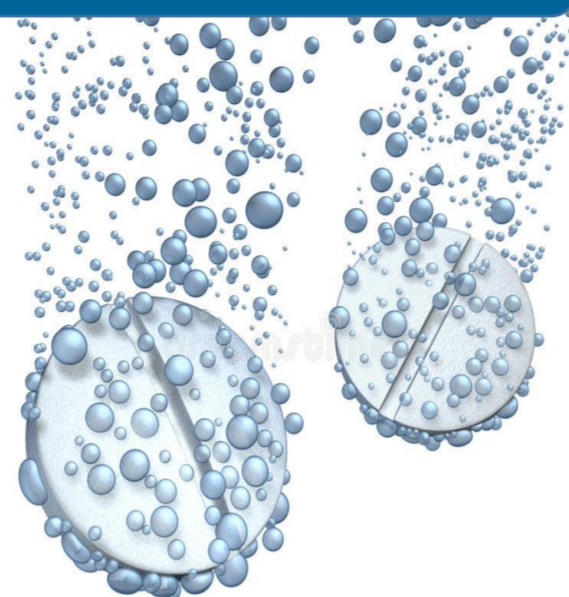
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## 1. Introduction

### Orodispersible tablets (ODTs) advantages:

- rapid dissolution
- easy administration
- improved bioavailability [1]



### Direct compression

#### Advantages:

- simple and economic manufacturing process
- less variable dissolution profiles of tablets
- reduced tablet friability

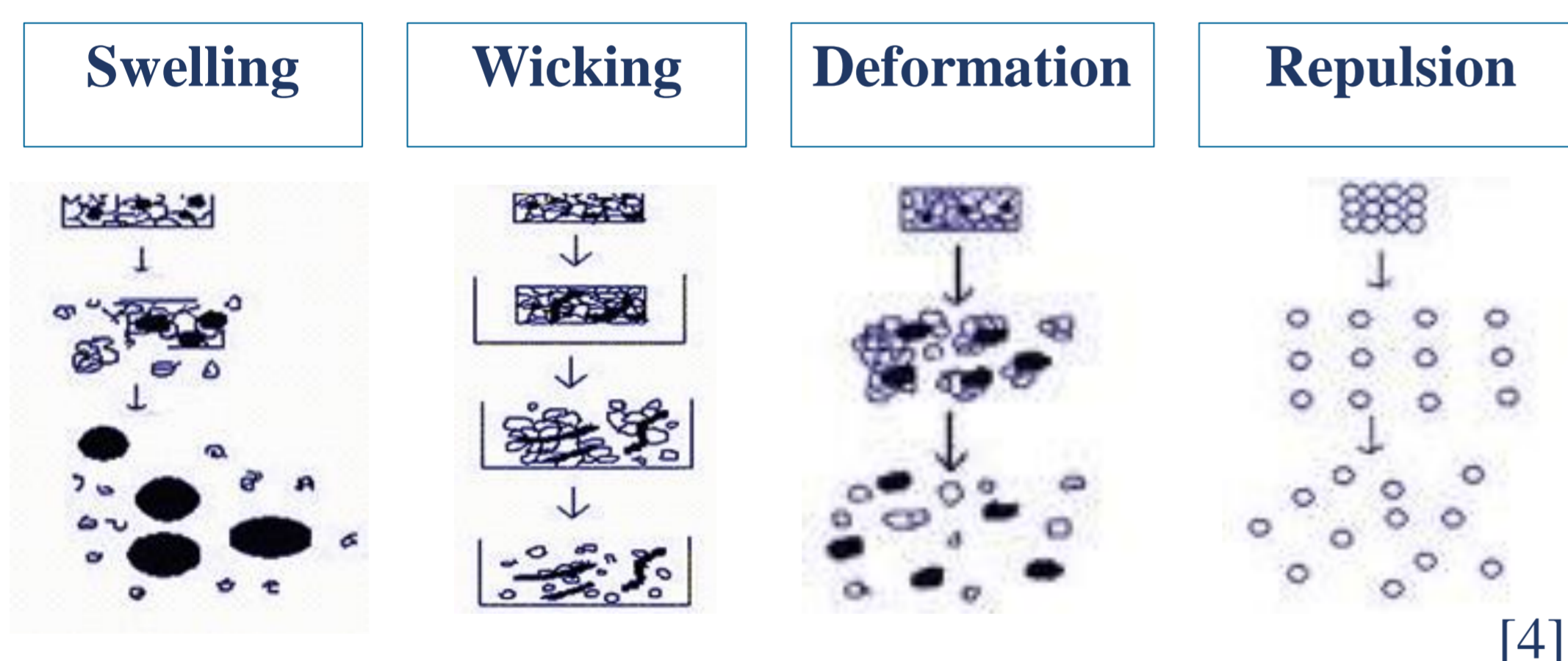
#### Disadvantages:

