TECHNICAL APPLICATION
INFORMATION

Herbstreith&Fox

Jams and Fruit Spreads with optimum Fruit Distribution

Jams and Fruit Spreads with optimum Fruit Distribution

The use of pectin as gelling and thickening agent has a long tradition in the production of fruit spreads and fruit preparations for industrial processing. Besides the traditional jams also fruit spreads with high fruit content and reduced sugar input find more and more the consumers' interest due to their naturally fruity flavour. Because of the high fruit content and the lower sweetness these products meet both consumers' demands and the current trend of today.

In addition to a pleasant texture and a naturally fruit typical flavour, the preservation of fruits as well as an optimum fruit distribution in both glassware and containers are decisive quality criteria in the industrial production of fruit preparations containing whole fruits or fruit pieces. In this connection texture and gelling properties of the fruit preparations essentially depend on recipe parameters such as soluble solids content, type of sugar, addition of buffer salts, pH-value of the product as well as the used pectin type and filling temperature.

H&F have developed pectins which, due to their rheological properties, prevent rising of the fruits and fruit pieces in the container already at high filling temperatures resulting in products with a pleasant texture and low tendency to syneresis.
The application of these H&F pectins guarantees an assured production process to the producers of fruit preparations and products with optimum and constant quality are obtained.

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		Tendency to Floatation at Filling Temperature		
Fruit	**Piece Size**	**< 40°Bx**	**40°Bx**	**> 40°Bx**
raspberry	broken	lower	low	higher
peach	6mm dices		medium	
cherry	whole fruit		medium	
strawberry	16mm dices		high	
	10mm dices		high	
	whole fruit		very high	

Critical yield stress

Reasons for Floatation of Fruits (Floating)

An uneven fruit distribution caused by rising of the fruits (floating) is a frequently occurring problem in the production of fruit preparations with whole fruits or fruit pieces.

The lower soluble solids content of the fruits compared with the ambient medium, the so called syrup, is responsible for the floating of fruits. The syrup mainly consists of sugar and water and is distinguished by a higher soluble solids content than that of the fruits. Due to this difference in density the fruits are exposed to a buoyancy force thus rising in the syrup.

The lower the density of the fruits and the higher the soluble solids content of the syrup, the higher is the buoyancy force which the fruits are exposed to and thus their tendency to rise in the fruit preparation.

In the production of fruit preparations and especially for products with higher soluble solids content and with technologies with shorter cooking times floating can be observed more often than in fruit spreads with lower sugar content and technologies with longer cooking times.

Furthermore, type and form of the fruits used have great influence on fruit distribution. Whole fruits show a higher tendency to rise than smaller fruit pieces. Fruits with lower density such as strawberries also tend more often to rise than more compact fruits such as raspberries. In fruit preparations with cherries there is additionally another floating factor due to a slower compensation of soluble solids caused by the skin.

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Prevention of Floatation in Fruit Preparations

The difference in density between fruit and syrup which is responsible for the fruits to rise can be reduced by e.g. prolonged cooking times or by storing the fruits in sugar prior to the cooking process.
In industrial production, the fruits are often defrosted together with sugar in order to initiate this compensation of soluble solids.
In practice, however, plants demand shorter processing times and aim for energy costs as low as possible.

Another possibility would be to decrease the filling temperature. With a lower filling temperature the viscosity of the fruit preparation increases and the buoyant force decreases.
If, however, the filling temperature is selected too low and comes close to the setting temperature of the fruit preparation, it will be possible that pre-gelation occurs. The final products are of less quality and show a weak gelation as well as an uneven and coarse texture often tending to syneresis.
Additionally in the production of glassware microbiological problems may occur due to the reduced filling temperature, if there isn't an additional pasteurisation step after filling.

Measure	Benefits	Possible Disadvantages
maximize heat viscosity	increase of viscosity	will destroy fruit pieces
reduce filling temperature	increase of viscosity	pre-gelation, microbiological problems
adapt density of particles to density of syrup, e.g. by prolonging cooking time	reduce difference in density	off-taste caused by long cooking time, long production time
reduce size of fruit pieces	reduction of buoyancy	fruit pieces too small
maximize agitation	even distribution of fruit pieces	will destroy fruit pieces

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H&F offers Solutions to Prevent Floatation by Selecting the Suitable Pectin

H&F have developed special pectins for fruit preparations which are able to surely prevent the rising of fruits in formulations with soluble solids ranges from 35 up to 65%.
The advantange of these special pectins is that they form a sufficiently high yield point already during the cooking process forming a weak, elastic gel structure. The fruits or fruit pieces are embedded in this structure and are distributed evenly thus they cannot rise even at high filling temperatures.

