

Hydrocolloid

1.

가 , , ,
 가 , 가 glucan,
 amylose amylopectin
 amylose 20 25% ,
 - 1,4- D- glucose 2×10^6 g/mol
 - 1,6- 가 가 amylose
 , inclusion
 complex , amylose
 가 amylose
 (Maningat and Juliano,
 1980). Amylopectin - 1,4-
 4 6% - 1,6- 가 가
 amylose 100 cluster

(Blanshard, 1987) amylo- pectin

amylose amylopectin

amylopectin

cluster

amylose가 amylo-

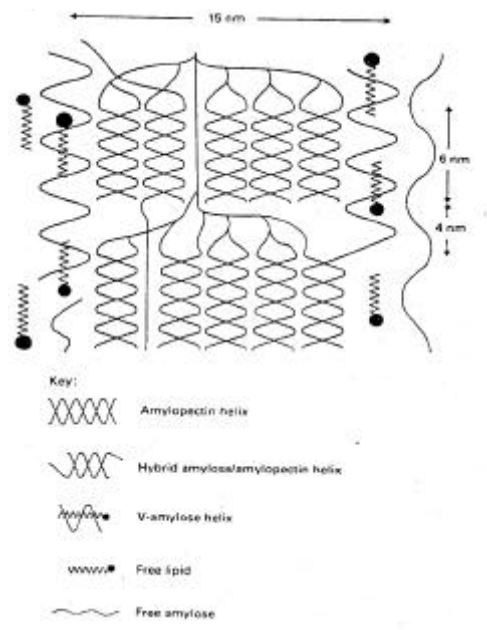


Fig. 1. Model of starch crystallite showing the possible positioning and interactions of various component. (Tashiro and Ebata, 1975)

pectin

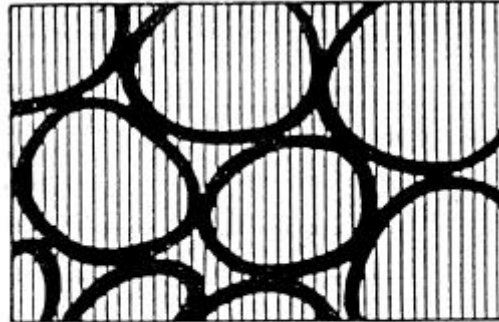
가
(Fig. 1).

1987, Hood, 1982).

(Blanshard,

가

가
X 가
가 가



— gelatinized "swollen" granule
— amylose matrix

Fig. 2. Scheme of starch paste (Morris, 1990)

Table 1. Some factors influencing the rheological behavior of starch paste (Eliasson, 1986)

가

가

(Donovan, 1979,

Gudmundson et al., 1990, Biliaderis, 1994, Biliaderis et al., 1986, 1980, Nishinari et al., 1994, Zeleznak and Hosoney, 1986, Ring, 1985). Biliaderis(1994)

가
helix-coil 가

가

. Miles

(1985)

2
amylose 가
amylopectin 가

Dispersed phase : starch granule

- Concentration
- Granule size and size distribution
- Shape of granules
- Swelling pattern of the starch
- Granule rigidity and deformability

Continuous phase : amylose/ amylopectin matrix

- Viscoelasticity of the phase
- Amount and type of amylose / amylopectin which leached from the granules
- Entanglements

Interaction between the components

- Granule-granule interactions
- Granule-amylose/ amylopectin interactions
- Granule-amylose/ amylopectin-granule interactions
- The surface of the starch granules

2.

amylose

integrity

medium

가 가 (Fig. 2).

amylopectin

amylose

2 (two phase sys- tem)

(Doublier et al., 1987).

2가

(Table 1).

volume fraction

(Fig. 3)

amylose가

amylopectin

2

shear modulus

가

amylose

. Amylose

가가

volume fraction

가

가

가

fraction

volume

amylose

(C.)