- good mechanical strength and fast disintegration difficult to achieve
- thickening of the external tablet film caused by polymer particles
- pH dependent polymer solubility
- incompatibility of polymer with other excipients [2]

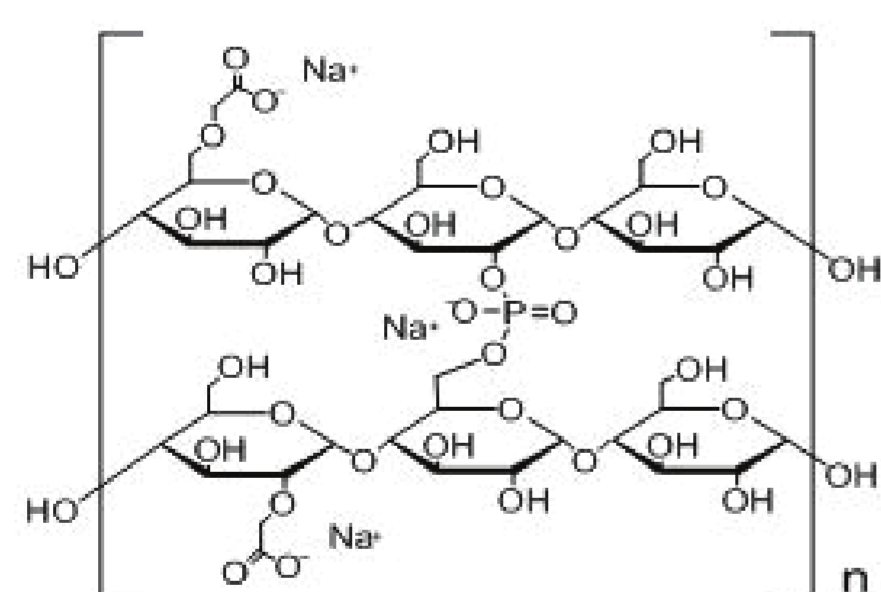
## 2. Disintegrants

- opposite action to tablet binder
- provide shorter disintegration time and enhanced drug dissolution
- effective in low concentration
- essentially important for adequate flowability and compressibility of the formulation [3]