At the same time it is guaranteed that the final products show a pleasant texture.

The producer of fruit preparations has lots of possibilities of selecting the recipe and is able to produce exactly "his" product, because the anti-floating pectins from H&F guarantee an assured processing resulting in high quality products which completely meet the high demands on fruit preparations regarding both texture and flavour.

Pectin Classic AF 504 for Products > 60% Soluble Solids Content

Pectin Classic AF 504 is a medium methylester apple pectin providing an even fruit distribution in products with a soluble solids content > 60% TSS already at high filling temperatures.

Fruit spreads produced with Pectin Classic AF 504 are particularly well spreadable and show a bright, smooth texture. The natural fruit flavour is additionally enhanced by the apple pectin.

Herbstreith & Fox KG — **Recipe**

Extra Jam

Pectin Classic AF 504

80g	Pectin solution 5% (= 0.4%)
450g	Fruit
420g	Sucrose, crystalline
200g	Glucose syrup
x ml	Citric acid solution 50% to adjust the pH-value

Input:	approx. 1150g
Output:	1000g
TSS:	approx. 63%
pH-value:	approx. 3.0

Manufacture

A Preparation of pectin solution see „Technical Application Information".
B Mix fruit, glucose syrup and sucrose and heat up to approx. 90°C.
C Add hot pectin solution and boil until final soluble solids content is reached.
D Add citric acid solution to adjust the pH-value.
E Filling temperature 80°C.

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Pectin Classic AF 711 for Products with 50-60% Soluble Solids Content

Pectin Classic AF 711 is a low methyl ester apple pectin which prevents floating of the fruits in products with a soluble solids content of approx. 55% TSS. The gels have body, are particularly well spreadable and show low tendency to syneresis.

Herbstreith & Fox KG — **Recipe**

Fruit Spread

Pectin Classic AF 711

120g	Pectin solution 5% (= 0.6%)	
450g	Fruit	
340g	Sucrose, crystalline	
200g	Glucose syrup	
x ml	Citric acid solution 50% to adjust the pH-value	
	Input:	approx. 1110g
	Output:	1000g
	TSS:	approx. 55%
	pH-value:	approx. 3.2

Manufacture

A Preparation of pectin solution see „Technical Application Information".
B Mix fruit, glucose syrup and sucrose and heat up to approx. 90°C.
C Add hot pectin solution and boil until final soluble solids content is reached.
D Add citric acid solution to adjust the pH-value.
E Filling temperature 80°C.

Recipe fruit spread with Pectin Classic AF 711 for organic Products with 50 - 60% Soluble Solids Content

Pectin Classic AF 711 can also be used for application in organic fruit spreads with 50-60% TSS. Within this soluble solids range Pectin Classic AF 711 prevents floating of the fruits, resulting in spreadable products with smooth and full-bodied texture.

Herbstreith & Fox KG — **Recipe**

Bio Fruit Jam

Pectin Classic AF 711

120g	Pectin solution 5% (= 0.6%)	
450g	Fruit	
500g	Organic sugar (organic raw cane sugar)	
x ml	Citric acid solution 50% to adjust the pH-value	
	Input:	approx. 1070g
	Output:	1000g
	TSS:	approx. 55%
	pH-value:	approx. 3.2

Manufacture

A Preparation of pectin solution see „Technical Application Information".
B Mix fruit and organic sugar and heat up to approx. 90°C.
C Add hot pectin solution and boil until final soluble solids content is reached.
D Add citric acid solution to adjust the pH-value.
E Filling temperature 80°C.

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Pectin Classic AF 712 for Products with approx. 40% Soluble Solids Content

Pectin Classic AF 712 is a low methyl ester pectin preventing floatation in products with a soluble solids content of approx. 40% TSS. Fruit spreads produced with this pectin are characterized by their spreadability, a full mouth-feel and low tendency to syneresis.

Herbstreith & Fox KG — Recipe

Fruit Spread

Pectin Classic AF 712

180g	Pectin solution 5% (= 0.6%)
450g	Fruit
355g	Sucrose
70g	Water
x ml	Citric acid solution 50% to adjust the pH-value

Input:	approx. 1055g
Output:	1000g
TSS:	approx. 40%
pH-value:	approx. 3.2

Manufacture

A Preparation of pectin solution see see „Technical Application Information".

B Mix fruit, glucose syrup and sucrose and heat up to approx. 90°C.

C Add hot pectin solution and boil until final soluble solids content is reached.

D Add citric acid solution to adjust the pH-value.

E Filling temperature 80°C.

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