. Bagley Christianson(1982)

가 Doublier (1987)

volume fraction

C.

$$= (1-S/100) \times C \times G \quad (6)$$

$$C = 1/(1-) \times C \times S/100 \quad (7)$$

S (g/100g), C

(g/g), G (g/g)

$$= \times f() \quad (8)$$

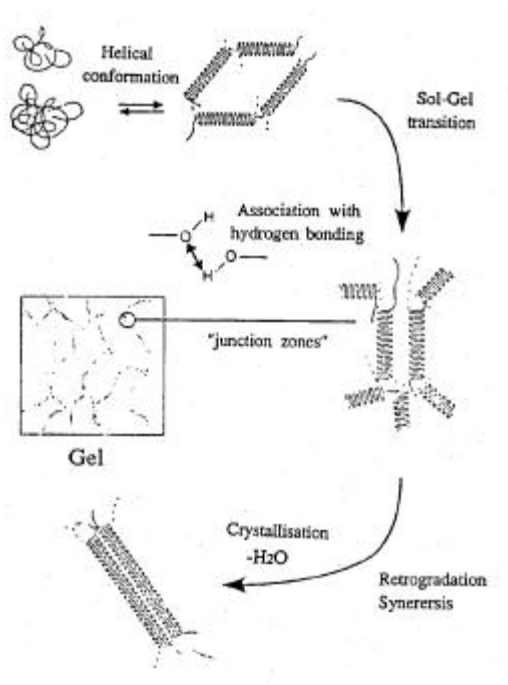


Fig. 3. Scheme for molecular mechanism of starch retrogradation. (Liehr and Kulicke, 1996)

가 modulus 24 shear modulus 24 amylose shear modulus 가 modulus 가 가 . Amylose 가 modulus

amylose (Doublier, 1987). Amylose 3 storage modulus loss modulus amylose 가 polymer-rich phase polymer-poor phase . 2 storage modulus 가 loss modulus polymer-rich phase가 network storage modulus가 가 polymer-rich phase amylose network . storage modulus가 가 . 3 storage modulus 가 가 가 amylose (Alloncle et al., 1989).

3. Hydrocolloid

가 amylose amylopectin amylose amylopectin amylose amylopectin 50%

가 . 가 가 가 . (Miles et al., 1985). amylose- , , (Doublier and Choplin, 1989, Hizukuri and Takeda, 1978, Hikone, 1998). Savage Osman(1978) glucose, galac- tose, fructose, maltose, sucrose, lactose, so- rbitol, mannitol 가 5, 20, 50% 가 가 가 가 . Nishinari (1990) -carrageenan glucose, sucrose, urea, guanidine, hydro- chloride 가 가 urea . Spies Hosney (1982) sucrose 가 가 가 , Bean (1978) glucose, fructose, sucrose 가 suc- rose가 가 가 가 Gudmundsson Eliasson(1990) amylose, amylopectin / cetyltrimethyl ammonium bromide sodium dodecyl sulfate monogl- yceride 가 X- DSC 가 amylopectin 50% amylopectin amylose amylopectin 50% amylose /

hydrocolloid

Hydrocolloid
and Rha, 1978).

(Olkku 가
(Ring, 1985, Sajjan and Rao, 1987).

/hydrocolloid
가 hydrocolloid가
miscibility

가 (Bagley . 2 phase
and Christianson, 1982). Yoshimura Nis- network
hinari(1996) glucomannan incompati- bility .
glucomannan 가 가
, 가 3 가 가
glucomannan . 가
amylose hydrocolloid
가
hydrocolloid 가 (Eliasson, 1986, Christianson, 1982).
가 syneresis가
가
hydrocolloid 가
가 Hydrocolloid 가 /
integrity , 가
hydrocolloid 가 , 가
, amylose hydrocolloid
2가 . arabinoxylan, - glucan
(Bagley and Christianson, 1982, Sajjan and
Rao, 1987, Bahnassey and Breene, 1994).
integrity hydro- 가
colloid 가
filler particle .
(Eidam et al., 1995, Doublier, 1987). 4.
volume fraction 2 Alloncle, M. and Doublier, J.L. 1991.
(Alloncle and Dou- Viscoelastic properties of maize starch/ hyd-
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