### Mechanism of tablet disintegration

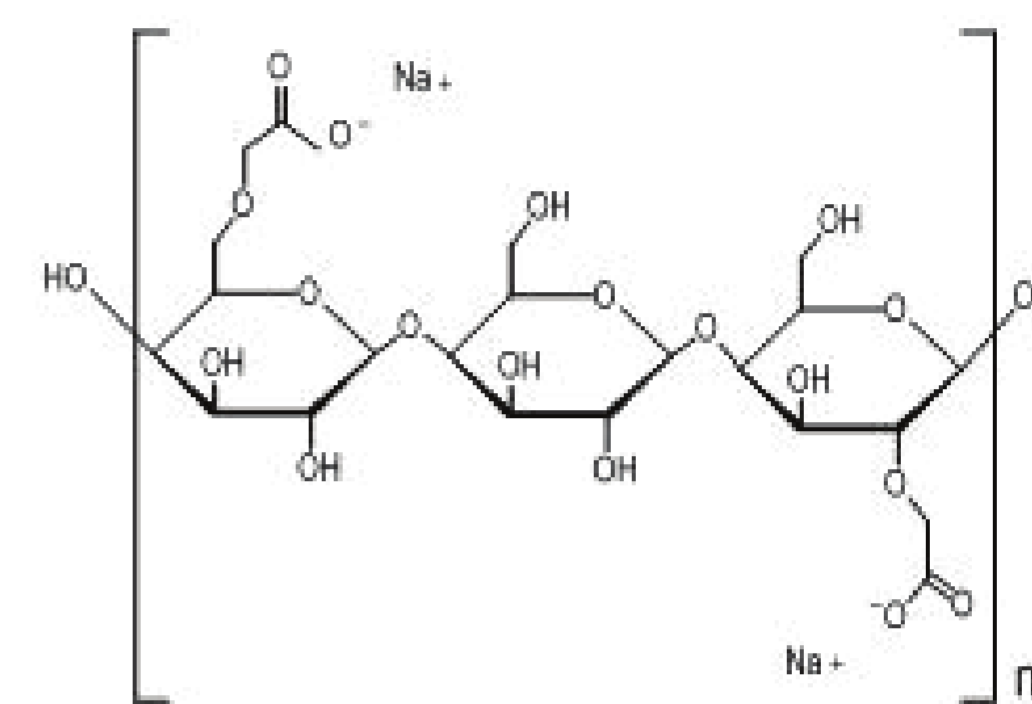


## 3. Sodium starch glycolate



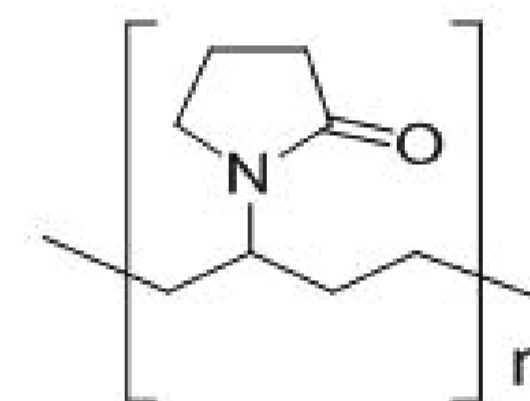
- cross-linked sodium salt of a carboxymethyl ether of starch
- effectiveness dependent on degree of cross-linking and substitution
- cross-linking reduce water-soluble polymer fraction and dispersion viscosity
- large carboxymethyl groups obstruct hydrogen bonding and facilitate fluid penetration
- rapid and uniform absorption due to swelling
- gelling and unpleasant feeling of gum texture in high concentration
- capacity and rate of liquid uptake reduced in acidic medium [5]

## 4. Croscarmellose sodium



- cross-linked polymer of carboxymethyl cellulose sodium
- cross-linking carried out by carboxy-methyl groups due to dehydration results in carboxyl-ester crosslinks
- rapid disintegration due to swelling and wicking, highly porous structure and low interfacial tensions toward aqueous fluid
- applicable for direct compression and wet-granulation
- gelling decreased compared to sodium starch glycolate
- swelling capacity disrupted by medium ionic strength [6]

## 5. Crospovidone



- homopolymer of N-vinyl-2-pyrrolidone
- very fast disintegration due to swelling and wicking
- high porosity provide rapid liquid penetration
- good compressibility due to specific particle morphology
- high crosslink density
- no tendency to form gel structure even in high concentration
- greatest rate of swelling and surface area to volume ratio
- best organoleptic characteristics
- robust tablets [7]

## 6. Conclusion

- moisture penetration and dispersion of the tablet matrix promoted by disintegrants very important for the rapid drug dissolution from ODTs
- crospovidone excels compared to sodium starch glycolate and croscarmellose sodium for direct compression ODTs manufacturing thanks to its specific particle morphology, high porosity and crosslink density

## References

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